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EDITORIAL

Health information and the experiences of health care

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Quantitative information is the “lingua franca” in health care. Health care professionals use numbers in implementing various tasks such as communicating with patients or with each other, making a diagnosis, prescribing treatments, monitoring the progress of therapy, prognosticating, reporting morbidities and mortalities, creating clinical practice guidelines, and evaluating interventions.

The way that most of research data are collected, analyzed, and reported in health care reinforces this. Doctors rely heavily on the brevity and efficiency of quantified health care information as a medium of communication and basis for decision-making when dealing with patients. When quantitative evidence is applied in clinical practice, there is great potential for important nuances to be lost in the process of framing clinical problems or dilemmas, seeking evidence, and then translating the evidence into clinical resolutions.

The point of health care is the promotion, maintenance, or restoration of well-being. This is very difficult to quantify. For instance, having pain with visual analogue scale pain score of 8/10 (severely painful) at home with the loved ones around can arguably be a better experience than having pain with a score of 5/10 (moderately painful) in a hospital ward. In the context of health care, numbers represent very complex experiences like pain, bleeding, inability to move, tendency to hurt oneself and others, loss of sensation, or inability to perform activities of daily living. Being unable to respond to any stimulus is scored as Glasgow Coma Scale 3/15. Having a seizure while at work is quantified as one morbidity. Loss of a loved one is counted as one mortality.

Unlike quantitative (numerical) information, which are mostly derived from surveys, existing records, clinical trials, or analytical studies, qualitative information are descriptive in nature.[1] Qualitative information can potentially represent and convey concepts or experiences that cannot be exhaustively articulated numerically.

In the patients’ hierarchy of needs, quantitative health outcomes are rarely on top. When patients seek health care, they don’t primarily intend for some numbers to change. Patients regard the outcomes of health care not so much for the quantitative information they carry as for the personal that the outcomes imply and for the overall experience of achieving those outcomes.

With the increasing availability of health information online, the gap between the amount of information the doctor has and the amount of information that the patient has gathered from the Internet becomes narrower. Open-access journals, websites with crowd-sourced health information, online patient group sites, and social media all support self-processing (or crowd-processing) of information that can eventually affect the experience of health care.

Because health care is primarily concerned with patients’ well-being, institutions or health care providers need to commit to patient-centered approaches in health care delivery. We need patient-centered information formats and communication approaches that directly address patients’ needs and desired outcomes.

The intention of evidence-based medicine (EBM) as an approach to health care is the integration of (usually quantitative) evidence, clinician’s judgment, and patients’ values and circumstances in decision-making in health care.[2] Yet many clinical departments and specialty societies (especially in the Philippines) limit the use of EBM to academic discussions that are hardly grounded on real clinical dilemmas. Most clinicians do use evidence–especially quantitative evidence–in making decisions. But when evidence is used in patient care, patients’ values–especially on hierarchy of desired outcomes–are rarely given any consideration in decision-making.

The concept and practice of narrative-based medicine[3] (NBM) has also been with us for some time now. It is a medical care approach that recognizes the important role of narratives in attaining relevant, patient-centered health care outcomes.[4] Narratives of both patients and clinicians can facilitate accurate diagnoses, help in healing patients, reinforce health education, and generate rich research data.[5] As a communication practice, it is the closest to the mundane and practical approach to exchanging information in health care with the view of attaining our desired patient outcomes, especially patients' well-being.[6] NBM requires good attending and communication skills, especially among clinicians and researchers. Yet, NBM has hardly caught on among practitioners. Only a few clinicians act on opportunities to enhance their practices with stronger doctor-patient relationships.

In practice, EBM heavily relies on mostly quantitative information in approaching clinical dilemmas. NBM was propagated to offer an alternative to the dependence of EBM on systematically generated evidence in coming up with decisions on patient care.[7] The advocacy of NBM highlights the need to address the complex nature of doctor-patient communication that requires more than the exchange of quantitative information. Information exchange is vital to health care delivery but, to be able to truly connect with patients, doctors need to use an information format that enables articulation of concepts, experiences, actions, and meanings that are beyond quantification.

In health care research, there is a need to generate more qualitative information, in order to restore in evidence what is lost in the process of translating outcomes to numbers. Health information should be able to connect directly with patients' values. We also need ways to efficiently and effectively communicate qualitative information so that they will serve to improve health care.

There has to be a practical middle ground in the use of quantitative and qualitative information in health care. Many information need to be in quantitative form for conciseness and accuracy. Those information that are in qualitative form convey depth and meaning to conversations in health care. The right combination of quantitative and qualitative information exchange can hopefully result in more empathetic and satisfying health care service delivery, and in outcomes that are more congruent to patients' expectations.

Quantitative information is useful. Numerical data are compact, and can be used efficiently to deliver messages and accomplish several other tasks in health care. But quantitative information may not be enough to articulate certain messages and connect with patients. For patients, health-seeking is an attempt to preserve or restore well-being, hence the doctor-patient interface usually requires more than an exchange of quantitative information. Communicating using qualitative information makes conversations more reflective of real-world scenarios. The use of an appropriate mix of quantitative and qualitative information can help stakeholders communicate about what really counts in health care.

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RESEARCH

Psychosocial needs and their determinants among patients with cancer

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ABSTRACT

Background. Psychosocial needs of patients vary according to the nature of their illnesses.
Objective. To measure and identify determinants of the psychosocial needs of patients with cancer.
Design. Cross-sectional study.
Setting. Cancer Center of Davao Regional Medical Center in Tagum City, Philippines.
Participants. 116 patients with cancer.
Main outcome measures. Mean scores of a modified psychosocial needs inventory questionnaire; cross-sectional odds ratios of having unmet needs for selected patient characteristics.
Main results. There were 34 (29.31%) male and 82 (70.69%) female patients with cancer who participated in this study. The mean age of the participants was 50.28 ± 10.28 years. The psychosocial domain with the highest needs importance rating was the information domain (4.44/5 ± 0.39; versus 4.39/5 ± 0.32 for support, 4.32/5 ± 0.35 for emotional, and 4.08/5 ± 0.28 for practical domains). Odds ratios of having unmet information needs were significantly high among patients ≥50 years old (OR=3.08; 95% CI 1.43 to 6.66; p=0.0042), without employment (OR=13.37; 95% CI 5.25 to 34.03; p<0.0001), in late-stage family life (OR=34.21; 95% CI 4.44 to 263.64; p=0.0007), and with stage IV cancer (OR=3.18; 95% CI 1.43 to 7.05; 0.0045).
Conclusion. In this study, the set of psychosocial needs in the information domain, which include access to information and management plans for the illness, was rated the most important. Being older, being unemployed, being in the late stages of the family life cycle, and having advanced stage cancer significantly increased the odds ratios of having unmet information needs.

Keywords. information needs, practical needs, emotional needs, spiritual needs, support needs

INTRODUCTION

The global burden of cancer is increasing. In 2012, a total of 14 million new cases and 8 million deaths of cancer were recorded. If the trend continues, it has been predicted that deaths from cancer worldwide would reach as high as 13.1 million in the year 2030.[1] In the Philippines, the third leading cause of morbidity and mortality is cancer.[2] In 2005, cancer ranked number 5 in mortality in Davao Region and number 3 in Davao City alone.[3]

Despite the current advancements in early detection and treatment of different cancer types, patients with cancer face many consequences including physical impairment, disability, and incapacity to perform daily activities. This places them at risk for developing psychosocial problems unique to patients living with cancer.[4]

Patients with cancer must cope with the stress induced by the physically demanding and sometimes life-threatening diagnostic and therapeutic approaches to the illness. This causes emotional and mental health problems, which can lead to a significant amount of psychosocial needs. The stress brought about by health care management of cancer is intensified by the existence of any pre-existing or underlying psychosocial stressors. These stressors are often closely linked, resulting from and contributing to each other.[5] [6] From the viewpoint of the patients and their caregivers, these psychosocial needs must be met lest we strive to prolong patient's lives without sufficiently addressing the quality of those lives.[5]

A study done in the United Kingdom was able to identify the psychosocial needs and significant unmet needs of patients with

IN ESSENCE

Psychosocial needs of patients with cancer should be explored and addressed.

In this study, patients with cancer rated information needs very highly in terms of importance. Patients who were older, without employment, or with advanced cancer had significantly high odds ratios of having unmet information needs.

Patients without employment or with low household income also had high odds ratios of having unmet support needs and/or emotional needs.

cancer and their carers.[5] The most important needs identified in the study included finding quality health care, acquiring information about the course of the disease and its management, gaining social support, and maintaining independence. Most of the unmet needs were within the practical, self-identity, and emotional domains. Patients who were younger, having long-standing illnesses or disabilities, socio-economically disadvantaged, not having a faith, having difficulty in talking freely to a carer about the cancer, having social activities disrupted by the cancer, and having financial difficulties were at greater risk for having unmet needs.[5] The prevalence and attributes of psychosocial needs can vary in different cultural contexts. The associations between patient characteristics and their psychosocial needs are also worth pursuing. A greater understanding of the issues in a particular cultural and social setting will help shape targeted services for clients in health care.

In this study, we wanted to determine the information, support, emotional, and practical needs of patients with cancer with the use of a structured psychosocial needs questionnaire. We also wanted to identify the sociodemographic and clinical determinants of unmet psychosocial needs among patients with cancer.

METHODS

Study design and setting

We conducted a cross-sectional study among patients with cancer admitted or seen at the outpatient department in Davao Regional Medical Center (DRMC) in Tagum City. DRMC is a 600 inpatient bed capacity tertiary hospital with an Outpatient Cancer Center that caters an average of 50 patients per day, mostly coming from different provinces in Mindanao.

Participants

Male and female patients who were at least 18 years old, admitted or seen at the outpatient department in DRMC, with established and disclosed diagnosis of cancer at any stage, and who gave written consent were eligible to participate in the study. We excluded patients who were unable to answer the questionnaires or too weak to participate in the study. We calculated the ideal sample size to compute for odds ratio (95% CI) of having an unmet psychosocial need (outcome) for selected exposures based on the assumptions that: (1) the ratio of unexposed to exposed is 1; (2) the outcome occurs in 50% of the participants in the unexposed group; (3) the outcome occurs in 75% of the participants in the exposed group; and (4) the odds ratio to be detected as significant is 3. In a computation of odds ratio carried out at a 95% confidence level, a sample size of 116 will have 80% power of rejecting the null hypothesis (no significant increase or significant decrease in the odds ratio of having the outcome) if the alternative holds. We were able to recruit a total of 116 eligible participants into the study.

Data collection

A psychosocial needs inventory (PNI) questionnaire was used to gather data. The questionnaire was based on the 48-item questionnaire from a previous study done in Lancaster University, United Kingdom.[5] The authors of the Lancaster study gave us permission to utilize, modify, and translate the original PNI questionnaire.

A panel, which consisted of three eligible patients with cancer, two resident physicians in Family and Community Medicine, and a fellow in Hospice and Palliative Medicine in Southern Philippines Medical Center reviewed and validated the contents of the questionnaire. We modified the questionnaire based on the comments and suggestions made by the panel. We translated the questionnaire to Cebuano and Tagalog versions. A licensed educator back-translated the non-English versions to English. We pilot tested the questionnaires among 10 patients not included in the main sample. Revisions on the translations were based on the patients' comments on the pilot test versions of the questionnaires. Final versions of the PNI questionnaire in English, Cebuano, and Tagalog were produced following iterations.

Each language version of the final study questionnaire was composed of three sections. The first section contained questions on the sociodemographic profile of the patient, including age, sex, educational attainment, employment status and family monthly income. Questions in the second section were about the patient's current illness, duration of illness, and treatments received. The last section was the PNI composed of 22 need items grouped into four psychosocial domains—namely, information needs (4 items), support needs (3 items), emotional needs (9 items) and

Table 1 Sociodemographic and clinical characteristics of participants

Characteristics	Values n=116
Mean age ± SD, years	50.28 ± 10.28
Sex distribution, frequency (%)	
Male	34 (29.31)
Female	82 (70.69)
Employment Status, frequency (%)	
Employed	43 (37.07)
Unemployed	73 (62.93)
Mean household income ± SD, PHP*	26284 ± 15777
Family life cycle stage, frequency (%)	
With young children	11 (9.48)
With adolescents	28 (24.14)
Launching	51 (43.97)
Later life	26 (22.41)
Mean duration of illness ± SD, months	19.10 ± 18.33
Cancer stage, frequency (%).	
Stage II	29 (25.00)
Stage III	42 (36.21)
Stage IV	45 (38.79)

*PHP = Philippine pesos.

practical needs (6 items). Items in the information domain refer to experiences or services that may be necesary for the individual to make decisions towards contributing to one's treatment. Those in the support domain are associated with experiences that can potentially strengthen the psycho-social resources of the individual. Items in the emotional domain pertain to affective aspects in the individual's experiences that can move life forward in a positive direction. Items in the practical domain are related to services that can help the individual think and work productively, and carry out the basic activities of daily living. In answering the last section of the questionnaire, the patient would first rate the importance of each need item on a scale of 1 to 5, with 1 being 'not at all important.' and 5 being 'very important.' Subsequently, the patient would rate his or her level of satisfaction in relation to each need item on a similar scale of 1 to 5, with 1 being 'not at all satisfied,' and 5 being 'very satisfied.' The importance rating of the needs in each psychosocial domain was determined by getting the average rating of the items within the domain. We considered a need item as unmet if the satisfaction rating was ≤3. We considered the entire domain as unmet when at least one need item in the domain was unmet.

After explaining the study to eligible patients and obtaining their informed consent, we provided them with the study questionnaire in the language version of their choice. We gave ample time for the patients to answer the questionnaires. While the participants were answering the questionnaires, we were readily available to address their queries.

Statistical analysis

We summarized continuous data, including the importance ratings of psychosocial needs, as means ± standard deviations. We summarized categorical data, including number of patients with unmet needs, as frequencies and percentages. We used Pearson's correlation to measure the degree of association between importance ratings and continuous data, and we used Spearman correlation to measure the association between importance ratings and ordinal data. We used logistic regression to determine the odds ratio (95% confidence interval) of having an unmet psychosocial domain need for the following pre-specified patient characteristics: being 50 years old or older, being male, having low household income (lower than 30,000 PHP, the median household income), being unemployed, being in late-stage family life (launching family or family in later life stage of the family life cycle), having stage IV cancer, and having cancer for less than 1 year (the median duration of illness). We considered two-sided p-values of <0.05 as statistically significant.

RESULTS

We were able to recruit a total of 116 patients with cancer into the study. The sociodemographic profile and clinical characteristics of the participants are shown in Table 1. The mean age of the participants was 50.28 ± 10.28 years. There were 34 (29.31%) males and 82 (70.69%) females. Most of the patients (73/116, 62.93%) were unemployed and 51 (43.97%) belong to a family in the launching stage. The mean monthly household income was 26,284 ± 15,777 PHP. The mean duration of the patient's illness was 19.10 ± 18.33 months. Most of the patients had either stage IV (38.79%) or stage III (36.21%) cancer.

Table 2 presents the results of the PNI

Table 2 Psychosocial needs inventory, with need items per domain arranged in terms of importance rating

Needs	Importance rating* Means ± SD n=116	Unmet needs† Frequency (%) n=116
Information		
Advice on what other services and help are available	4.56 ± 0.73	63 (54.31)
Opportunities to participate in choices around treatment	4.54 ± 0.62	20 (17.24)
Information about treatment plans, medications, and side effects	4.34 ± 0.54	14 (12.07)
Easy and quick access to health professionals who have time to discuss issues with me and honest information	4.32 ± 0.60	41 (35.34)
Domain summary‡	4.44 ± 0.39	63 (54.31)
Support		
Support from family	4.46 ± 0.53	28 (24.14)
Support from health care professionals	4.44 ± 0.64	26 (22.41)
Support from friends	4.27 ± 0.52	47 (40.52)
Domain summary‡	4.39 ± 0.32	49 (42.24)†
Emotional		
Spiritual support	4.78 ± 0.50	67 (57.76)
Help with anger	4.47 ± 0.65	67 (57.76)
Help with my fears	4.47 ± 0.62	70 (60.34)
Help with finding a sense of purpose and meaning	4.40 ± 0.62	24 (20.69)
Support in dealing with changes in my body of the way I look and in the sense of who I am	4.38 ± 0.67	24 (20.69)
Help in maintaining a sense of control in my life	4.35 ± 0.58	23 (19.83)
Hope for the future outcomes	4.35 ± 0.55	58 (50.00)
Help in considering my sexual needs	3.34 ± 1.05	69 (59.48)
Opportunities for meeting others who are in similar situation	4.34 ± 0.68	24 (20.69)
Domain summary‡	4.32 ± 0.35	103 (88.79)†
Practical		
Help with transport	4.40 ± 0.59	37 (31.90)
Help with housework and daily activities	4.31 ± 0.65	42 (36.21)
Advice about food and diet	4.18 ± 0.60	19 (16.38)
Help with financial matters	4.17 ± 0.61	79 (68.10)
Help with any distressing symptoms	4.12 ± 0.53	45 (38.79)
Help with child care	3.28 ± 0.87	33 (28.45)
Domain summary‡	4.08 ± 0.28	107 (92.24)†

*Rating given to the item was “not at all important,” “not very important,” “neither important nor unimportant,” “important,” or “very important”.
†Unmet if item was rated “not at all satisfied,” “not very satisfied,” or “neither satisfied nor unsatisfied.”
‡The entire need domain is considered unmet if at least one item within the domain was rated “not at all satisfied,” “not very satisfied,” or “neither satisfied nor unsatisfied.”

among the participants, and Box 1 summarizes the top five psychosocial needs ranked in terms of importance and top five unmet needs ranked in terms of frequency. Needs in the information among all the psychosocial need domains, the information domain had the highest importance rating (mean needs rating=4.44/5 ± 0.39), followed by the support domain (4.39/5 ± 0.32), the emotional domain (4.32/5 ± 0.35), and the practical domain (4.08/5 ± 0.28). While the overall importance ratings of need items in all domains were relatively high, ratings of ‘help in considering my sexual needs’ (emotional domain) and ‘help with child care’ (practical domain) were lower compared with those of the other need items, with mean scores of 3.34/5 ± 1.05 and 3.28/5 ± 0.87, respectively. Needs in the practical domain had the highest frequency of being unmet (107/116, 92.24%), followed by those in the emotional domain (103/116, 88.79%), information domain (63/116, 54.31%) and support domain (49/116, 42.24%).

Correlations between characteristics of patients and the mean importance ratings of the needs within the psychosocial domains are shown in Table 3. Age and duration of illness were inversely proportional to the mean importance ratings of information needs (r=-0.364, p<0.001 and r=-0.25, p=0.006, respectively) and emotional needs (r=-0.702, p<0.001 and r=-0.339, p<0.001, respectively). Household income (r=0.233, p=0.0118) was directly proportional, while stage of family life cycle (r=-0.463, p<0.001) and stage of the cancer (r=-0.289, p=0.002) were inversely correlated with mean importance ratings of emotional needs.

Table 4 shows the comparison of mean importance ratings of the needs per psychosocial domain between males and females, and between employed and unemployed patients. Employed patients gave higher importance rating to the needs in the emotional domain compared to unemployed patients (4.45 ± 0.25 versus 4.24 ± 0.38, p=0.0017). Importance ratings in the rest of the needs per domain did not significantly differ between males and females, and between employed and unemployed patients.

The univariate cross-sectional odds ratios of having unmet needs per domain for selected sociodemographic characteristics are presented in Table 5. Odds ratios of having unmet information needs were significantly high among patients ≥50 years old (OR=3.08; 95% CI 1.43 to 6.66; p=0.0042), without employment (OR=13.37; 95% CI 5.25 to 34.03; p<0.0001), in late-stage family life (OR=34.21; 95% CI 4.44 to 263.64;

Box 1 **Top 5 psychosocial needs ranked in terms of importance rating and top 5 unmet needs ranked in terms of frequency**

Important needs

1. Spiritual support
2. Advice on what other services and help are available
3. Opportunities to participate in choices around treatment
4. Help with anger
5. Help with my fears

Unmet needs

1. Help with financial matters
2. Help with my fears
3. Help in considering my sexual needs
4. Spiritual support
5. Help with anger

p=0.0007), and with stage IV cancer (OR=3.18; 95% CI 1.43 to 7.05; p=0.0045). Similarly, the odds ratios of having unmet support needs were significantly high among patients ≥50 years (OR=2.39; 95% CI 1.12 to 5.08; p=0.0237), with low household income (OR=3.23; 95% CI 1.50 to 6.96; p=0.0028), who were unemployed (OR=2.25; 95% CI 1.01 to 4.98; p=0.0465), and in late-stage family life cycle (OR=3.42; 95% CI 1.37 to 8.56; p=0.0085). Finally, the odds ratio of having unmet emotional needs was significantly high among patients with low household income (OR=5.19; 95% CI 1.10 to 24.55; p=0.0379).

DISCUSSION

Key results

In this study, we found out that psychosocial needs in the information domain are the most important needs for patients with cancer. Odds ratios of having unmet information needs were significantly high among patients who were older, unemployed, in late-stage family life, and with stage IV cancer. Odds ratios of having unmet support needs were also significantly high among those with low household income, unemployed and in late-stage family life. Odds ratios of having unmet emotional needs was significantly high among patients with lower household income.

Table 3 **Correlations between sociodemographic characteristics and the importance of the need domains**

Characteristics	Correlation coefficient (p-value)			
	Information needs	Support needs	Emotional needs	Practical needs
Age*	-0.364 (<0.001)†	0.005 (0.9565)	-0.702 (<0.001)†	0.011 (0.9087)
Income*	0.172 (0.0642)	0.155 (0.0975)	0.233 (0.0118)†	-0.018 (0.8474)
Stage of FLC‡	-0.085 (0.3657)	0.028 (0.7630)	-0.463 (<0.001)†	-0.093 (0.3233)
Stage of Cancer‡	-0.099 (0.2909)	-0.006 (0.9465)	-0.289 (0.002)†	-0.042 (0.6508)
Duration of Illness*	-0.25 (0.006)†	0.026 (0.7808)	-0.339 (<0.001)†	-0.042 (0.6551)

*Using Pearson r.
†Statistically significant
‡Using spearman rho

Strengths and limitations

Through this study, we are able to glean patients' perceptions of the importance of the psychosocial aspects of their lives in relation to their illness, as well as data on whether the needs attached to those psychosocial aspects have been addressed. We were also able to determine some demographic and clinical characteristics that can reasonably alert clinicians about the likelihood of certain needs to be unmet. This is different from mainstream psycho-oncology studies, which focus more on the psychological morbidities as a consequence of cancer.[5] Furthermore, this study took a more comprehensive approach to psychosocial needs and their determinants, compared to previous studies, which only dealt with particular dimensions of needs in certain tumor-specific populations.[7-9]

A limitation to this study is that it was more quantitative than qualitative. We adapted a tool with fixed questions, and although the process of modifying it was qualitative in nature, the final questionnaire that we administered to the study participants was quantitative. Quantitative studies may fall short in capturing the nuances of psychosocial needs, especially when cultural contexts of the needs will have to be accounted for. Because the questionnaire we used had fixed questions, our results are likely to miss unquantifiable needs or attributes of those needs.

Interpretation

Overall, the needs in the information domain were rated to be the most important psychosocial needs, followed by those in the support, emotional and practical domains. This is similar to the results of the Lancaster study where information and support domains had higher mean scores compared to emotional/spiritual and practical categories.[5] The factors for gaining information services are complex. Patients' preferences for information have been attributed to their

Table 4 Mean importance ratings of needs per psychosocial domain, according to sex and employment status

	Information needs		Support needs		Emotional needs		Practical needs	
Characteristics	**Mean ± SD**	**p-value**	**Mean ± SD**	**p-value**	**Mean ± SD**	**p-value**	**Mean ± SD**	**p-value**
Sex								
Male	4.40 ± 0.38	0.5298	4.46 ± 0.26	0.1111	4.29 ± 0.29	0.5209	4.14 ± 0.27	0.1024
Female	4.45 ± 0.39		4.36 ± 0.33		4.33 ± 0.37		4.05 ± 0.28	
Employment Status								
Employed	4.48 ± 0.34	0.4304	4.34 ± 0.35	0.2231	4.45 ± 0.25	0.0017*	4.02 ± 0.29	0.1190
Unemployed	4.42 ± 0.41		4.42 ± 30		4.24 ± 0.38		4.11 ± 0.27	

*Statistically significant

coping strategies or attitudes towards managing their own illnesses.[10] In a previous study, three attitudes that limited a patient's desire for more information have been identified: faith in their doctor's medical expertise, hope for a normal life, and charity to fellow patients.[10] In our study, age and duration of illness had significant inverse relationships with the importance of information needs. Older patients may have been used to a doctor-centered practice, wherein information is gained solely from the physician, whereas younger patients today find greater use of alternative independent information services (i.e., the Internet).

Among the individual items explored in our PNI, the most important rated need was 'spiritual support,' which was different from the study done in Lancaster where 'confidence in the health professional I meet' was the most important. Nonetheless, our finding was consistent with that of a previous study done in Philippine General Hospital, which reported spiritual support as the most pressing need of terminally-ill geriatric patients with cancer.[9] The need for spiritual support is attributed to the Filipinos' deep sense of religiousness and belief that a supreme power can alleviate their suffering. Child care was ranked the least important psychosocial need. This was because most of the patients in this study belong to families in the launching and later life family cycle stage.

The domain with the highest frequency of unmet needs was the practical domain. The item in the practical domain with the highest frequency of unmet need was 'help with financial needs.' This was expected as most of the patients in this study were unemployed and had relatively lower household income. In the Philippines, where medical expenses for accessing health care for late-stage cancer are usually from out-of-pocket spending, many patients with cancer experience financial stress. In one report,

Table 5 Univariate cross-sectional odds ratios of having unmet needs per domain for selected sociodemographic characteristics

	Information needs		Support needs		Emotional needs		Practical needs	
Characteristics	**Odds ratio (95% CI)**	**p-value**	**Odds ratio (95% CI)**	**p-value**	**Odds ratio (95% CI)**	**p-value**	**Odds ratio (95% CI)**	**p-value**
Age 50 or older	3.08 (1.43 to 6.66)	0.0042*	2.39 (1.12 to 5.08)	0.0237*	0.66 (0.21 to 2.12)	0.4898	1.69 (0.40 to 7.11)	0.4743
Male sex	2.20 (0.95 to 5.08)	0.0662	1.32 (0.59 to 2.95)	0.4993	5.66 (0.71 to 45.35)	0.1027	1.49 (0.29 to 7.58)	0.6286
Low income†	‡	0.9492	3.23 (1.50 to 6.96)	0.0028*	5.19 (1.10 to 24.55)	0.0379*	‡	0.9652
Unemployed	13.37 (5.25 to 34.03)	<0.0001*	2.25 (1.01 to 4.98)	0.0465*	0.47 (0.12 to 1.82)	0.2763	0.46 (0.09 to 2.32)	0.3471
Late-stage family§	34.21 (4.44 to 263.64)	0.0007*	3.42 (1.37 to 8.56)	0.0085*	‡	0.9714	‡	0.9632
Stage IV cancer	3.18 (1.43 to 7.05)	0.0045*	1.81 (0.85 to 3.86)	0.1252	‡	0.9616	‡	0.9679
Less than 1 year illness||	0.86 (0.41 to 1.80)	0.6859	1.49 (0.70 to 3.14)	0.2994	0.57 (0.18 to 1.81)	0.3372	0.87 (0.22 to 3.44)	0.8460

*Statistically significant.
†Lower than 30,000 PHP, the median household income.
‡Undefined odds ratio.
§Launching family or family in later life stage of the family life cycle.
||Less than 12 months, the median duration illness.

56% of patients with cancer suffered financial catastrophe within a year after diagnosis.[11] Health expenditure for cancer has been reported to be higher than the annual family income, and patients would ask financial assistance from family and/or friends, use savings, loan money, sell assets, and seek financial assistance from charitable institutions.[11]

The domain with the least frequency of unmet psychosocial needs was the support domain. This can be attributed to the fact that Filipinos are known to have closely knit families and communities that are usually ready to help the patient in difficult times. The lowest unmet need item was 'information about treatment plans, medications, and side effects.' The high satisfaction rate for information need was expected since all patients included in this study have sought the services of a tertiary hospital with cancer care.

In this study, the importance of information and emotional need domains were found to be significantly correlated with certain sociodemographic characteris-tics. Importance of the information needs is inversely correlated with age and the duration of illness. This could mean that younger patients and those recently diagnosed with cancer are more hopeful towards the outcome of cancer[10] and more proactive in the decision-making process about treatment approaches. This could also mean that, among older patients, the task of acquiring information about the illness, the financial burden, and the decision-making in relation to the illness are delegated to younger family members.

The importance of emotional needs domain was inversely correlated with age, family life cycle stage, cancer stage and duration of illness. On the other hand, income was directly correlated with the emotional needs domain. The affective aspects in the individual's experiences that can move life forward in a positive direction may be more important among younger patients, patients with families in earlier family life cycle, and among patients in the early stage of the disease.

Patients older than 50 years old and patients in the late stages of family life had significantly increased odds of having unmet information needs. Another study reported about lower expectations from health services among older persons,[12] but our findings may reflect the need to address unmet information needs among older persons despite apparent delegation of acquisition of information to younger family members. Patients in this subgroup was also found to have a significantly high odds of having unmet support needs. The support domain had the least frequency of unmet psychosocial need, however, our findings suggest that older patients may still lack support from immediate family members especially if these members have families of their own.

Patients with lower household income and who were unemployed also having unmet support and had increased odds of emotional needs. Psychosocial needs may vary across different socioeconomic groups.[5] In fact, affluence has been previously reported to affect the importance of psychosocial needs.[5] [13] [14] More well-off patients have greater demands and expectations from the services of health care providers, information sources, and informal social support groups.[13] [14] In contrast, patients with lower household income and those who are unemployed would have difficulty in acquiring these needs because more practical and financial issues are usually addressed first.[5] Additionally, patients who are unemployed also had higher odds of having unmet information needs. For this subgroup of patients, access to health care and information may be difficult, as previously discussed.

Patients with stage IV cancer had increased odds of having unmet information needs. In a previous study, most physicians would prefer to disclose information about the illness first to the relatives of terminally-ill patients because they feel that patients do not want disclosure. It is the patient's relatives who would then decide whether to tell the patient about a prognosis of terminal cancer.[15] Our findings, however, were more congruent with another study, which reported that patients wanted to be informed of their illness and wanted to be included in decision-making around the management of their illness.[16] Other studies also reported that the level of need increases as health status declines.[5] [17]

Generalizability

Our findings in this study can be improved by conducting further studies that utilize qualitative methods to explore the contexts of the findings and provide deeper understanding on the interrelatedness of patients' characteristics and their psychosocial needs.

Although this study was done among patients with cancer, the psychosocial needs identified in this study may also be present in patients with other chronic debilitating illnesses, the same sociodemographic characteristics, similar cultural backgrounds, and similar experiences with health care. In general, it is important that these unmet psychosocial needs and their determinants be addressed as they may also affect the patients' quality of life and their ability to deal with the consequences of their illnesses.

In light of our findings on the interrelationships of certain patient characteristics and unmet psychosocial needs, we recommend: 1. emphasizing the communication of information about the nature of illness and options on treatment and other services among older patients, those with advanced cancer, those who are unemployed, and those who belong to families in late-stage family life; 2. involving all patients in decision-making with regards to their health care; and 3. screening for unmet support and emotional needs with the use of family tools [i.e., Family APGAR (Adaptation, Partnership, Growth, Affection, and Resolve),[18] SCREEM (Social, Cultural, Religious, Economic, Educational, and Medical),[19] family mapping,[19] and FICA (Faith and belief, Importance, Community, and Address in care)[20]] especially among older patients, those in late-stage family life cycle, those who are unemployed, and those with low household income.

CONCLUSION

Patients with cancer consider information needs to be of highest importance among the psychosocial needs related to the experience of cancer. Having Stage IV cancer significantly increased the odds ratio of having unmet information needs. Being 50 years or older, unemployed and belonging to a family in late-stage family life significantly increased the odds ratio of having unmet information needs and support needs. Having a low household income significantly increased the odds ratio of having unmet support needs and emotional needs.

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This study was reviewed and approved by the Department of Health XI Cluster Ethics Review Committee (DOHXI CERC reference P14040101)

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RESEARCH

Clinical profile of and factors associated with remission among patients with well-differentiated thyroid cancer undergoing radioactive iodine therapy in Southern Philippines

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ABSTRACT

Background. Thyroid cancer among Filipinos is known to be more aggressive, with higher recurrence rates. Many Filipinos with thyroid cancer receive radioactive iodine (RAI) as part of adjuvant therapy.

Objective. To describe the clinical profile of and determine the factors associated with remission among patients with well-differentiated thyroid cancer who undergo RAI.

Design. Retrospective cohort study.

Setting. Nuclear Medicine Department, Davao Doctors Hospital, Davao City, Philippines.

Participants. 265 patients with thyroid cancer who underwent RAI therapy.

Main outcome measures. Remission frequency, odds ratio (95% CI) of non-remission for selected factors.

Main results. There were 205/264 (77.65%) females and 59/264 (22.35%) males in this study, with an overall mean age of 46.06 ±14.04 years. Most of the cancer lesions (241/265, 90.94%) had papillary histopathology. Majority of the patients (191/257, 74.32%) had early-stage cancer, while a third of them (89/264, 33.71%) had metastasis. Remission frequency within one year after initial RAI therapy was 155/265 (58.49%). Having an early-stage cancer significantlly increased (OR=3.87, 95% CI 2.02 to 7.41), while having any metastasis significantly decreased the (OR=0.22, 95% CI 0.12 to 0.41) the odds ratio of remission.

Conclusion. In this study, patients with thyroid cancer were mostly middle-aged women who had early-stage cancer with papillary histopathology. A little more than half of the patients had remission within one year post-RAI therapy. Early-stage cancer increased, while metastasis decreased, the odds ratio of remission.

Keywords. thyroid neoplasm, nuclear medicine, papillary carcinoma, follicular carcinoma

INTRODUCTION

Differentiated thyroid cancer (DTC) is the most common cancer arising from the thyroid follicular epithelial cells.[1] DTC has two major subtypes—papillary thyroid cancer (PTC), which comprises 80% of thyroid malignancies, and follicular thyroid cancer (FTC), which makes up 10 to 20% of thyroid malignancies.[2] PTC and FTC have similar prognoses.[3-6] Although these types of cancer are usually indolent and confer good prognoses,[7] there have been reports suggesting that they may be highly recurrent and can lead to poor outcomes.[8] Known independent factors of poor prognosis are old age (≥45 years old), male sex, tumor size (≥4 cm), histologic grades and types (tall cell, hobnail, certain and columnar cell variants), local invasion, multicentricity, presence of metastatic disease, certain genetic mutations (ETE, BRAF), and incomplete resection of the tumor.[9-12]

Several studies have demonstrated race or ethnicity as a risk factor for thyroid cancer.[13] [14] Filipinos in particular have been identified to have higher risk and recurrence rates for thyroid cancer compared to other races or ethnicities in the Unites States.[15-18] One study done in the Philippines, showed that Filipino patients with thyroid cancer had lower mean age, larger mean tumor size on presentation, and higher rate of recurrence, compared to

IN ESSENCE

Thyroid cancer among Filipinos has been reported to be aggressive and associated with high recurrence rates.

Patients with thyroid cancer in this study were mostly females and middle-aged. They initially presented with early-stage cancer, with mostly papillary carcinoma histopathology. One-third of the patients had metastatic cancer, and more than half of them had remission within one year after radioactive iodine therapy.

Early-stage cancer and non-metastatic cancer are significantly associated with remission.

other Asian patients.[19]

Many possible theories have been proposed to explain the relatively high incidence of thyroid cancer among Filipinos. A high iodine diet from fish and seafoods, low consumption of carotenoids and isoflavones, and exposure to volcanic lava are several environmental exposures that have been previously observed to increase incidence of thyroid cancer.[18] The association of genes such as MAPK, BRAF, RAS, and RET with the pathogenesis of thyroid malignancy has also been established. BRAF gene mutation has been found to be prevalent among Filipinos, and the mutation has been associated with the more aggressive tumor behavior, higher rates of recurrence and treatment failure, and worse outcomes in this population.[20]

In the American Thyroid Association (ATA) guidelines, the basic goals of therapy for DTC include improvement of patient survival, reduction of risk of recurrent or persistent disease and related morbidities, and accurate staging and risk stratification of the disease.[1]

While complete removal of the thyroid tumor by adequate surgery is the recommended initial therapy and an important determinant of outcome, postoperative radioactive iodine (RAI) therapy may be necessary for remnant ablation in order to allow for initial staging. Remnant ablation also facilitates post-surgery monitoring for disease recurrence by either thyroglobulin (Tg) measurements or whole-body RAI scans. RAI therapy may also be done with the goal of improving disease-free survival, especially among patients at high risk for recurrence or persistence.[1] This is usually done 4 to 12 weeks after initial surgery.[21]

The American College of Radiology (ACR) recommends the use of postoperative RAI adjuvant therapy among patients >45 years old, or among those with tumors >1-1.5 cm, lymph node metastasis, or distant metastasis. Other indications for post-operative RAI therapy include capsular, vascular or soft tissue invasion of the tumor, multifocal disease, residual disease, recurrent disease, and intermediate- or high-risk disease.[21] Based on the guidelines set by the ATA, an initial risk stratification system is recommended for DTC in order to predict the risk for recurrence and persistence of thyroid cancer.[1] The 2009 ATA risk stratification system is a 3-tier system that classifies patients as low-, intermediate- or high-risk for recurrence based on clinico-pathological features. Patients with intrathyroidal DTC with no metastasis, extra-thyroidal extension, or vascular invasion are classified as having low-risk disease. Patients with microscopic extrathyroidal extension, tumor spread to the cervical lymph nodes, RAI-avid disease outside the thyroid but within the neck, vascular invasion of the tumor, or tumor with aggressive histology are classified as having intermediate-risk disease. Finally, those patients with incomplete tumor resection, inappropriate postoperative serum Tg levels, gross extrathyroidal extension, or distant tumor metastasis are classified as having high-risk disease.[1]

Robust evidence for RAI effectiveness is only available for intermediate- and high-risk patients, [1 22-24] and there have been conflicting evidence on the role of RAI in improving recurrence and disease-specific mortality among low-risk DTC.[24-29] In light of previous studies about the unique patient profile and aggressiveness of thyroid cancers among Filipinos, it has been a local practice to refer all patients with the disease to radiation oncologists for possible RAI remnant ablation postoperatively.

No local studies have been done in order to establish the significance of RAI therapy among Filipino patients with thyroid cancer, hence the lack of local guidelines regarding RAI therapy.

We did this present study to describe the clinical profile of postoperative patients with well-differentiated thyroid cancer who underwent RAI therapy and to determine the factors associated with remission.

METHODS

Study design, setting and participants

We conducted a retrospective cohort study based on a review of medical records of Filipino patients with well-differentiated thyroid cancer who underwent RAI therapy at the Davao Doctors Hospital's Nuclear Medicine Department (DDH-NMD) in Davao City, Philippines between the years 2012 and 2014. DDH-NMD caters to most patients needing RAI in Southern Philippines because it is the first and, at the time of this study, the only institution that offers such services in Mindanao. Every month, DDH-NMD admi-nisters RAI therapy to 20-30 patients, mostly with thyroid cancer. The records of 265 patients were eligible for inclusion in this study.

Data collection

From the records, we collected socio-demographic and clinical data including age, sex, height, weight, body mass index (BMI), presence of hypertension and diabetes, tumor histopathologic findings, clinical stage, presence and site of metastasis (including nodal involvement and/or distant metastasis), and first RAI dose given. We also operationally defined 'high dose RAI' as ≥100 millicuries (mCi) of RAI.

The clinical staging reflected in the records followed the tumor-node-metastasis (TNM) system proposed by the American Joint Commission on Cancer and Union for International Cancer Control (AJCC/UICC).[1] For the purposes of this study, we defined 'early stage cancer' as TNM stage I among patients less than 45 years old, and TNM stages I and II among patients 45 years old and above. 'Late stage cancer' refers to TNM stage II among patients less than 45 years old, and TNM stages III and IV among patients 45 years old and above.

In order to determine disease remission, we looked at post-RAI treatment whole body scan or neck ultrasonography for tumor spread, unstimulated/stimulated Tg and anti-Tg results 3-10 days after treatment and on the 6th and 12th months of follow up. We defined disease 'remission' as 'excellent response' according to the 2015 ATA guidelines, wherein no clinical, biochemical (i.e., stimulated serum Tg ≥1 ng/ml, TSH-suppressed Tg > 0.2ng/ml, elevated or rising anti-Tg titer), or imaging (RAI whole-body scan and/or neck ultrasound) evidence of disease after total and near-total thyroidectomy and RAI ablation can be found.[1] Patients who did not achieve 'excellent response' within one year post-RAI were classified as having 'non-remission.' We determined the overall frequency of remission as well as other frequencies of the outcome among several subgroups of patients—those with early-stage cancer, late-stage cancer, nodal involvement, and distant metastasis, and those without metastasis.

Statistical analysis

For statistical analysis, we used Epi Info 7.1.4.0 and SOFA stats 1.4.4. Sociodemographic and clinical data were summarized using means ± SD and frequencies (%). Means were compared using t-test, while frequencies were compared using chi-square test or Fisher exact test (for frequencies of less than 5). We performed logistic regression analysis to determine the univariate odds ratios (95% CI) of remission for selected patient characteristics. To achieve binary classifications for logistic regression analysis, we dichotomized patient characteristics as follows: age—<45 years versus ≥45 years; sex—males versus females; BMI—≥ 23 (overweight/obese) versus < 23 (normal, underweight); diabetes—present versus absent; hypertension—present versus absent; papillary carcinoma histopathology—yes versus no; follicular carcinoma histopathology—yes versus no; and metastasis—present versus absent. We analyzed patient characteristics that had significant univariate associations with remission using a multivariate regression model in order to come up with adjusted odds ratios (95% CI) of remission. Because patients <45 years old are staged differently from patients ≥45 years old, we also computed a separate OR (95% CI) of remission for each age category. For all statistical analyses, a two-tailed p-value of <0.05 was considered significant.

RESULTS

Data of 265 Filipino patients with thyroid cancer were included in the analysis. Table 1 shows the demographic and clinical characteristics of the patients. The mean age of the patients was 46.06 ± 14.04 years (median = 45 years). There were 59 (22.35%) males and 205 (77.65%) females, with a mean BMI of 25.54 ± 3.83. There were 35 (14.89%) patients with diabetes and 71 (30.47%) patients with hypertension. Most of the patients (241/265, 90.94%) had papillary carcinoma based on histopathologic findings.

Most of the patients who were <45 years old had stage I cancer (122/128, 95.3%). On the other hand, most of the patients who were ≥45 years old, either had stage I cancer (56/129, 43.41%) or stage IV cancer (41/129, 31.78%). The mean RAI dose that the patients received was 102.30 ± 14.19 mCi. Overall, 89 (33.71%) patients had nodal and/or distant metastasis.

Overall, 155 (58.49%) patients had remission within one year post-RAI treatment. Patients with early-stage cancer had a higher frequency of remission (130/191, 68.06%) compared to those with late-stage cancer (18/66, 27.27%). When stratified according to the presence of nodal

Table 1 Sociodemographic and clinical profile

Characteristics	n*	Values
Mean age ± SD, *years*	267	46.06 ± 14.04
Sex, *frequency (%)*	264	
Male		59 (22.35)
Female		205 (77.65)
Mean BMI ± SD	185	25.54 ± 3.83
Diabetes, *frequency (%)*	235	35 (14.89)
Hypertension, *frequency (%)*	233	71 (30.47)
Histopathology, *frequency (%)*	265	
Papillary carcinoma		241 (90.94)
Follicular carcinoma		24 (9.06)
TNM stage, *frequency (%)*		
Age < 45	128	
I		122 (95.3)
II		6 (4.69)
Age ≥ 45	129	
I		56 (43.41)
II		13 (10.08)
III		19 (14.73)
IV		41 (31.78)
Presence of nodal involvement, *frequency (%)*	264	70 (26.52)
Presence of distant metastasis, *frequency (%)*	264	19 (7.20)
Mean RAI dose ± SD, *mCi*	261	102.30 ± 14.19
Remission, *frequency (%)*	265	155 (58.49)
Stratified by TNM stage†		
Early-stage cancer	191	130 (68.06)
Late-stage cancer	66	18 (27.27)
Stratified by presence of nodal involvement and distant metastasis		
No nodal involvement, no distant metastasis	175	128 (73.14)
With nodal involvement only	70	26 (37.14)
With distant metastasis with or without nodal involvement	19	0

*Value of n varies because of missing data.
†"Early-stage cancer" includes TNM stage I cancer for patients <45 years old and TNM stages I and II cancer for patients ≥45 years old. 'Late-stage cancer' includes TNM stage II cancer for patients <45 years old and TNM stages III and IV cancer for patients ≥45 years old.

involvement and distant metastasis, 26/70 patients (37.14%) with nodal metastasis had remission, while 128/175 (73.14%) of patients with neither nodal involvement nor distant metastasis had remission. Among patients with distant metastasis, none had remission.

We compared the sociodemographic and clinical profiles of patients who had remission with those of patients who did not achieve remission (Table 2). The mean age, sex distribution, mean BMI, frequency of comorbidities and distribution of histopathologic types were all comparable between the two groups.

The distributions of TNM staging were significantly different between the two comparison groups. For patients <45 years old, all patients with remission had stage I cancer, and those who had non-remission also predominantly had stage I cancer (44/50, 88%). For this age bracket, the frequency of remission was 78/122 (63.93%) among patients with stage I (early-stage) cancer and (0/6) among those with stage II (late-stage) cancer. On the other hand, among patients ≥45 years old, patients who had remission predominantly had stage I cancer (44/70, 62.86%), while patients who did not achieve remission mostly had stage IV cancer (32/59, 54.24%). For this subgroup of patients, the frequency of remission was 52/69 (75.36%) among patients with stage I or stage II (early-stage) cancer and 18/60 (30%) among patients with stage III or stage IV (late-stage) cancer.

Metastasis was seen significantly more frequently in patients with non-remission (63/110, 57.27%) than among those who had remission (26/154, 16.88%) (p<0.0001). Patients with non-remission received a higher mean RAI dose (105.73 ± 16.19 mCi) compared to those with remission (99.84 ± 12.04 mCi) (p=0.0008), but the absolute difference between the two mean doses was only 5.89 mCi.

The univariate odds ratios (95%CI) of remission for sociodemographic and clinical characteristics are presented in Table 3. Among all patients, the presence of metastasis significantly decreased the odds ratio of remission (OR=0.15; 95% CI 0.09 to 0.27), while having early-stage cancer significantly increased the odds ratio of remission (OR=6.10; 95% CI 3.34 to 11.14).

The multivariate logistic odds ratio (95% CI) of remission for early-stage cancer and presence of metastasis are presented in Table 4. Patients diagnosed with early-stage cancer had increased odds ratio of remission (adjusted OR=3.87; 95% CI 2.02 to 7.41; p=0.001), and patients with metastasis had decreased odds ratio of having the outcome (adjusted OR=0.22; 95% CI 0.12 to 0.41; p=0.001).

Table 2 Comparison of sociodemographic and clinical profiles according to clinical outcomes after RAI

	Non-remission n = 110		Remission n = 155		
Characteristics	**n**	**Values**	**n**	**Values**	**p-value**
Mean age ± SD, *years*	110	47.11 ± 13.79	154	45.31 ± 14.20	0.3059
Sex, *frequency (%)*	110		154		0.4689
Male		27 (24.55 %)		32 (20.78 %)	
Female		83 (75.45 %)		122 (79.22 %)	
Mean BMI ± SD	74	26.17 ± 4.21	111	25.12 ± 3.51	0.0674
Diabetes, *frequency (%)*	99	13 (13.13 %)	136	22 (16.18 %)	0.5174
Hypertension, *frequency (%)*	98	32 (32.65 %)	135	39 (28.89 %)	0.5377
Histopathology, *frequency (%)*	110		155		0.6759
Papillary carcinoma		101 (91.82 %)		140 (90.32 %)	
Follicular carcinoma		9 (8.18 %)		15 (9.68 %)	
TNM stage, *frequency (%)*					
<45 years old	50		78		0.0029†‡
I		44 (88%)		78 (100%)	
II		6 (12 %)		0	
≥45 years old	59		70		<0.0001‡
I		12 (20.34 %)		44 (62.86 %)	
II		5 (8.47 %)		8 (11.43 %)	
III		10 (16.95 %)		9 (12.86 %)	
IV		32 (54.24 %)		9 (12.86 %)	
Presence of metastasis, *frequency (%)*	110	63 (57.27 %)	154	26 (16.88 %)	<0.0001‡
Mean RAI dose ± SD, *mCi*	109	105.73 ± 16.19	152	99.84 ± 12.04	0.0008‡

*Using chi-square for categorical data and t-test for continuous data, except when indicated otherwise.
†Using Fisher's exact test.
‡Statistically significant.

Table 3 Univariate odds ratios (95% CI) of remission for selected factors

Factors	Odds ratio (95% CI)	p-value
Age ≥45 years*	0.83 (0.51 to 1.35)	0.4540
Male sex	0.81 (0.45 to 1.44)	0.4694
Overweight/ obese (BMI ≥23)	0.93 (0.86 to 1.01)	0.0694
Hypertension	1.13 (0.65 to 1.97)	0.6576
Diabetes	0.78 (0.37 to 1.64)	0.5180
Papillary Ca	0.83 (0.35 to 1.98)	0.6763
Follicular Ca	1.20 (0.50 to 2.86)	0.6763
High RAI dose†	0.49 (0.15 to 1.58)	0.2310
Early-stage cancer (all ages)‡	6.10 (3.34 to 11.14)	<0.0001§
<45 years old subgroup (n=128)	||	||
≥45 years old subgroup (n=127)	7.14 (3.28 to 15.53)	<0.0001§
Presence of metastasis	0.15 (0.09 to 0.27)	<0.0001§
≥45 years old subgroup (n=127)	0.11 (0.05 to 0.25)	<0.0001§

*Median age.
†≥100 mCi radioactive iodine.
‡"Early-stage cancer" includes TNM stage I cancer for patients <45 years old and TNM stages I and II cancer for patients ≥45 years old.
§Statistically significant.
||Undefined.

Table 4 Multivariate odds ratios (95% CI) of remission for selected factors

Factors	Adjusted odds ratio (95% CI)	p-value
Early-stages cancer*	3.87 (2.02 to 7.41)	<0.001†
Presence of metastasis	0.22 (0.12 to 0.41)	<0.001†

*"Early-stage cancer" includes TNM stage I cancer for patients <45 years old and TNM stages I and II cancer for patients ≥45 years old.
†Statistically significant.

DISCUSSION

Key results

We found out that Filipino patients with thyroid cancer are predominantly middle-aged females presenting with stage I cancer with papillary carcinoma histopathology. More than half of the patients had remission within one year post-RAI. Patients with early-stage cancer were more likely to have remission, while those with metastasis were less likely to have remission.

Strengths and limitations

To our knowledge, this was the first study that described Filipino patients with thyroid cancer and their remission status after RAI therapy. The study was limited to a one-year post-RAI follow up, which may not be long enough to account for remissions that take longer to achieve. Based on available data from the records we reviewed, we used TNM staging to classify the varied points in the course of illness that the patients were initially in. Although the TNM staging is good for predicting overall survival and mortality, the ATA risk stratification has been the recommended method for prognostication because of its utility in predicting response to RAI therapy and risk of disease recurrence. Finally, this study did not look into other clinically important outcomes, such as side effects of RAI therapy, disease recurrence, and mortality, simply because data on these were not available in the records that we reviewed.

Interpretation

The Filipino patients with thyroid cancer in our study generally had sociodemographic and baseline clinical profiles that were similar to those in previous local and international studies.[19 30-33] In this study, as in other studies, Filipinos with thyroid cancer are usually females and usually present with TNM stage I cancer commonly with papillary carcinoma histopathology. The mean age at diagnosis of patients in this study (46.06 years old) is slightly higher compared to the mean age reported in another study done in the Philippines (43 years old),[19] but is comparable to yet other studies among Asian patients (45-49 years old).[31 34 35] The baseline data we gathered were on patients who already underwent near-total or total thyroidectomy and who were about to receive RAI therapy. At such point, the patients were in hypothyroid state and might have gained weight, which could explain the relatively high BMI among the participants.

The post-RAI therapy overall remission rate that we recorded in our study was comparable to remission rates described in previous studies.[1 36-39] Previous studies, however, further classified patients according to the ATA risk category—by making use of both clinical and histopathological features—in order to come up with stratifications in the remission rates.[1] To give a semblance of risk categorization among our patients following the ATA risk stratification (albeit using a limited number of parameters available to us), we subgrouped our patients according to the presence or absence of nodal involvement and distant metastasis. The frequencies of remission among our patients 'with no nodal involvement and no distant metastasis' (roughly comparable to ATA low risk) (73.14%), among those 'with nodal involvement only' (roughly comparable to ATA intermediate risk) (37.14 %), and among those 'with distant metastasis with or without nodal involvement' (roughly comparable to ATA high risk) (0%) were all lower compared to the remission rates reported by other studies (78-91% in low risk, 52-64% in intermediate risk, and 14-31% in high risk, respectively).[1 36-39] The lower remission rates on initial therapy among our patients compared to those from studies from other countries may also support the notion that thyroid cancer among Filipinos tend to have a more aggressive behavior.[19]

A patient is considered to have non-remission if there is incomplete biochemical and/or structural response after RAI. Incomplete biochemical response can be seen in 11-22% of patients.[36 37] Clinical outcomes are very good, usually with patients achieving no evidence of disease, in about 56-68% during long-term follow-up. However, 19-27% of patients may continue to have persistently abnormal Tg values, and 8-17% may develop structural recurrence in the next 5-10 years of follow-up.[36 37] However, patients rarely die of well-differentiated thyroid cancers. In one 10-year study, no deaths have been reported.[37]

Incomplete structural response to initial therapy, whether clinically or functionally evident (by RAI uptake), can be seen in 2-6% of patients with ATA low-risk, 19-28% of patients with ATA intermediate risk, and as high as 67-75% of patients with ATA high-risk. Majority of these patients will have persistent structural and/or biochemical evidence of disease during long-term follow-up. Mortality is also higher—11% in patients with loco-regional disease and 57% among those with distant metastasis.[36 37]

In our study, it was difficult to determine whether the apparently lower remission rates at initial therapy eventually translated into poorer long-term outcomes. We had no data on recurrence and patient mortality during the one-year follow-up. On the one hand, patients who initially have poor response to RAI therapy may eventually achieve complete remission.[1] On the other hand, it can take up to 20 years after initial treatment for recurrent thyroid cancers to be detected.[38] One study among Filipinos with thyroid cancer reported that recurrent disease was present in 30% of patients within a mean time of 15 months post-RAI therapy.[19] Postoperative RAI ablation has been reported to significantly decrease the odds ratio of recurrence.[12] Extrathyroidal spread, aggressive histopathology and the presence of vascular and capsular invasion have all been linked to poor remission after postoperative RAI therapy.[1] The presence of the BRAF gene has also been associated with high recurrence rates and has been found to be predominant in Filipino thyroid cancer patients.[20]

Other factors such as age >45 years old, multifocality of cancer, nodal involvement and distant metastasis have also been associated with disease recurrence among Filipinos.[12] However, in our study, age, sex, BMI, histopathology, and presence of hypertension and diabetes were not statistically different between the remission group and the non remission group within the one-year follow-up period.

In our study, presenting with an early-stage cancer increased the odds ratio for remission. Subgroup analysis for this characteristic among patients ≥45 years old also revealed increased odds ratio for remission. Features of the disease that are associated with late-stage cancer, such as larger intrathyroidal and extrathyroidal extensions of the cancer, macroscopic lymph node involvement, and the presence of local and distant metastasis, are associated with an increased risk for structural persistence (non-remission) and recurrence.[1] In another study that risk-stratified patients according to their TNM stage (stage I - low risk, stage II - intermediate risk, and stage III/IV - high risk), RAI was seen to be beneficial among patients with stages II, III or IV cancer in terms of disease-free outcome and overall survivability. No benefit from RAI was seen among patients with stage I cancer.[40] Survivability was not measured in our study. Since all our patients received RAI therapy, we think that the good prognosis inherent to stage I thyroid cancer can, at the very least, partly explain the increased odds ratio of remission among patients with early-stage cancer.

Conversely, the presence of nodal involvement and distant metastasis decreases the odds ratio for remission. In the ATA risk category, the presence of metastasis is associated with high risk of either cancer recurrence or persistent disease.[1] Several studies have reported lower remission rates ranging from 14 to 31% in patients with thyroid cancer falling under the high-risk category.[1 36-39]

Patients in our study who achieved remission received a slightly (but statistically significantly) lower mean RAI dose compared to patients who had non-remission. This probably happened because risk factors on which decisions to give larger RAI doses are based (i.e., aggressive histopathology, larger tumor, presence of nodal involvement, and distant metastasis) are also associated with non-remission. We did not find any significant association between RAI dose and remission. This is consistent with the findings of a large meta-analysis, comprising of 9 randomized controlled trials, which reported that low-dose (<30 mCi) RAI is comparable to high-dose (>100 mCi) RAI in terms of successful remnant ablation.[41]

Generalizability

This study was done among Filipino patients with thyroid cancer who all underwent postoperative RAI therapy. The socio-demographic and clinical profile of our patients was similar to those reported in both local and international studies. However, the low remission rate seen in this study continues to support previous findings that thyroid cancer is more aggressive among Filipinos. Both late-stage cancer and presence of metastasis have been identified to have significant inverse associations with remission, but these risk factors for non-remission are universal for patients with cancer. In order to further explain the aggressiveness of thyroid cancer among Filipinos, other factors, such as the presence of environmental, histological and genetic risk factors unique to Filipinos, may be explored in future studies.

CONCLUSION

We found out that Filipino patients with thyroid cancer are predominantly middle-aged females. Patients usually present with stage I cancer and with papillary carcinoma histopathology. The overall remission rate among patients who receive RAI is 58.49% within one year post-RAI therapy. Patients with early-stage cancer had an increased odds ratio of remission, while patients with neither nodal involvement and/or distant metastasis had a decreased odds ratio of remission.

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Ethics approval
This study was reviewed and approved by the Davao Doctors Hospital Ethics Review Committee (DDH ERC reference 16-011-iis).

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Perspectives of good death and dying among patients with cancer, their caregivers, and health care providers: qualitative study

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ABSTRACT

Background. Social backgrounds, cultural beliefs, ideologies and experiences of well-being all affect people's perspectives on good death and dying.

Objective. To describe the perspectives of patients with cancer, caregivers and health care providers on good death and dying.

Design. Qualitative study using constant comparative method.

Setting. Southern Philippines Medical Center in Davao City, Philippines.

Participants. 7 patients with cancer, 5 caregivers, and 8 health care professionals.

Main outcome measures. Concepts of good death and ideal dying process from interviews with study participants.

Main results. Of the 20 participants, 16 were females and 4 were males, with ages ranging from 16 to 64 years old. Three interrelated themes emerged from the interviews. First, participants recognize that an omnipotent force external to the self controls when and where death happens and the circumstances around death. Second, participants believe that good death happens when one is ready for it. Readiness for death entails having lived life according to one's purpose in life, achieving emotional closure with loved ones, and having accepted that death is near. Finally, for our participants, the ideal dying process happens at home, is free of uncomfortable symptoms, and is experienced with the family and friends of the dying person.

Conclusion. Participants in this study recognize that an external force controls the time and place of and circumstances around death. For our participants, good death happens when one is emotionally ready for it, and it is important to provide physical and emotional comfort to an actively dying person.

Keywords. spirituality, readiness, comfortable dying, constant comparative method

INTRODUCTION

Death in cancer is unique and greatly feared because it is commonly associated with a long dying process, as opposed to the relatively "quick death" in other causes of mortality. However, this protracted phase near the end of life can give patients more control over what happens to them and their environment while they are dying. Terminally ill patients with cancer can potentially control pain, discomfort and other symptoms, and they relatively have ample time to settle their interpersonal issues and say goodbye to their loved ones before they die.[1]

Dying is the multi-dimensional process that leads to death. The process of dying affects not only the physical body, but also one's psychosocial aspects and immediate social environment—i.e., family, relatives, friends, etc.[2] Several studies done among Western cultures asked terminally ill patients, as well as their families and health care providers, about what they consider important at the end of life. Frequent responses included optimum pain control,[3-7] being involved in making diagnostic and therapeutic decisions,[3 8] psychosocial support, from the family,[6 7 9] spiritual support and having meaningful emotional closures with loved ones.[3 4 10]

Many notions tend to be strong in particular cultures. In Muslim societies, having a sense of self-esteem, projecting a positive image of the dying person among his or her relatives, and assuring economic and social

IN ESSENCE

Concepts of good death and dying vary across different cultures.

In this study, notions on good death and dying include: that life and death are controlled by an external omnipotent force; that good death happens when one is ready for it; and that, ideally, active dying is symptom-free and happens at home with one's immediate family and friends around.

Discussions and planning for advance care prepare terminally ill patients and families for events around active dying and death.

security of the family, are regarded as very important psychosocial states that must be attained before a person dies.[11] Some cultures take great care in avoiding posthumous physical distortions, fatal wounds, or bad odors and make sure that a person's body looks as normal as possible after death as part of preserving the dead person's self-esteem.[11] Among Asians, good death is associated with having physical and psychological comfort, having a natural death, and being respected as an individual.[5] As to the manner of dying, one study among adults with lung cancer reported that patients describe a good death to be peaceful, pain-free and quick, and to occur during sleep.[12] Patients preferred a quick death, with little suffering and not amidst their children's presence. Some patients expressed fear of being seen by their children in a state of vulnerability as they die.[6] In an Asian study among bereaved families of patients with cancer, caregivers said that being physically present during the final moments and being able to bid goodbye to their dying loved ones are important to them.[6]

Filipinos have close-knit families. It is common and expected among Filipinos to personally take care of family members and relatives during times of illness. The concept of hospice and palliative care has not yet gained a firm foothold among Filipinos since its movement began in late 1990s[13] probably because of this prevailing approach to caregiving. Many patients with cancer who are brought to the hospital for hospice care usually believe that they may eventually have complete cure. Health care practitioners also tend to be more aggressive than what is called for when managing patients with terminal illness. Many physicians hesitate withholding therapy or making do-not-intubate and do-not-resuscitate orders during appropriate situations.[14] Because of insufficient knowledge and experience, health care practitioners have difficulty in helping patients make advance directives for end-of-life care.[15] To date, there are no established procedures or guidelines in preparing Filipino patients and their families for death. A strong basis for such guidelines would be the different notions of good death among those who are likely to have pondered more deeply on death. We did this study in order to describe notions of good death and the ideal dying process among patients with cancer, their caregivers, and health practitioners who provide medical care for them.

METHODS

Research team and reflexivity

This study was done in Southern Philippines Medical Center (SPMC), a tertiary government hospital in Southeastern Philippines. SPMC has fully departmentalized wards and outpatient clinics, as well as a Children's Cancer and Blood Diseases Unit (CCBDU). The Department of Family and Community Medicine (DFCM) in SPMC runs a Hospice and Palliative Care Training Program (HPCTP), to which most of the hospital's patients with cancer needing their services are referred.

One of us (ARDL) conducted all the interviews. The two other authors (RJS and MEAC) helped in the planning, data analysis and reporting of the results of this study. All of us were trained in Family Medicine, have strong background and training in client-centered counselling, and are consultants in SPMC. Two of us (ARDL and RJS) subspecialize in Hospice and Palliative Care. Two of us are females, and one is male.

Study design, participants and setting

In this qualitative study, we utilized the constant comparative method[16-18] to identify and characterize notions of good death from interviews among patients with cancer and their caregivers, and among health care practitioners.

All in all, we were able to interview seven patients with cancer, five caregivers, and eight health care professionals who responded to our poster invitation to join the study. We already knew four of the patients prior to their participation in the study since they have been referred to us for palliative care. As Hospice and Palliative Care consultants, we (ARDL and RJS) have been active in the management of the four patients for 6 to 12 months prior to the actual interviews for this study. For each of the three other patients, our interview for the study was our first in-depth conversation. The five caregivers who participated in our study were relatives of five of the seven patient participants. All of them decided to join after each of their patients signified participation in the study. We all personally knew the eight health care professionals we interviewed for this study. They have been working either in the CCBDU, in HPCTP, or in the outpatient clinic of the DFCM in our institution for at least 3 years.

We obtained written informed consent from all participants. Prior to the actual interviews, we asked each of the participants to answer a two-page questionnaire that includes questions on their clinical and demographic data. The questionnaire also contained the four questions of the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PRIME-MD PHQ-4DA) to screen the participants for clinical depression and generalized anxiety disorder.[19]

Data collection

For each participant, we did a one-time, face-to-face, individual interview in a secluded room in SPMC. We carried out the interviews using four general questions taken from the objectives of this study, namely—"What is your concept of a good death?" "For you, what is the best way to die?" "Where is your preferred place of death?" and "Who would you like to be present when you die?" We asked subsequent questions after each of these general questions to probe their main answers. All interviews were audio-recorded. We were given written permission by all participants to audio-record the interviews. Each interview ran for an average of one hour.

Data analysis and reporting

We transcribed all the interviews verbatim. All three of us (ARDL, RJS, MEAC) read and coded the transcripts separately. Two of our colleagues (JGLA and ASC) with background in social research also helped us in coding and analyzing the transcripts (see acknowledgment). We identified themes from among the participants' answers to each of the four general questions by noting emerging or recurring notions of good death and the ideal dying process. We also used the answers to the probe questions to further characterize the properties of the emerging themes and triangulate our findings. Five more colleagues (SSBE, CXDL, RCR, ELLB, JJSA) helped us in preparing this report (see acknowledgment). We lifted quotations that could best illustrate the emerging themes that we identified from the transcripts. We then translated the non-English quotations to English and incorporated them in the results portion of this report. Translation was contextual, rather than literal. The initials that appear after the quotations in the results section are codes and are not the real initials of the participants.

RESULTS

Description of participants

Among the 20 participants included in this study, 16 were females and 4 were males. All of the seven patients with cancer were females, with ages ranging from 16 to 64 years old. Four of the patients were single, while three were married. Six of them completed high school education, and one graduated from a college course. Of the seven patients, three were Catholics, two were Protestants and two were Muslims. As to family life cycle stage, one patient was an unattached young adult, three belonged to families with adolescents, one came from a launching family, and two were from families in later years. The patients have been having cancer for less than one to four years. All of them have been informed about their illness. Their diagnoses and cancer staging as of the time of interview include colon cancer stage IV, cervical cancer stage III, rhabdomyosarcoma stage IV, osteosarcoma stage IV, chronic myelogenous leukemia, and breast cancer stage II.

The caregivers who participated in our study were five family members—two mothers, a son, a husband and a niece—of the seven patient participants. Their ages ranged from 22 to 47 years old. The youngest caregiver had a college degree and was single, while the rest graduated high school and were married. Two of them were Muslims, two were Catholics and one was Protestant.

The health care providers included in our study were five physicians and three nurses, with ages ranging from 27 to 36 years old. Two of them were males and six were females. Five were single and three were married. Six were Catholics, one was Muslim and one was Protestant.

All twenty of the participants were screened with the PRIME MD PHQ-4DA and were negative for anxiety and depression.

Emerging themes

Three interrelated themes emerged from the interviews that we processed: the control of life, dying and death is external; a good death is something that one is ready for; and, it is ideal for one to die comfortably.

Recognition of an external locus of control. Death is regarded as universal and something that inevitably happens to everyone. It is an event at the end of life. A mother of one of our patient participants said that one ought to accept that death eventually happens.

> "*...bug-os jud na madawat na nimo na taman nalang ka dira.* (...it is absolutely important that you accept that your life ends at that point.)"
> - WR, 36 years old, mother and caregiver of a patient with rhabdomyosarcoma stage IV

An external omnipotent force beyond one's control willfully determines, as if through a master plan, the mundane course of one's life, including the time of, place of and circumstances around one's death. This deference to an all-powerful other externalizes the locus of control of life, dying and death and helps one come to terms with the inevitability of death. To Christians among our respondents, this omnipotent force is God; to Muslims, it is Allah. Two of our participants said,

> "*...sa akoa, wala ka nag-*suffer *sa imong sakit,* and you have your family with you... *maabot man ang oras na kuhaon na gyud ka sa Ginoo.* (...for me, as long as you do not suffer, and you have your family with you... time will really come when God decides to take you.)"
> - OE, 29 years old, Catholic, female nurse

> "*Si Allah na lang bahala kung asa ko niya kuhaon.* (As to where I die, I leave it to Allah.)"
> - DL, 45 years old, housekeeper, Islam, female patient with colon cancer stage IV

This omnipotent force that people believe in is also the source of meaning and purpose of one's life. How one is supposed to live life is something that one seeks for and discovers through a strong relationship with the omnipotent force. A person can lead a good life by living it according to how the omnipotent force has meant it to be lived. A life well lived ends in a good death.

These notions of death provide the contexts on which to view the other emerging themes in this study.

A good death is something that one is ready for. Having experienced and understood cancer and having been told about the prognosis of their illness, patients in our study were aware that death for them is imminent. For patients with cancer, a good death is something that one has prepared for. One is ready to die if one has found meaning and purpose in life, and when life has been lived according to one's perceived meaning and purpose. Two patients from among our participants said,

> "*Para sa akin, nahuman nako ug eskwela. Kanang* fulfilled *ang pamati. Pero kung* will *talaga ni* God *na kunin ako, tanggap ko po. Naay* acceptance *na dapat.* (To me, since I have already finished schooling, there is this sense of fulfillment. So if it is God's will to take me, I accept it. There should already be acceptance.)"
> - CY, 18 years old, female patient with rhabdomyosarcoma stage IV

> "Fulfilled *ka, murag nahuman na tanan.* (You feel fulfilled, as if everything is done.)"
> - BR, 33 years old, female patient with cervical cancer stage III

Fulfillment comes from being able to live life according to how one perceives the omnipotent force has planned it to be. This makes it easier for one to say, as life is about to end, that "all is done" and openly accept death. As how our participants put it,

> "If you have had a good life then you have lived your life fully."
> - OE, 29 years old, female nurse

> "*Malipayon sa kamatayon—kanang naay* peace *ug nadawat na.* (Dying can be happy if one has peace and has accepted that death is imminent.)"
> - OJ, 33 years old, daughter and caregiver of patient with breast cancer stage II

Despite the uncertainty of one's exact time of death, one can still be ready to die. Readiness to die is dependent not only on being at peace with one's self, but also on having had a good relationship with others. Emotional closure and resolution of conflicts with loved ones happen when a person has settled differences with them and do not harbor any negative feelings towards them. Our participants said,

> "*Kana jud kinahanglan preparado ko ug nadawat nimo.* (What is important is that I'm prepared and have accepted [that death is coming].)"
> - FT, 47 years old, husband of patient with cervical cancer stage III

> *"Yung mamatay ka na masaya. Kung may kasalanan ka, nag*-sorry *ka na. Apil ang* fulfillment *ug* acceptance. ([You have a good death] when you die happy, when you have already asked for forgiveness for the wrong things you have done, and when you have fulfillment and acceptance.)"
>
> - HN, 18 years old, student, female patient with chronic myelogenous leukemia

> *"Para sa akoa ang konsepto sa* good death *is kanang hapsay ang imong relasyon sa pamilya ug sa imong sarili nga mubiya sa diring kalibutana nga wala kay dalang kahiubos, wala kay dalang aligutgot ug, sama sa gwapo imong relasyon sa pamilya, ang imo pud panghuna-huna is maayo pud. Kumbaga ready na ka.* (My concept of good death involves having a good relationship with your family and yourself, having peace of mind before you die, and leaving this world without disappointment or bitterness. In other words, being ready [before you die].)"
>
> - WN, 33 years old, male physician

It is ideal for one to die comfortably. Our participants associate good dying process with physical and emotional comfort. Physical comfort depends on where and how one experiences dying. Most of our participants, not only those diagnosed with cancer but also caregivers and health care providers, associate good death with the absence of pain. Dying comfortably means not experiencing any agonizing pain or labored breathing. Our participants said,

> *"Kanang* painless *ug* comfortable. ([I want dying to be] painless and comfortable.)"
>
> - UD, 64 years old, female patient with breast cancer stage III

> *"Para sa akin, yung hindi nahihirapan, kanang di gud nimo makita na naghingalo o nag*-suffer. (For me, [dying] should not be agonizing, and [the dying person] should not be gasping for breath or suffering.)"
>
> - SR, 27 years old, female nurse

> *"Gusto nako sa balay ra, pamati man gud nako na kung sa ospital, daghan pang sakit na ikuwan...* (I want to die in our home, I believe that dying in a hospital involves unnecessary pain...)"
>
> - DL, 45 years old, female patient with colon cancer stage IV

Dying at home is desirable because it provides emotional comfort during the final moments of life. The preference to die in a hospital setting may also be associated with providing physical comfort for the dying person. One physician from among our participants said that she prefers to die at home, but that she would want her family members to die in the hospital, presumably after providing them appropriate medical care.

> *"Kung ako, sa balay* with my loved ones. *Pero, kung* family members, *gusto ko sa* hospital. (For me, I want [to die] at home with my loved ones around. However, for my family members, I want them [to die] in a hospital.)"
>
> - AK, 36 years old, female physician

A person's last moments of life are best spent together with loved ones. The presence of family members and friends also affords emotional comfort for the dying person and provides the last opportunity for everyone to exchange goodbyes. Two of our participants said,

> "My immediate family and *mga* close friends. *Kanang palibutan ko sa mga taong nag*-love *sa akoa.* (My immediate family and close friends. [I want to be] surrounded by those who love me.)"
>
> - CY, 18 years old, female patient with rhabdomyosarcoma IV

> *"Sa balay siguro kay* close *sa pamilya,* then *matan-aw tan-aw siya or kauban pud ang* family *sa pagpanaw.* ([It is best to die] at home, with family members who can watch over the dying person and who will be there when the person goes away.)"
>
> - IB, 35 years old, male, nurse

DISCUSSION

Key results

From this study, we were able to identify three interrelated notions of good death and dying among patients with cancer and their caregivers, and among health care providers, namely—the recognition that something external to the self is controlling life and death, including the time and place of death and the circumstances around it; one can have a good death if one is ready for it; and, physical and emotional comfort while one is dying makes for a good death.

Interpretation

The reference to an omnipotent force—that is beyond one's control and that determines life, the meaning and purpose of one's life and one's eventual death—is a unique emerging theme in our study. The belief that a supreme being determines a person's life and death is strong in Filipino culture.[20 21] When diagnosed with life threatening illnesses, patients are likely to experience spiritual distress, seeking emotional refuge from or expressing anger to a higher power, considering their illness as punishment from life's poor choices, questioning the meaning of life, and even questioning the presence of the higher power in times of suffering.[22]

Religious spirituality affects how Filipinos approach decisions around health, healing, life, and death. Muslims believe that Allah predetermines the exact timing and place of death. The concept of good death centers on the importance of dignity, privacy and family security, and emphasizes on the value of spiritual and emotional support for the dying person.[11] The phrase *"Si Allah na lang bahala"* ("[I] leave it to Allah")—or *"Ang Diyos na lang bahala"* ("[I] leave it to God") for Christians—implies that the speaker entrusts everything to Allah, God or any external force.[23] Another study pointed out that, for Filipinos, good death happens when one comes "to peace with God."[7] This courteous regard for a force other than the self is a strong attribute of Filipino religious spirituality. Spirituality helps in creating awareness of the present condition, in coping with illness, and in finding end-of-life comfort.[24] The externalization of the locus of control of one's life and death is a way of recognizing the limits of the self and of accepting the inevitability of death.

People on some cultures prefer to be unaware of the imminence of death and to live a life free of the feeling of confronting an approaching death.[5] In palliative care, death is expected as part of the natural course of the patient's illness, and sudden death is uncommon. The lack of preparedness for death can result in complicated grief among bereaved family members and caregivers.[25] Our participants emphasize the importance of being ready for death. The "readiness to die" referred to by our participants involves being fulfilled as a person after living one's life according to one's spirituality.

Readiness presupposes an ideal state that one ought to prepare for or ought to work towards,[6] even if one's future is uncertain in the face of an illness that may soon lead to death.[26] Reaching that ideal state means being ready for death. This mindset is expected since death is itself the inevitable end that, in a way, one has to prepare for and work towards. Like the first emerging theme in our study, this theme showcases the religious spirituality of Filipinos. For our participants, the ideal state of readiness involves having done the things that one ought to do in life, being at peace with oneself, and having positive emotional closure with loved ones. Each of these elements of readiness has a layer of religiosity. What one ought to do in life and being at peace with oneself are based on religious beliefs regarding one's purpose in life. Emotional closure with loved ones involves asking for forgiveness and seeking reconciliation from people one has wronged.

Desiring comfort at the end of life has been described in previous studies.[4-6 8 9 11 12] Avoiding discomfort is human nature. The comfortable dying process described by our participants entails physical comfort, with dying occurring at home in the presence of family and friends. Chronically ill patients may actually want to die alone or die at a time when their caregivers are away from them for a short time.[27] Our participants' articulation of wanting to die with loved ones around them speaks of the relationship-centeredness of their approach to these final moments of life.[28] Being able to ask or grant forgiveness, say goodbye, or express gratitude[6] in person translates to emotional comfort not only for the person who is actively dying but also for the family and friends who are physically present.

Strengths and limitations

Unlike previous studies that asked questions about good death through surveys,[3 5 7 11] the findings of this study were based on interviews with participants. The constant comparative method of analysis that we employed in this study enabled notions of good death to emerge from the interviews. The notions that emerged demonstrate that the participants' concepts of good death are akin to the Filipinos' general approach to life, characterized by strong religious spirituality and close-knit relationships with family members and friends.

This study had a few limitations. Because we invited participants using a poster announcement, interviews were limited to those that we did with the volunteers who responded to our invitation. Our study did not have representation from male patients with cancer. Only three religions (Catholic, Islam and Protestantism) were represented in this study. It is possible that new themes will emerge from interviews with people with sociodemographic profiles that are different from those of our participants.

Implications

A patient-centered care plan for terminally ill patients can be designed to revolve around the emerging themes that we have gleaned from our study. Advance care planning and discussions can be initiated to prepare the patients and families for end-of-life events.[25] Our themes on spirituality, readiness and comfort are all important aspects of advance care planning and end-of-life discussions that should be acknowledged and addressed. Resolution of spiritual issues would facilitate acceptance and readiness that may eventually affect the quality of the experience of dying. It is common notion that physicians' responsibilities do not include addressing spiritual concerns,[24] therefore the subject of spirituality presents a challenge to physicians and health care providers. Although spiritual or religious discussions should not be forced, it should be understood that religion and spirituality influence ethical and medical decisions.[29]

Future research in this area can include perspectives from male patient participants and those from other religions or ideologies, and can explore how these attributes help shape notions of good death and dying process. The implications of the patients' experience of illness, as well as the influence of family roles and professions, on notions of good death are also worth exploring in future studies.

Good death and dying

For our participants—patients with cancer and their caregivers, and health care providers—good death happens to a person who is ready to die. One is ready to die after gaining a personal understanding of the meaning of life and achieving one's perceived purpose in life. A strong religious influence, especially among Filipinos, underlies this spiritual outlook in life. The meaning and purpose in life spring from one's belief in an external omnipotent force. Because death is universal and inevitable, it is also regarded as a phenomenon that is controlled by an external force. A fitting end for a life well lived is a symptom-free active dying process that happens at home, where family and friends are present to provide emotional comfort to the dying person.

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Ethics approval

This study was reviewed and approved by the Department of Health XI Cluster Ethics Review Committee (DOHXI CERC reference P13103101).

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SPMC JHCS

RESEARCH

Predictors of prolonged mechanical ventilation after coronary artery bypass grafting among Filipino adults with coronary artery disease

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ABSTRACT

Background. Identifying risk factors for prolonged mechanical ventilation (PMV) can improve postoperative outcomes of patients undergoing coronary artery bypass grafting (CABG).
Objective. To determine the occurrence rate and predictors of PMV among patients who underwent CABG.
Design. Retrospective cohort study.
Setting. Southern Philippines Medical Center Heart Institute, Davao City, Philippines.
Participants. 213 patients with coronary artery disease (CAD) who underwent CABG.
Main outcome measures. PMV occurrence rate; odds ratios (95% CI) of PMV for selected clinical characteristics.
Main results. There were 167 (78.4%) males and 46 (21.6%) females in this study. The patients had a mean age of 60.2 ± 9.68 years and a mean BMI of 25.8 ± 5.65 kg/m2. Post-CABG, PMV occurred in 18.87% of the patients. Univariate odds ratios of PMV were significantly high for renal dysfunction (OR=2.75; 95% CI 1.34-5.66), New York Heart Association functional class IV (7.53; 3.07-18.46), angina grade IV (4.52; 1.69-12.07), left ventricular ejection fraction <50% (2.80; 1.23-6.38), cardiogenic shock (12.14; 2.26-65.11), intraoperative IABP insertion (3.17; 1.46-6.88), postoperative acute kidney injury (AKI) (6.72; 2.99-15.10), postoperative hemodialysis (4.84; 2.21-10.60), postoperative neurological complications (13.04; 4.21-40.39), postoperative arrhythmia (2.59; 1.19-5.63), pulmonary complications (3.50;1.67-7.34), and other complications (3.44;1.22-9.68). On multiple regression analysis, AKI after CABG significantly increased the odds ratio of PMV (11.82;1.03-135.35).
Conclusion. PMV after CABG occurred in 18.87% of the patients in our study and was associated with poor preoperative cardiac and renal conditions, intraoperative IABP insertion, and postoperative complications. The development of AKI after CABG independently increased the odds ratio of PMV.

Keywords. early extubation, acute kidney injury, EuroSCORE II, Society of Thoracic Surgeons Adult Cardiac Surgery Risk

INTRODUCTION

Prolonged mechanical ventilation (PMV) after coronary artery bypass grafting (CABG) increases postoperative morbidity, mortality, and the cost of hospitalization.[1] Post-cardiac surgery patients who are reintubated following extubation are likewise prone to more complications and have a higher mortality rate.[2,3] In recent years, early extubation (EE)—or extubation within 8 hours of arrival at the postoperative care unit—has gained popularity because the practice has been shown to improve cardiac performance, reduce respiratory complications, allow early mobilization and feeding, increase patient autonomy and comfort,[4] and reduce the workload of medical and nursing staff.[5] EE, however, may not apply to all patients such as those who are at high risk for postoperative complications.[4,5]

Identifying patients who are at high risk for PMV can help physicians optimize health care to improve the outcomes of patients undergoing CABG. However, the key factors associated with early PMV and EE are poorly understood.[6] To start with, PMV has been defined differently from study to study, with some setting the cutoff at 12 hours or less after surgery,[2,6,7] and then others at 24 hours,[8-11]

IN ESSENCE

It is important to identify patients at risk of prolonged mechanical ventilation (PMV) after coronary artery bypass grafting (CABG).

In this study, clinical factors associated with PMV include poor preoperative cardiac, renal and pulmonary status, long operative procedure and development of postoperative complications. Postoperative acute kidney injury independently increased the odds ratio of having PMV.

Coming up with local prediction models for PMV and regularly reassessing these models can help improve the outcomes of patients who undergo CABG.

48 hours,[3 12 13] or even 72 hours[14 15] post-operatively. Studies with PMV cutoffs lower than 24 hours usually report only a few predictors for PMV while in studies that report PMV as more than 72 hours, only patients with serious, non-transient issues remained ventilated.[6 7]

In a study that defined PMV as mechanical ventilation for more than 12 hours after CABG, redo surgery, cardio-pulmonary bypass (CPB) time of more than 91 minutes, intraoperative transfusion of more than 4 units of red blood cells, and left ventricular ejection fraction (LVEF) of ≤30% all increased the odds of having PMV.[2] Another study, which set the PMV cutoff at 72 hours post-CABG, reported that advanced age, renal dialysis, peripheral vascular disease, hypertension, advanced stage of heart failure, elevated body mass index (BMI), reduced forced expiratory volume at 1 second, and prolonged CPB are all associated with PMV.[15] Age >70 years, diabetes, and the use of an intra-aortic balloon pump (IABP) have been identified as significant predictors of failure of EE among patients on off-pump CABG.[16] Another study suggested that reducing the CPB time and keeping blood glucose levels low during CPB can help avoid delayed extubation.[10]

The predictors of PMV identified in previously reported studies were varied, and sometimes conflicting.[2-16] One study was able to show that the predictors of PMV may even change within the same institution, owing to the changes within patient demographics, and surgical and anesthetic techniques over time.[3] This suggests that predictors are context-specific and that the application of previous findings on predictors of PMV cannot be fully extended to any other patient groups. We thought of doing this study since, as far as we know, there were no previous attempts to explore the risk factors for PMV among Filipino patients undergoing CABG. In this study, we aimed to determine the rate of occurrence of PMV after CABG among patients with CAD and to identify the preoperative, intraoperative and postoperative factors that are associated with PMV.

METHODOLOGY

Study design and setting

We employed a retrospective cohort study design in reviewing and analyzing the medical records of patients who underwent CABG at the Southern Philippines Medical Center Heart Institute (SPMC-HI) in Davao City, Philippines. Cardiac interventions and open heart surgical procedures have been offered by SPMC-HI since its opening in 2007. The institute caters to an average of 428 surgical procedures per year, around 15% of which are CABG.

Participants

All adult patients aged 19 to 75 years old with coronary artery disease (CAD) who underwent CABG at the SPMC-HI from 2007 to 2015 were eligible for inclusion in this study. We excluded patients who had previous percutaneous cardiac intervention or cardiac surgery.

Data collection

We collected sociodemographic data, which included age, sex, weight, and height. We also gathered clinical data such as smoking history, history of myocardial infarction within 3 months pre-CABG, comorbidities (hypertension, diabetes and chronic obstructive pulmonary disease [COPD]), Canadian Cardiovascular Society Angina Grading Scale (CCS AGS), New York Heart Association functional classification (NYHA FC) of heart failure , number of diseased coronary vessels, and LVEF from the last 2D echocardiography prior to the CABG procedure.

We calculated BMI from the weight and height of each patient. The glomerular filtration rate (GFR) was calculated using the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) formula[17] available online. We also determined the chronic kidney disease (CKD) stage of each patient, albeit based on the calculated GFR alone and without considering urine findings or structural abnormalities. For each patient, we either noted the EuroSCORE (European System of Cardiac Operative Risk Evaluation) II[18] and the online Society of Thoracic Surgeons Adult Cardiac Surgery Risk (STS ACSR) v2.81[19] score as recorded in the patient's chart, or calculated one or both scores using their respective calculators available online. Both EuroSCORE II and STS ACSR were based on models developed from pooled patients in Europe and America, respectively, and have been repeatedly validated in several studies.[20-23] Both scores are commonly used to calculate the risks of morbidity and mortality from cardiac procedures and are presently used to screen patients for CABG under the Z-package program of the Philippine Health Insurance Corporation.[24]

We also collected data on preoperative, intraoperative and postoperative clinical characteristics of patients in relation to the CABG procedure. The preoperative variables we noted included demographic characteristics, comorbidities, severity of CAD, preoperative intubation status, presence of cardiogenic shock (with inotropic or intra-aortic balloon pump support), and the urgency of the surgery (elective or emergency). The intraoperative variables we collected were cardiopulmonary bypass (CPB) time, aortic cross-clamp (ACC) time, whether CABG was done off-bypass, number of units of blood products transfused, the use of Cell Saver® (autologous blood transfusion), the use of IABP, and the use of more than two kinds of inotropic agents. We also gathered postoperative variables such as hematocrit level, PaO_2/FiO_2 ratio, and the occurrence of postoperative complications, namely, acute kidney injury (AKI; as defined by the Kidney Disease: Improving Global Outcomes (KDIGO)[25]—increase in creatinine by more than 0.3 mg/dL (26.5 µmol/L) from baseline within 48 hours or increase to 1.5 times from baseline within seven days), neurological sequelae, new onset arrhythmia, myocardial infarction, acute respiratory distress syndrome, pulmonary complications (i.e., nosocomial pneumonia, pleural effusion, atelectasis, pulmonary congestion, pulmonary edema), and other non-pulmonary complications (i.e., upper gastrointestinal bleed, decubitus ulcer, device related infection, surgical site infection, ischemic hepatitis, postoperative myasthenia gravis).

The main outcome measures for this study were the rate of occurrence and predictors of PMV. Since it has been the prevailing practice among cardiologists and pulmonologists in our institution to extubate patients the day (i.e, within 24 hours) after performing CABG, we operationally defined PMV as mechanical ventilation beyond 24 hours after the end of the CABG procedure. Patients who were immediately extubated (within 24 hours postoperatively) but who required reintubation within 72 hours of weaning from the mechanical ventilator were also classified as belonging to the PMV group. Patients who were successfully

Table 1 **Demographic and preoperative clinical characteristics of patients**

Characteristics	n*	Values
Mean age ± SD, *years*	213	60.20 ± 9.68
Sex, *frequency (%)*	213	
Male		167 (78.40)
Female		46 (21.60)
Mean BMI ± SD, *kg/m^2*	212	25.80 ± 5.65
Smoker, *frequency (%)*	213	108 (50.70)
Hypertension, *frequency (%)*	213	154 (72.30)
Diabetes mellitus, *frequency (%)*	213	123 (57.75)
COPD, *frequency (%)*	213	17 (7.98)
Mean GFR ± SD, *mL/min/1.73 m^2*	206	71.48 ± 26.31
CKD stage†, *frequency (%)*	206	
1		58 (28.16)
2		82 (39.81)
3A		29 (14.08)
3B		25 (12.14)
4		6 (2.91)
5		6 (2.91)
Renal dysfunction‡, *frequency (%)*	206	69 (33.50)
On hemodialysis, *frequency (%)*	213	6 (2.82)
CAD severity		
CCS AGS classification, *frequency (%)*	123	
I		34 (27.64)
II		41 (33.33)
III		12 (9.76)
IV		36 (29.27)
NYHA FC, *frequency (%)*	199	
I		59 (29.65)
II		80 (40.20)
III		35 (17.59)
IV		25 (12.56)
Recent myocardial infarction§, *frequency (%)*	211	73 (34.60)
LVEF	140	
Mean ± SD, %	140	50.33 ± 13.54
<50%, *frequency (%)*	140	59 (42.14)
Number of diseased coronary vessel, *frequency (%)*	212	
1		12 (6.13)
2		27 (12.74)
3		172 (81.13)
Preoperative condition		
Cardiogenic shock‖, *frequency (%)*	213	8 (3.76)
Intubated preoperatively, *frequency (%)*	213	4 (1.88)
Urgency of procedure, *frequency (%)*	213	
Elective		211 (99.06)
Emergency		2 (0.94)

*Value of n varies because of missing data.
†CKD stage solely based on calculated GFR.
‡Patients with GFR <60mL/min/1.73 m^2.
§Within 3 months.
|| Use of inotropic agents or IABP.
BMI — body mass index; CAD — coronary artery disease; CCS AGS — Canadian Cardiovascular Society Angina Grading Scale; CKD — chronic kidney disease; COPD — chronic obstructive pulmonary disease; GFR — glomerular filtration rate; IABP — intra-aortic balloon pump; LVEF — left ventricular ejection fraction; NYHA FC — New York Heart Association Functional Class.

Table 2 **Comparison of outcomes between patients who had early extubation (EE) and patients with prolonged mechanical ventilation (PMV)**

Outcomes	n*	EE	n*	PMV	p-value
Mortality after 24 hours, *frequency (%)*	171	3 (1.75)	39	10 (25.64)	<0.0001†
Mean length of ICU stay ± *SD, hours*					
Overall	170	113.24 ± 69.58	39	222.48 ± 292.02	<0.0001†
Survivors‡	167	113.24 ± 69.88	29	165.16 ± 119.37	0.0013†
Mean length of hospital stay ± *SD*, *days*					
Overall	170	17.95 ± 9.35	37	30.08 ± 411.24	<0.0001†
Survivors‡	167	17.89 ± 9.33	27	31.30 ± 376.52	<0.0001†

*Value of n varies because of missing data.
†Significant at $p<0.05$.
‡Among those who survived.
ICU — intensive care unit.

extubated within 24 hours from end of the CABG procedure comprised the EE group. We also looked at other outcomes including mortality, length of hospital stay, and length of intensive care unit (ICU) stay.

The varying value of the sample size n in the Results section of this report reflects some missing data from patient records. Of the 213 patients included in this study, one patient died within 24 hours postoperatively, so only 212 could be assessed for the outcome of either EE or PMV. Two additional patients were transferred to another institution within 24 hours postoperatively, but after extubation, so only 210 could be assessed for mortality after 24 hours. Data on duration of stay were either missing from or inaccurate in some patient records, so only 209 could be assessed for length of ICU stay, and only 207 could be assessed for length of hospital stay.

Statistical analysis

We summarized continuous variables as means and standard deviations, and categorical variables as frequencies and percentages. We then used student t-test to compare continuous variables and chi-square test or Fisher's exact test (for variables with frequencies of <5 to compare categorical variables. To calculate the odds ratios (95% confidence intervals) of having PMV for each predetermined preoperative, intraoperative or postoperative variable, we performed univariate logistic regression. We dichotomized non-binary variables prior to performing logistic regression. For continuous variables, we determined the following cutoff points based either on the mean or on a clinically significant value: age >60 years; abnormal BMI (either less than 18.5 or more than 25); GFR <60 mL/min/1.73m^2 (renal dysfunction); LVEF <50%; EuroSCORE II mortality >5.0%; STS ACSR mortality >5.0%; CBP duration >180 min; ACC time >150 min; transfusion of packed red blood cells (PRBC) and/or whole blood (WB) >4 units; transfusion of total blood products >10 units; use of >2 kinds of inotropic agents; hematocrit level <0.38 for males or <0.34 for females; and PaO_2/FiO_2 ratio <200. We also dichotomized categorical variables with more than two categories as follows: NYHA FC IV (yes/no); CCS AGS IV (yes/no); and 3-vessel CAD (yes/no). For factors that significantly increased or decreased the odds ratios of having PMV by univariate logistic regression, we performed multivariable logistic regression to determine independent predictors of the outcome. For all statistical tests, the level of significance was set at <5%. All statistical tests were performed using Epi Info 7.1.4.0.

RESULTS

A total of 213 patient charts were included in the analysis for this study. The summary of the sociodemographic and clinical profiles of patients are shown in Table 1. The mean age of the patients was 60.20 ± 9.68 years old, and the mean BMI was 25.80 ± 5.65 kg/m^2. Among the patients 167/213 (78.40%) were males and 46/213 (21.60%) were females. Half of the patients (108/213, 50.70%) were smokers. Hypertension was the most common comorbidity, with 154/213 (72.30%) of the patients having it. More than half of the patients (123/213; 57.75%) had diabetes mellitus, while 17/213 (7.98%) had COPD.

The mean GFR was 71.48 ± 26.31 mL/min/1.73 m^2; 69/206 (33.50%) patients had renal dysfunction (GFR <60 ml/min/1.73 m^2), and 6/213 (2.82%) were on hemodialysis prior to the CABG procedure. The most frequent CKD stage among the patients was stage 2 (82/206; 39.81%).

In terms of cardiovascular status, the most frequent CCS AGS category among the patients was class II (41/123; 33.33%), while the most frequent NYHA FC was II (80/199; 40.20%). There were 73/211 (34.60%) patients who had a history of myocardial infarction within 3 months prior to CABG. The mean LVEF was 50.33 ± 13.54%, and 59/140 (42.14%) of the patients had LVEF less than 50%. Most of the patients (172/212; 81.13%) had 3-vessel

Table 3 Comparison of preoperative characteristics between patients who had early extubation (EE) and patients with prolonged mechanical ventilation (PMV)

Characteristics	n*	EE	n*	PMV	p-value
Mean age ± SD, *years*	172	60.04 ± 9.63	40	60.51 ± 10.01	0.7506
Sex, *frequency (%)*	172		40		0.8913
Male		135 (78.49)		31 (77.50)	
Female		37 (21.51)		9 (22.50)	
BMI	172		40		
Mean ± SD, *kg/m²*		26.08 ± 6.00		24.58 ± 3.58	0.1307
Obese†, *frequency (%)*		104 (60.47)		21 (52.50	0.3563
Malnourished patients‡, *frequency (%)*		7 (4.07)		3 (7.50)	0.3567
Hypertension, *frequency (%)*	172	124 (72.09)	40	29 (72.50)	0.9587
Diabetes, *frequency (%)*	172	102 (59.30)	40	20 (50.00)	0.2836
COPD, *frequency (%)*	172	12 (6.98)	40	4 (10.00)	0.5144
Mean GFR ± SD, *mL/min/1.73 m²*	167	74.77 ± 24.83	38	57.68 ± 28.46	0.0003§
CKD stage ||, *frequency (%)*	167		38		0.0213§
1		53 (31.74)		5 (13.51)	
2		67 (40.12)		15 (39.47)	
3A		23 (13.77)		5 (13.16)	
3B		18 (10.78)		7 (18.24)	
4		3 (1.80)		3 (7.89)	
5		3 (1.80)		3 (7.89)	
Renal dysfunction¶, *frequency (%)*	167	48 (28.74)	38	20 (52.63)	0.0047§
On hemodialysis, *frequency (%)*	172	3 (1.74)	40	3 (7.50)	0.0480§
Smoker, *frequency (%)*	172	86 (50.00)	40	21 (52.50)	0.8592
CCS AGS classification, *frequency (%)*	101		21		0.0158§
I		31 (30.69)		3 (14.29)	
II		37 (36.63)		4 (20.05)	
III		10 (9.90)		2 (9.52)	
IV		23 (22.77)		12 (57.14)	
NYHA FC, *frequency (%)*	159		39		<0.0001§
I		51 (32.08)		8 (20.51)	
II		67 (42.14)		12 (30.77)	
III		30 (18.87)		5 (12.82)	
IV		11 (6.92)		14 (35.90)	
Recent myocardial infarction**, *frequency* (%)	170	54 (31.76)	40	18 (45.00)	0.1452
Mean LVEF ± SD, %	109	51.72 ± 12.80	31	46.16 ± 15.04	0.0516
LVEF <50%, *frequency (%)*	109	40 (36.70)	31	19 (61.29)	0.0144§
Number of diseased vessels, *frequency* (%)	171		40		0.7940
1		10 (5.85)		3 (7.50)	
2		23 (13.45)		4 (10.00)	
3		138 (80.70)		33 (82.50)	
Preoperative condition, *frequency (%)*					
Cardiogenic shock††	172	2 (1.16)	40	5 (12.50)	0.0003§‡‡
Intubated preoperatively	172	0 (0.00)	40	4 (10.00)	<0.0001§‡‡
Urgency of procedure, *frequency (%)*	172		40		0.0032§‡‡
Emergency		0 (0.00)		2 (5.00)	
Elective		172 (100.00)		38 (95.00)	
Mean % risk of mortality by EuroSCORE II ± SD	92	2.16 ± 2.17	26	5.09 ± 4.97	<0.0001§
Mean % risk of mortality by STS ACSR ± SD	102	1.74 ± 3.04	26	3.85 ± 4.54	0.0055§

*Value of n varies because of missing data.
†BMI >25 kg/m^2.
‡BMI <18.5 kg/m^2.
§Significant at p<0.05.
||CKD stage solely based on calculated GFR
¶GFR <60 mL/min/1.73 m^2.
**Within 3 months prior to CABG.
††Use of inotropic agents or IABP.
‡‡Fisher's exact test.
BMI — body mass index; CCS AGS — Canadian Cardiovascular Society Angina Grading Scale; CKD — chronic kidney disease; COPD — chronic obstructive pulmonary disease; EuroSCORE II — European System for Cardiac Operative Risk Evaluation II; GFR — glomerular filtration rate; IABP — intra-aortic balloon pump; LVEF — left ventricular ejection fraction; NYHA FC — New York Heart Association Functional Class; STS ACSR — Society of Thoracic Surgeons Adult Cardiac Surgery Risk.

CAD. Prior to CABG, 8/213 (3.76%) patients had cardiogenic shock, 4/213 (1.88%) were intubated for an indication that occurred preoperatively, and 2/213 (0.94%) had to undergo emergency CABG.

Of 212 patients, 172 (81.13%) had EE (within 24 hours postoperatively), while 40 (18.87%) had PMV (after 24 hours postoperatively). Table 2 shows the comparison of outcomes between patients who had EE and those with PMV. The PMV group had significantly higher mortality rate after 24 hours (10/39; 25.64% versus 3/171; 1.75%); <0.001), longer mean length of ICU stay (222.48 ± 292.02 hours versus 113.24 ± 69.58 hours; p<0.001), and longer mean length of hospital stay (30.08 ± 411.24 days versus 17.95 ± 9.35 days; p<0.001) compared to patients in the EE group.

Table 3 shows the comparison of demographic and preoperative clinical characteristics between patients who had EE and patients with PMV. The preoperative GFR of patients with PMV (57.68 ± 28.46 mL/min/1.73 m^2) was significantly lower compared to that of patients who had EE (74.77 ± 24.83 mL/min/1.73 m^2; p=0.0003). There were more patients with early-stage CKD in the EE group (53/167; 31.74% with CKD stage 1 and 67/167; 40.12% with CKD stage 2) than in the PMV group (5/38; 13.51% with CKD stage 1 and 15/38; 39.47% CKD stage 2). The PMV group had significantly higher proportions of patients with renal dysfunction (20/38; 52.63% versus 48/167; 28.74%; p=0.0047) and patients on hemodialysis (3/40; 7.50% versus 3/172; 1.74%; p=0.0480) compared to the EE group.

The most frequent angina CCS AGS classifications were class II among patients who had EE (37/101; 36.63%) and class IV among patients with with PMV (12; 57.14%; p=0.0158). Likewise, the most frequent NYHA FC were class II among patients who had EE (67/159; 42.14%) and class IV among patients with with PMV (14/39; 35.90%; p<0.0001). The PMV group had significantly higher proportions of patients with LVEF less than 50% (19/31; 61.29%), in cardiogenic shock (5/40; 12.50%), patients intubated preoperatively (4/39; 10.00%) and patients requiring emergency CABG (2/39; 5.00%) compared to the EE group. Patients with PMV group had significantly higher mean risk of mortality by EuroSCORE II (5.09 ± 4.97%) and mean mean risk of

Table 4 Comparison of intraoperative characteristics between patients who had early extubation (EE) and patients with prolonged mechanical ventilation (PMV)

Characteristics	n*	EE	n*	PMV	p-value
CPB duration	163		38		
Mean ± SD, *minutes*		180.96 ± 41.87		200.23 ± 51.93	0.0147†
Proportion of CPB >180mins, *frequency (%)*		78 (47.56)		25 (64.10)	0.0633
Mean ACC time ± SD, *minutes*	161	149.54 ± 34.81	39	162.79 ± 46.16	0.0476†
OPCAB, *frequency (%)*	171	8 (4.65)	39	0 (0.00)	0.3571‡
Mean number of units of blood products transfused ± SD					
PRBC	172	2.13 ± 1.88	40	2.55 ± 1.97	0.2193
WB	172	0.70 ± 1.23	40	0.63 ± 1.21	0.7164
PC	172	2.48 ± 2.45	40	2.28 ± 2.63	0.6440
FFP	172	1.75 ± 1.73	40	1.73 ± 2.15	0.9376
Total blood products	172	9.97 ± 6.89	40	10.55 ± 7.80	0.6413
Use of Cell Saver®, *frequency (%)*	172	58 (33.72)	40	13 (32.50)	0.8828
Intraoperative insertion of IABP§, *frequency (%)*	172	25 (14.53)	40	14 (35.00)	0.0026†
Use of >2 kinds of inotropic agents, *frequency (%)*	172	10 (5.85)	40	6 (15.00)	0.0476†
Other surgical procedures, *frequency (%)*	172	6 (3.49)	40	1 (2.50)	0.6072‡

*Value of n varies because of missing data.
†Significant at p<0.05.
‡Fisher's exact test.
§Excluding those with IABP preoperativley.
ACC — aortic cross-clamp; CPB — cardiopulmonary bypass; FFP — fresh frozen plasma; IABP — intra-aortic balloon pump; OPCAB — off-pump coronary artery bypass; PC — platelet concentrate; PRBC — packed red blood cells; WB — whole blood.

Table 5 Comparison of postoperative characteristics between patients who had early extubation (EE) and patients with prolonged mechanical ventilation (PMV)

Characteristics	n*	EE	n*	PMV	p-value
Mean hematocrit level ± SD	170	0.35 ± 0.05	38	0.33 ± 0.04	0.4555
PaO_2/FiO_2					
Mean ± SD	169	272.01 ± 119.50	39	277.23 ± 215.33	0.8363
PaO_2/FiO_2<200, *frequency (%)*	169	45 (26.04)	39	13 (35.90)	0.2157
Acute kidney injury†, *frequency (%)*	166	45 (27.11)	35	25 (71.43)	<0.0001‡
New indication for hemodialysis†, *frequency (%)*	169	23 (13.61)	37	16 (43.24)	<0.0001‡
Neurologic complications§, *frequency (%)*	172	5 (2.91)	40	12 (30.00)	<0.0001‡
Arrhythmia, *frequency (%)*	172	27 (15.70)	40	13 (32.50)	0.0144‡
New myocardial infarction||, *frequency (%)*	172	2 (1.16)	40	2 (5.00)	0.1621¶
Acute respiratory distress syndrome, *frequency (%)*	172	10 (5.81)	40	5 (12.50)	0.1374
Other pulmonary complications**, *frequency (%)*	172	30 (17.44)	40	17 (42.50)	0.0006‡
Other non-pulmonary complications††, *frequency (%)*	171	10 (5.81)	39	7 (17.50)	0.0142‡

*Value of n varies because of missing data.
†Excluding those on hemodialysis preoperatively.
‡Significant at p<0.05.
§Including seizures, cerebrovascular infarct, cerebrovascular bleed, tansient ischemic attack.
||Excluding pre-existent myocardial infarction.
¶Fisher's exact test.
**Including nosocomial pneumonia, pleural effusion, atelectasis, pulmonary congestion, pulmonary edema.
††Including upper gastrointestinal bleed, decubitus ulcer, device related infection, surgical site infection, ischemic hepatitis, postoperative myasthenia gravis.
FiO_2 — fraction of inspired oxygen; PaO_2 — partial pressure of oxygen in arterial blood.

mortality by STS ACSR (3.85 ± 4.54%) than those who had EE. The rest of the demographic and preoperative clinical characteristics were comparable in between the two groups.

Comparison of the intraoperative characteristics between patients who had EE and those with PMV are presented in Table 4. The mean CPB time of patients with PMV (200.23 ± 51.93 minutes) was significantly higher compared to that of patients who had EE (180.96 ± 41.87 minutes; p=0.0147). Likewise, the mean ACC time of patients with PMV (162.79 ± 46.16 minutes) was significantly higher than that of patients who had EE (149.54 ± 34.81 minutes; p=0.0476). The PMV group (14/40; 35.00%) had a significantly higher proportion of patients who had intraoperative insertion of IABP, than those in EE group (25/172; 14.53%;

Table 6 Univariate odds ratios (95% CI) of having prolonged mechanical ventilation (PMV) for selected preoperative, intraoperative, and postoperative characteristics of patients who underwent coronary artery bypass grafting (CABG)

Characteristics	Odds ratio (95% CI)	p-value
Preoperative variables		
Demographic/clinical profile		
Age >60 (mean)	1.12 (0.56 to 2.24)	0.7403
Male	0.94 (0.41 to 2.16)	0.8899
Abnormal BMI*	0.81 (0.40 to 1.64)	0.5606
Hypertension	1.02 (0.47 to 2.20)	0.9587
Diabetes	0.69 (0.34 to 1.37)	0.2851
Smoking	1.11 (0.56 to 2.20)	0.7758
COPD	1.48 (0.45 to 4.86)	0.5162
Renal dysfunction	2.75 (1.34 to 5.66)	0.0058†
ESRD on hemodialysis	4.57 (0.89 to 23.53)	0.0694
CAD severity		
NYHA FC IV	7.53 (3.07 to 18.46)	<0.0001†
CSS AGS IV	4.52 (1.69 to 12.07)	0.0026†
Recent MI	1.76 (0.87 to 3.55)	0.1150
LVEF <50%	2.80 (1.23 to 6.38)	0.0141†
3 vessel disease	1.13 (0.46 to 2.77)	0.7940
Preoperative condition		
Cardiogenic shock	12.14 (2.26 to 65.11)	0.0036†
EuroScore II mortality >5.0%	5.56 (1.88 to 16.46)	0.0020†
STS mortality >5.0%	7.34 (1.90 to 28.42)	0.0039†
Intraoperative variables		
CPB duration >180 mins	1.97 (0.96 to 4.05)	0.0662
ACC time >150 mins	1.75 (0.85 to 3.57)	0.1271
PRBC+WB >4	1.05 (0.44 to 2.50)	0.9053
Total blood >10	0.77 (0.39 to 1.55)	0.4704
Use of Cell Saver®	0.95 (0.45 to 1.97)	0.8831
Intraoperative insertion of IABP	3.17 (1.46 to 6.88)	0.0036†
Use of >2 kinds of inotropic agents	2.86 (0.97 to 8.40)	0.0561
Other procedure	0.71 (0.08 to 6.06)	0.7540
Postoperative variables		
Low hematocrit	1.01 (0.43 to 2.39)	0.9865
Low PaO$_2$:FiO$_2$ ratio	1.59 (0.76 to 3.33)	0.2179
Acute kidney injury	6.72 (2.99 to 15.10)	<0.0001†
New indication for hemodialysis	4.84 (2.21 to 10.60)	<0.0001†
Neurological complications	13.04 (4.21 to 40.39)	0.0001†
Arrythmia	2.59 (1.19 to 5.63)	0.0168†
New myocardial infarction	4.47 (0.61 to 32.77)	0.1403
Other pulmonary complications‡	3.50 (1.67 to 7.34)	0.0009†
Other non-pulmonary complications§	3.44 (1.22 to 9.68)	0.0195†

*BMI <18.5 and >25.
†Significant at p<0.05.
‡Including nosocomial pneumonia, pleural effusion, atelectasis, pulmonary congestion, pulmonary edema.
§Including upper gastrointestinal bleed, decubitus ulcer, device related infection, surgical site infection, ischemic hepatitis, postoperative myasthenia gravis.
ACC — aortic cross-clamp; BMI — body mass index; CAD — coronary artery disease; CCS AGS — Canadian Cardiovascular Society Angina Grading Scale; COPD — Chronic Obstructive Pulmonary Disease; CPB — cardiopulmonary bypass; ESRD — end stage renal disease; EuroSCORE II — European System for Cardiac Operative Risk Evaluation II; IABP — intra-aortic balloon pump; LVEF — left ventricular ejection fraction; NYHA FC — New York Heart Association Functional Class; PRBC — packed red blood cells; STS ACSR — Society of Thoracic Surgeons Adult Cardiac Surgery Risk; WB — whole blood.

p=0.0026). Similarly, the proportion of patients who were given more than two kinds of inotropic agents intraoperatively in the PMV group (6/40; 15.00%) was significantly higher than that in the EE group (10/172; 5.85%; p=0.0476). The two groups were comparable in terms of the rest of the intraoperative characteristics.

Table 5 shows the comparison of the postoperative characteristics of patients who had EE and patients with PMV. Patients with PMV had significantly higher frequencies of the following postoperative complications: AKI (25/35; 71.43% versus 45/166; 27.11%; p<0.0001), new indication for hemodialysis (16/37; 43.24% versus 23/169; 13.61%; p<0.0001), neurologic sequelae (12/40; 30.00% versus 5/172; 2.91%; p<0.0001), arrhythmia (13/40; 32.50% versus 27/172; 15.70%; p=0.0144), other pulmonary complications (17/40; 42.50% versus 30/172; 17.44%; p=0.0006), and other non-pulmonary complications (7/39; 17.50% versus 10/171; 5.81%; p=0.0142) compared to patients who had EE. Other postoperative characteristics between the two groups were comparable.

Presented in table 6 are the univariate odds ratios of PMV for preoperative, intraoperative and postoperative characteristics. Among the preoperative variables, renal dysfunction (OR=2.75; 95% CI 1.34 to 5.66; p=0.0058), NYHA FC IV (OR=7.53; 95% CI 3.07 to 18.46; p=<0.0001), CCS AGS IV (OR=4.52; 95% CI 1.69 to 12.07; p=0.0026), LVEF <50% (OR=2.80; 95% CI 1.23 to 6.38; p=0.0141), cardiogenic shock (OR=12.14; 95% CI 2.26 to 65.11; p=0.0036), EuroSCORE II mortality >5.0% (OR=5.56; 95% CI 1.88 to 16.46; p=0.0020), and STS ACSR mortality >5.0% (OR=7.34; 95% CI 1.90 to 28.42; p=0.0039) all significantly increased the odds ratio of having PMV. Only intraoperative insertion of IABP (OR=3.17; 95% CI 1.46 to 6.88; p=0.0036) among the intraoperative variables increased the odds ratio of PMV. Postoperative variables that significantly increased the odds of PMV include postoperative AKI (OR =6.72; 95% CI 2.99 to 15.10; p=<0.0001), a new postoperative indication for hemodialysis (OR =4.84; 95% CI 2.21 to 10.60; p=<0.001), postoperative neurological complications (OR =13.04; 95% CI 4.21 to 40.39; p=0.0001), postoperative arrhythmia (OR =2.59; 95% CI 1.19 to 5.63; p=0.0168), other pulmonary complications (i.e., nosocomial pneumonia, pleural effusion, atelectasis, pulmonary congestion, or pulmonary edema) (OR=3.50; 95% CI 1.67 to 7.34; p=0.0009), and other non-pulmonary complications (i.e., surgical site infection, upper gastrointestinal bleed,

Table 7 Multivariable odds ratio (95% CI) of having prolonged mechanical ventilation (PMV)

Characteristics	Adjusted odds ratio (95% CI)	p-value
Renal dysfucntion	1.16 (0.13 to 10.15)	0.8913
NYHA FC IV	1.64 (0.10 to 28.15)	0.7342
CCS AGS IV	7.74 (0.49 to 121.28)	0.1449
LVEF <50	0.52 (0.07 to 3.96)	0.5256
Preoperative cardiogenic shock	10.79 (0.13 to 913.76)	0.2937
Intraoperative insertion of IABP	8.43 (0.97 to 72.96)	0.0530
Acute kidney injury	11.82 (1.03 to 135.35)	0.0470*
New indication for hemodialysis	2.75 (0.27 to 27.68)	0.3909
Neurological complications	2.98 (0.17 to 52.24)	0.4549
Arrythmia	2.32 (0.32 to 17.16)	0.4069
Other pulmonary complications	5.27 (0.59 to 46.97)	0.1361
Other non-pulmonary complications	1.94 (0.12 to 30.45)	0.6382

*Significant at $p<0.05$
CCS AGS — Canadian Cardiovascular Society Angina Grading Scale; IABP — intra-aortic balloon pump; LVEF — left ventriculat ejection fraction; NYHA FC — New York Heart Association Functional Class.

decubitus ulcer, device related infection, surgical site infection, ischemic hepatitis, or postoperative myasthenia gravis) (OR =3.44; 95% CI 1.22 to 9.68; p=0.0195).

All significant variables in the univariate logistic regression analyses were entered into a multiple regression model. The multivariable odds ratio (95% CI) of PMV are presented in Table 7. In this regression model, only AKI independently increased the odds ratio of having PMV (adjusted OR=11.82; 95% CI (1.03 to 135.35; p=0.0470).

DISCUSSION

Key results

The frequency of PMV after CABG among patients with CAD in this study was 18.87%. Preoperative patient characteristics that increased the odds ratios of having PMV include renal dysfunction, cardiogenic shock, NYHA FC IV, CCS AGS class IV, LVEF <50%, greater than 5% mortality risk by EuroSCORE II, and greater than 5% mortality risk by STS ACSR. The intra-operative use of IABP and the postoperative development of AKI, neurological complications, arrhythmia, other pulmonary and non-pulmonary complications, as well as a new postoperative indication for hemodialysis, all significantly increased the odds ratios of having PMV. Multiple regression analysis showed that postoperative AKI was an independent predictor of PMV.

Strengths and limitations

This is the first systematic and comprehensive description of the demographic and clinical profiles of patients with CAD who underwent CABG that has been reported from our heart institute since its opening in 2007. To the best of our knowledge, this is also the first time that predictors of PMV have been explored among Filipino patients belonging to this subpopulation.

We identified some limitations that are inherent to the retrospective design of this study. Some important data on potential predictors and outcomes, which could possibly influence our results, were not reflected in the patient records that we reviewed. Moreover, we were not able to accurately account for potential variations in medical and surgical technology, surgical technique and experience, as well as prevailing health care approach to patients, throughout the 8-year span covered by this study. It is possible that these variations have significant impact on the outcomes that we measured in this study.

Interpretation

The demographic and clinical profiles of patients in our study were similar to those in previous studies done among similar patients in other older heart institutions in the Philippines (Table 8). The previous studies reported that the average ages of Filipino patients with CAD who underwent CABG were within the range of 59-62 years,[26-28] and that the mean BMI was 24.8 kg/m^2.[27] As in our study, majority of the patients in previous studies (75-85%) were males[26-28] and had hypertension (69-72%).[26 27] The mean LVEF of patients in our study was comparable to that of patients in another study.[27] Our study however recorded higher rates of smoking, diabetes and COPD among patients. There were also more patients who presented with 3-vessel disease and who were admitted for elective surgery in our study. The observed differences in the rates of comorbidities probably reflect the increasing trends of these medical conditions over the years.[29 30] This could also mean that more and more patients with comorbidities undergo CABG as a therapeutic procedure. Another possibility is that this is a form of selection bias. Further studies are needed to explore these differences.

Compared to the PMV rates reported in other studies, which range from 2.4 to 10.4,[3 5 8 9 12 14] the rate in our study (18.87%) appears to be the highest. The definition of PMV varied among the previous reports, with time cutoffs ranging from 12 hours to 72 hours

Table 8 Comparison of demographic and clinical profiles of patients with coronary artery disease (CAD) who underwent coronary artery bypass grafting (CABG) in different heart institutions in the Philippines

Outcomes	This study 2015 n=213	Enriquez 2008[26] n=225	Bastan 2007[27] n=296	Vilela 2005[28] n=298
Number of years covered by the study	8	1	7	1
Mean age ± SD, *years*	60.20 ± 9.68	59.76 ± 9.18	59.7 ± 9.69	61.6 ± 9.15
BMI ± SD, kg/m^2	25.80 ± 5.65	---	24.8 ± 3.58	---
Male sex, *%*	78.40	85.3	79	75.48
Hypertension, *%*	72.30	71.6	69.6	---
Diabetics, *%*	57.75	41.3	38.8	---
Smokers, *%*	50.70	33.3	38.2	---
COPD, *%*	7.98	---	---	4.7
Previous history of MI, *%*	34.60	---	40.5	40.93
LVEF				
Mean ± SD	50.33 ± 13.54	---	53.4 ± 21.73	---
<40%, *%*	---	---	---	10.4
<50%, *%*	30.71	---	---	---
3-vessel disease, *%*	81.13	---	59.5	---
Elective CABG, *%*	99.06	---	68.5	64.76

BMI — body mass index; COPD — chronic obstructive pulmonary disease; EF — ejection fraction; LVEF — left ventricular ejection fraction; MI — myocardial infarction.

postoperatively.[2-16] Studies with cutoffs of >24 hours cutoffs for PMV will tend to exclude more patients from being classified as having PMV and report lower PMV rates. On the other hand, a cutoff of 12 hours would further increase the PMV rate in our study because of our practice of extubating patients the day after the CABG procedure. The relatively high rate of PMV in our study could be due to the inclusion of more patients with worse preoperative cardiac, renal, and pulmonary conditions, higher operative mortality risks, worse intraoperative hemodynamic conditions, longer operative durations, and postoperative complications—clinical factors that proved to be associated with PMV.

In this study, PMV is associated with poor preoperative cardiac and renal status, and postoperative complications. Low cardiac output syndrome (LCOS), which is a consequence of myocardial dysfunction, is a common complication of CABG that requires intraoperative placement of IABP and the use of more than two kinds of inotropic agents.[31,32] LCOS is associated with poorer outcomes and increased incidence of pulmonary complications, myocardial infarction and renal failure.[33] The risk factors for LCOS are similar to the ones that we identified as associated with PMV, including low LVEF,[32,33] renal failure,[32] and emergency nature of the CABG procedure,[33] probably suggesting a common pathophysiology for the two conditions. Higher operative risks scores (EuroSCORE II and STS ACSR) are associated with PMV because these scores are calculated based on preoperative variables that influence PMV, including cardiopulmonary and renal parameters.

The incidence of AKI after CABG may range from 3.6% to 30%, depending on the definition used,[34-36] and around 1% of the patients undergoing the procedure develop new indications for hemodialysis.[37] Following the KDIGO definition of AKI—increase in creatinine by 0.3 mg/dL (26.5 μmol/L) from baseline within 48 hours or increase 1.5 times from baseline within seven days—[26] we found that 34.83% of the patients in our study developed AKI post-CABG, and that 18.93% of patients who underwent CABG had new indications for hemodialysis postoperatively.

AKI can develop from several conditions, including intraoperative hypotension, postoperative cardiac complications that compromise kidney perfusion, hemolysis, atheroemboli, and contrast media exposure.[37] AKI after surgery was the only independent risk factor for PMV among patients in our study. This is the first time that postoperative AKI is reported to be associated with PMV. AKI will ultimately manifest as low urine output and volume overload in the lungs and heart, exacerbating cardiac dysfunction and pulmonary congestion, which will require extended mechanical ventilation support.

In prolonged CABG procedures, both CPB and ACC durations are increased. Unlike other open heart surgeries, those that require CPB have been known to decrease pulmonary function and increase the risk for postoperative pulmonary complications.[38] This dysfunction, otherwise known as the pump lung or the post pump syndrome, is due to an acute pulmonary inflammatory response that can arise from ischemia-reperfusion injury, endotoxemia, operative trauma, pre-existing left ventricular dysfunction, non-pulsatile blood flow, or contact of blood components with the artificial surface of the bypass circuit.[37] Many studies have looked into CPB time as a risk factor for PMV.[2,3,8,9,13] Two studies were able to establish CPB time as an independent predictor of PMV.[2,9] In one study, a CPB duration of more than 91 minutes significantly increased the odds ratio of having PMV of more than 12 hours to 1.39.[2] The other reported that a CPB duration of more than 120 mins significantly increased the odds ratio of having PMV of more than 24 hours to 9.6.[9] ACC time, on the other hand, refers to the duration that the aorta is clamped during bypass. Aorta clamping increases brain circulation but compromises the blood supply to the lower extremities and, more importantly, to the kidneys. Prolonged ACC, because of its strong association with postoperative AKI,[12] may indirectly result in PMV.

Generalizability

CABG is an important surgical procedure in the treatment of CAD. Postoperative complications related to a patient's preoperative medical condition and to the complexity of the CABG procedure —especially AKI—can predispose the patient to PMV. PMV, in turn, has been associated with prolonged hospital stay and mortality. Reducing the risk for AKI can reduce the incidence of PMV and subsequently reduce duration of hospital stay and mortality post-CABG. Every attempt should be made in order to avoid events or interventions that predispose patients to postoperative AKI such as exposure to contrast media, intraoperative hypotension, and cardiac complications that result in hypoperfusion of the kidneys.

We hope to be able to develop preemptive strategies for reducing the occurrence of PMV based on the findings of this study. To account for differences or changes in patients' demographic and clinical characteristics, the growing experience of health care providers, as well as improvements in surgical and anesthetic techniques over time,[3] other institutions can come up with their own prediction models for PMV after CABG and regularly reassess or update their findings.

CONCLUSION

PMV occurred in 18.87% of the patients with CAD who had CABG in this study. Preoperative renal dysfunction, cardiogenic shock, NYHA FC IV, CCS AGS class IV, LVEF <50%, EuroSCORE II of >5% mortality risk, and STS ACSR score of >5% mortality risk increased the odds ratio of having PMV. The intraoperative insertion of IABP, as well as the occurrence of postoperative complications, namely—AKI, neurological complications, arrhythmia, other pulmonary and non-pulmonary complications, and a new postoperative indication for hemodialysis, all significantly increased the odds ratios of having PMV. On multiple regression analysis, postoperative AKI proved to be an independent predictor of PMV.

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Ethics approval
This study was reviewed and approved by the Department of Health XI Cluster Ethics Review Committee (DOHXI CERC reference P15101201).

Reporting guideline used
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CASE REPORT

Malignant extragonadal yolk sac tumor of the cervix in a 2-year-old female: case report

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ABSTRACT

Extragonadal germ cell tumors (EGGCT) are rare neoplasms. Yolk sac tumors (YST), a histologic variant of EGGCT, is rarely found in the cervix, especially among infants. We report a 2-year-old girl who presented with a 6-week history of foul smelling vaginal discharge and a cervical mass on computed tomography. Diagnosis of YST was established through biopsy, positive immunohistostaining with SALL4, placental alkaline phosphatase and alpha-fetoprotein (AFP), and an elevated serum AFP level. Because surgery can possibly affect the patient's reproductive capacity adversely, we initially decided to aim for remission with chemotherapy. The presence of a residual mass post-chemotherapy and an increasing trend in serum AFP levels prompted us to do radiotherapy for local control of the mass, with incomplete tumor response.

Keywords. cervico-uterine mass, germ cell tumor, radiotherapy, chemotherapy, immunohistostaining

INTRODUCTION

Malignant germ cell tumors (MGCT) are rare. Their incidence varies according to age and sex. They occur in the <20-year-old group with the incidence of 12 cases per million populaton.[1] Pediatric MGCT account for less than 3% of pediatric malignancies.[2] In children less than three years of age, MGCT are most commonly extragonadal or testicular in males and ovarian in females.[1] Extragonadal germ cell tumors (EGGCT) are germ cell neoplasms characterized by one of the histologies associated with gonadal origin, but are located outside of the gonads. Commonly, EGGCT are located in the mediastinum and retro-peritoneum. On rare occasions, EGGCT can be found in the pineal region, prostate, vagina, sacrococcygeal region, orbital region, liver and gastrointestinal tract.[3] Cervical yolk sac tumor, a variant of EGGCT, is extremely rare, with only three cases in children less than three years old reported worldwide.[4-6] We present a young girl who came in due to bloody vaginal discharge and was eventually diagnosed as having malignant extragonadal yolk sac tumor of the cervix.

CLINICAL FEATURES

A two-year-old girl from Southern Mindanao came to our institution for a six-week history of occasional bloody, brownish, foul-smelling vaginal discharge, with passage of meaty tissues and blood clots. This was associated with occasional vaginal pain. There was no reported fever, loss of appetite, weight loss, vomiting, dyspnea, abdominal pain, diarrhea or easy bruising. The patient's parents brought her to a local clinic, and she was initially prescribed with antibiotics, which did not stop the symptoms. During a second consult in a local hospital, a pelvic ultrasonography done on the patient revealed an echogenic solid structure, measuring 2.8 x 2.4 cm, in the pelvic region. She was then referred to a pediatric oncologist in our institution for further evaluation and management. The patient's past medical, family, birth, and maternal histories were all unremarkable. She had complete immunizations for a two-year-

IN ESSENCE

Yolk sac tumor of the cervix is rare among children less than three years old.

In this case report, a two-year-old girl was diagnosed to have a cervico-uterine yolk sac tumor. Because of the location and possible complications or consequences of surgery, remission by chemotherapy was attempted. The lack of a complete response prompted us to proceed with radiotherapy for local control. However, the persistence of a residual mass and rising tumor markers made us decide to pursue surgery.

Based on limited case reports, complete remission and local control of yolk sac tumors may require chemotherapy, radiotherapy and surgery.

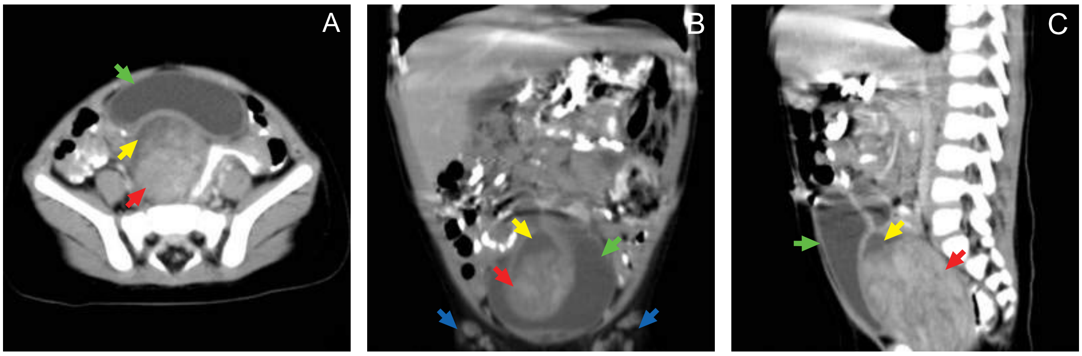

Figure 1 Abdominal computed tomography taken on admission, showing a large, fairly defined, heterogeneously enhancing soft tissue, measuring 6.4 x 5 x 4.3 cm, noted at the region of the cervix and uterus (A, B, and C: red arrows). Cystic components are seen contiguous to the enhancing mass (A, B, and C: yellow arrows). The sigmoid colon is compressed, demonstrating wall thickening. The mass causes compression and displacement of the urinary bladder anteriorly (A, B, and C: green arrows). Multiple enhancing lymph nodes are seen in the left and right inguinal areas (B: blue arrows).

old, and her growth and developmental milestones have been at par with age.

On physical examination during the initial admission, the patient was awake but was pale and weak looking. She had pale conjunctivae. The abdomen was globular. A firm, palpable hypogastric mass, measuring 7 x 3 cm, and bilateral inguinal lymph nodes were noted. The external genitalia showed no lesions. Vaginoscope also revealed an intact hymen. The rest of the physical and neurological examination findings were unremarkable. Our primary consideration then was vaginal bleeding secondary to a urogynecological tumor.

DIAGNOSTIC APPROACHES

Blood workup revealed anemia of 94 g/L and leukocytosis of 10.60 x 103/μL, with 77% neutrophilic predominance. We requested for serum alpha-fetoprotein (AFP), lactate dehydrogenase (LDH) and beta human chorionic gonadotropin (beta-hCG), which all turned out

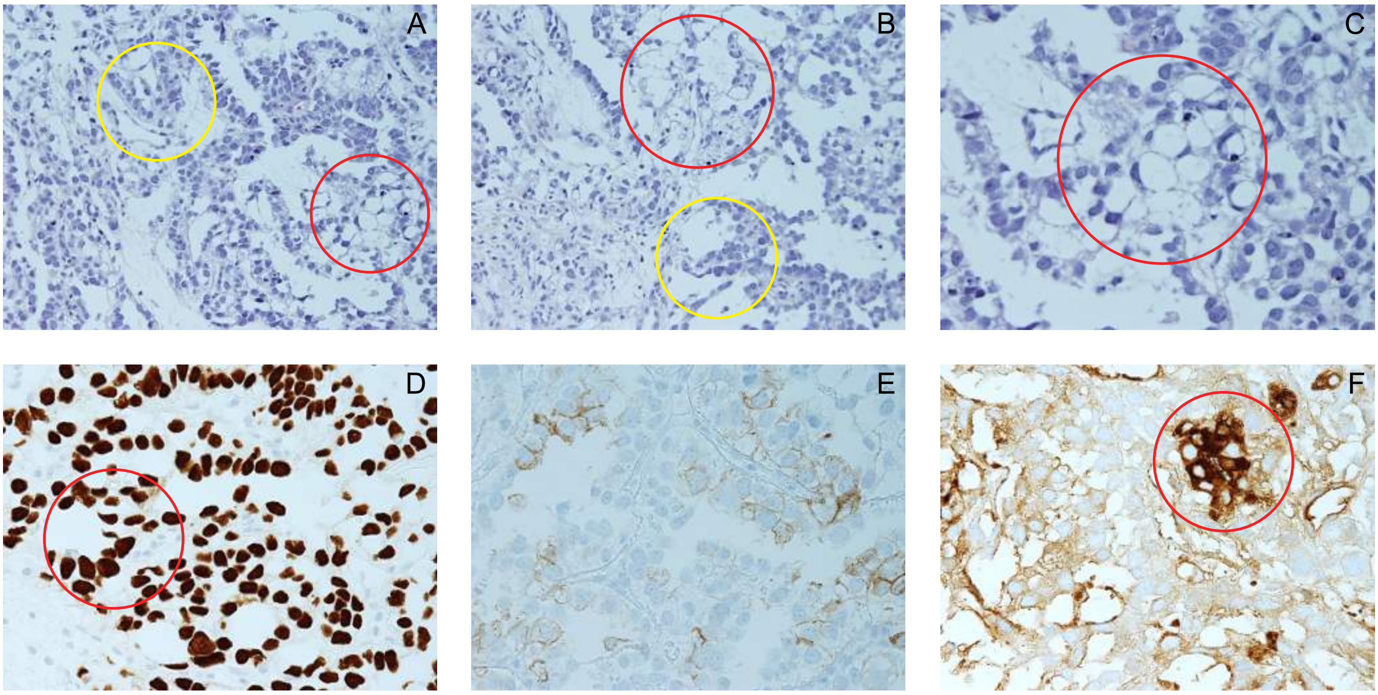

Figure 2 Histopathology of the cervico-uterine mass, which revealed a malignant neoplasm, displaying reticular, cord-like (A and B: yellow ring), and microcystic patterns (A, B, and C: red rings). The tumor is composed of polygonal cells with eosinophilic cytoplasm, round nuclei and occasional prominent nucleoli (hematoxylin-eosin stain, A: x200, B: x200, C: x400). The neoplastic cells demonstrate immunoreactivity for SALL4 with nuclear staining of tumor cells (D: red ring, x400) and for alpha-fetoprotein with cytoplasmic staining of tumor cells (F: red ring, x400), consistent with a yolk sac tumor. Immunohistostaining with placental alkaline phosphatase shows very weak membranous and cytoplasmic staining of few tumor cells (positive) (E: x400).

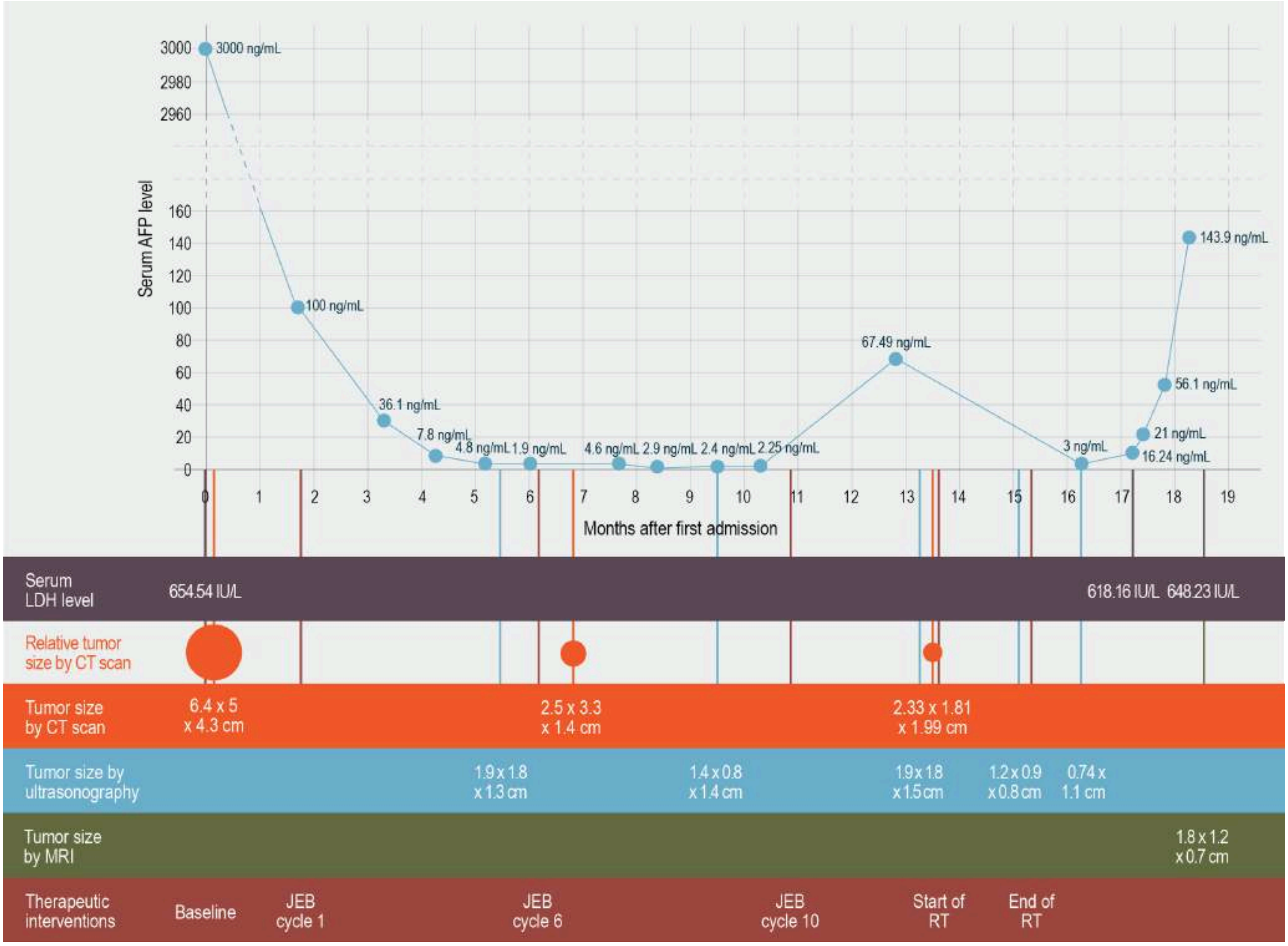

Figure 3 Chart showing temporal relationships of the therapeutic interventions, serum alpha-fetoprotein (AFP) levels, serum lactate dehydrogenase (LDH) levels, and the patient's tumor sizes by computed tomography (CT) scan, ultrasonography, and magnetic resonance imaging (MRI).

to be elevated: >3000 ng/mL (normal 0-9 ng/mL), 736 U/L (normal: 266-500 U/L) and 0.710 mIU/mL (normal: 0.5-1350 mIU/mL), respectively. Computed tomography (CT) of the whole abdomen with oro-rectal contrast (Figure 1) showed a large cervico-uterine mass measuring 6.4 x 5 x 4.3 cm and compressing the sigmoid colon and urinary bladder. At this point, we were considering extragonadal germ cell tumor.

We did a biopsy of the cervico-uterine mass by transvaginal approach. Histopathologic findings revealed areas with reticular, cord-like and microcystic patterns (Figure 2). The neoplastic cells demonstrate immunoreactivity to SALL4, placental alkaline phosphatase (PLAP) and AFP. These findings are consistent with a malignant germ cell tumor, specifically yolk sac tumor (YST). We staged the patient's malignancy (based on the childhood Extragonadal and Extracranial Germ Cell Tumor staging[7]) as stage III due to the involvement of the regional lymph nodes.

THERAPEUTIC APPROACHES

Our initial goal was to achieve remission by chemotherapy to preserve our patient's reproductive structures. We started the patient on a platinum-based chemotherapy regimen, consisting of six cycles of carboplatin, etoposide and bleomycin (JEB) every 21 days. Serum AFP level monitoring throughout the JEB course showed a gradual decrease from the baseline level of >3,000 ng/mL to its normal range of 9-10 ng/mL. By the sixth cycle, serum AFP level was 1.9 ng/mL (Figure 3).

Repeat CT scan after the JEB course showed a residual mass measuring 2.5 x 3.3 x 1.4 cm (Figure 4), hence we decided to extend the patient's chemotherapy regimen to 4 more cycles. The serum AFP level taken 11 weeks after the end of the tenth cycle was again elevated at 67.49 ng/ml. A repeat CT scan 3 months after the tenth JEB cycle did not show any significant reduction in the size of the mass (2.33 x 1.81 x 1.99 cm). The patient also started to have hypogastric pain. At this point, we decided to proceed with radiotherapy for local control. The patient underwent 28 fractions of external beam radiation therapy within 50 days. The tumor received a total radiation dose of 5040 cGy. After the radiotherapy, repeat ultrasonography revealed a reduction in the size of the mass to 1.2 x 0.9 x 0.8 cm.

The repeat serum AFP level taken three months after the end of radiotherapy showed further elevation at 143.9 ng/mL (Figure 3). We performed an abdominal magnetic resonance imaging (MRI), which showed the size of the residual mass to be 1.8 x 1.2 x 0.7 cm (Figure 4).

OUTCOMES

Due to the persistence of the mass and the elevated serum AFP levels, we held a multidisciplinary meeting with the Gynecology, Pathology, Radiology, General Surgery, Urology, Pediatric Surgery and Pediatric Oncology services. The consensus was to perform a total hysterectomy with vaginal exploration after obtaining the informed consent of the patient's family. Thorough preparation of the patient for the procedure is underway as of this writing.

DISCUSSION

Bloody vaginal discharge is a common and distressing complaint in the vast majority of women, especially during their reproductive years, but when it occurs in a two-year-old girl whose reproductive tract has not yet fully developed, a variety of conditions must be considered as possible diagnoses.

Vulvovaginitis is the most common gynecologic problem for prepubertal children presenting with abnormal vaginal discharge, genital pain, pruritus, erythema and dysuria.[8] This was initially considered in our patient but she did not improve with antibiotic therapy. Other considerations that merit further investigation are trauma, the presence of foreign bodies, or sexual abuse. We ruled out these conditions when the vaginoscopy done on the patient showed an intact hymen and did not reveal any foreign body.

Genital tumors are uncommon among children and adolescents, accounting for only 1.5 to 2.0% of all malignancies in this age group.[9] Vaginal bleeding in the premenarcheal girl is an early symptom and warrants investigation, including vaginoscopy.[10] An ultrasonography that was initially done on our patient was able to elucidate the underlying cause of the symptoms and allowed us to perform timely interventions.

Vaginal malignancies are usually embryogenic rhabdomyosarcomas, yolk sac tumors, or vaginal adenocarcinomas.[9 11] In our patient, the transvaginal biopsy revealed a malignant germ cell tumor. We initially entertained either an embryonal carcinoma or a yolk sac tumor. Immunohistostaining, turned positive for SALL4, PLAP and AFP stains, confirming the diagnosis of a yolk sac tumor.[12] It is expected that PLAP staining in YST is often focal, with stain uptake of less than 30% of tumor cells.[12]

Perivascular Schiller-Duval bodies are the most distinctive features of yolk sac tumor,[12 13] but these structures were not found in the biopsy specimen that we took from our patient. Tumor markers may also help differentiate the germ cell tumors. An elevated serum AFP

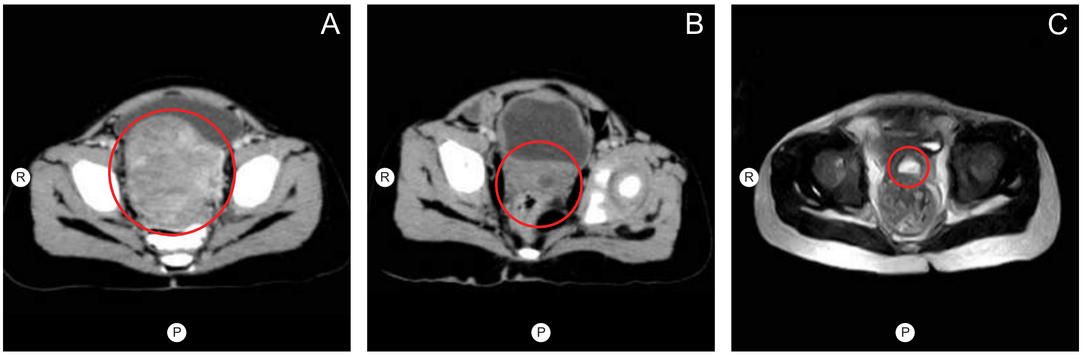

Figure 4 Axial views of abdominal computed tomography (CT) pre-chemotherapy (A), CT post-chemotherapy (B) and magnetic resonance imaging (MRI) 12 weeks post-radiotherapy (C), demonstrating a decrease in the size of the mass in the cervico-uterine region (A, B, and C: red rings). R - right; P - posterior.

level is mostly consistent with yolk sac tumor, while elevated beta-human chorionic gonadotropin (beta-HCG) usually accompanies germinomas or choriocarcinomas.[14]

Germ cell tumors, such as YST, mostly occur in the ovaries or testes.[4] EGGCT, such as YST in the cervix, are extremely rare especially in the pediatric population. This is the first case of YST in the cervix that we have seen in our institution. A review of literature that we did revealed only three reported cases of cervical YST among children less than three years old.[4-6] This is the fourth reported case worldwide.

Management of tumors in pediatric gynecology remains challenging since it aims not only to be lifesaving but also to preserve all capabilities for future pregnancy. The management of extragonadal YST may require the prudent combination of surgery, chemotherapy and radiotherapy.

Our patient's pretreatment tumor extended from the cervix to the uterus, displacing the bladder anteriorly and compressing the sigmoid colon. Due to the extent of the tumor, surgical resection would entail total hysterectomy, eliminating any hopes of future childbearing. The decision to originally avoid surgey and to achieve remission by chemotherapy alone was based on our attempt to preserve our patient's sexual and reproductive functions. When chemotherapy alone failed, we pursued radio-therapy, despite the added cost, to achieve local control of the residual tumor.

Chemotherapy with cisplatin, etoposide and bleomycin is the first line of chemotherapy and is the most effective regimen, with a greater than 90% overall survival outcome.[15] In our patient, we used the equally efficacious carboplatin instead of cisplatin in order to avoid the renal toxicity of cisplatin, which commonly occurs among children.[16]

Radiotherapy is an acceptable alternative option to surgery for local control following first-line chemotherapy in EGGCT, particularly in the mediastinum.[17] However, its role is less certain among patients with YST in the cervix. In previous case reports on EGGCT, most patients underwent surgical resection with neoadjuvant or adjuvant chemotherapy.[4-6] This is the first reported case of YST in the cervix where remission by chemotherapy and local control by radiotherapy were attempted. However, because of the residual tumor and rising serum AFP levels after chemotherapy, we decided to perform surgical removal of the tumor.

The rarity of malignant extragonadal yolk sac tumors in the cervix compelled us to approach our patient's management with limited information regarding effective treatments or evidence-based management guidelines, and with lack of experience among health care providers. We strongly considered our patient's age, the site of the tumor, and the patient's potential for childbearing when we opted to follow a chemotherapy and radiotherapy course, yet the patient's incomplete response to chemoradiotherapy convinced us to resort to surgery.

Acknowledgments
Our heartfelt gratitude goes to: the Department of Radiological and Imaging Sciences in Southern Philippines Medical Center (SPMC) for providing us the CT and MRI images used in this report; Dr Je-Ann Fabian-Tan of the Department of Radiology in Davao Doctors Hospital for evaluating and providing the labels in the CT and MRI images; Dr Oscar P Grageda and the residents of the Department of Pathology and Laboratories in SPMC for preparing the histopathologic report; and the Division of Clinical Pathology, Department of Pathology in St Jude Children's Research Hospital in Memphis, Tennessee, USA for reviewing the slides and for performing the immunohistostaining.

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Obtained through the patient's legally acceptable representative

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CARE Checklist
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None declared

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CASE REPORT

Giant scalp arteriovenous malformation in a 29-year-old male: case report

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ABSTRACT

Arteriovenous malformation (AVM) is rare, and extracranial AVMs comprise only 8.1% of all AVMs. Scalp AVMs may present with headache, local pain, and tinnitus. They may also remain clinically silent until a bleeding episode ensues. We report the case of a 29-year old male with an extremly large scalp AVM in the right temporoparietal region. We initially wanted to do conventional angiography to map the nidus, identify the feeders, and plan for a preoperative embolization. Our patient needed prompt surgery to control an episode of profuse bleeding coming from the mass before a conventional angiography could be done. The surgery incurred a significant amount of blood loss, and a non-resectable mass was left after the procedure. We were able to successfully perform serial embolization of a part of the patient's residual AVM two years after the surgery.

Keywords. embolization, conventional angiography, computed tomographic angiogram, magnetic resonance angiogram

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INTRODUCTION

Vascular formation within the brain develops through angiogenesis and vasculogenesis.[1] Arteriovenous malformation (AVM) results from a disruption of normal vascular differentiation and growth during fetal development.[1] The pathogenesis of AVM may be due to a persistent congenital vascular plexus, proliferative capillaropathy, or cellular and molecular differentiation.[1] In the general population, the prevalence of AVM is 15-18 per 100,000 adults.[1] The different treatment strategies for scalp AVMs include transarterial embolization, transvenous embolization, direct percutaneous embolization, electrothrombosis, and surgical excision or ligation.[2] Extracranial AVMs account for 8.1% of all AVM cases.[3] Scalp AVM is rare, and is about 20 times less common than intracranial AVMs.[4] We present the case of a 29-year-old male with a large scalp AVM, the clinical features of the disease, and our diagnostic and therapeutic approaches.

CLINICAL FEATURES

A 29-year-old male came to our hospital due to a scalp mass on the right temporo-parietal area. The mass was noted since birth. It had been gradually enlarging with no associated signs and symptoms until 5 years ago, when the mass had minimal bleeding, which was easily controlled by direct manual compression. A year after, the patient started complaining of on and off headache, exacerbated by exertion and usually relieved by taking paracetamol. The patient did not consult a physician for his condition until three years ago. He was admitted in 2013 so that thorough diagnostic imaging studies could be done. Past medical, social, and family histories were unremarkable.

When we first examined the patient, we noted a 15 x 10 x 3 cm bulging, soft, pinkish to erythematous mass on the right temporoparietal area. The lesion was scabbed, irregularly contoured, and nodular. Figure 1 shows a photo taken by the patient a few days prior to his first admission. The mass had a palpable thrill and an auscultable bruit. Vital signs were within normal limits. There were no other systemic abnormalities noted. At this point, we were thinking that the

IN ESSENCE

Scalp arteriovenous malformation (AVM) is a rare condition that requires imaging modalities for diagnosis and surgical planning.

We managed a patient with a giant scalp AVM on the right temporoparietal area. Because of profuse bleeding of the mass, we performed a surgical resection of a portion the lesion without preoperative conventional angiography or embolization. The patient had massive blood loss during the procedure.

To manage the progression of the postoperative residual mass, we mapped the lesion through conventional angiography and subsequently performed serial embolization.

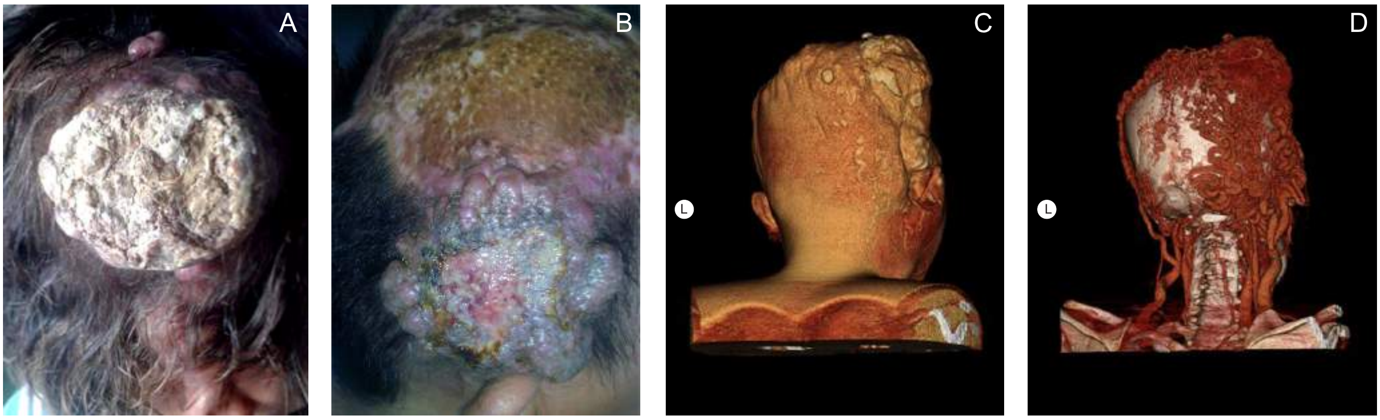

Figure 1 Photos of the right temporo-parietal scalp lesion taken by the patient in 2013, prior to surgical excision (A) and in 2015, two years post-surgery and prior to embolization (B), showing a large, bulging, nodular, pinkish to erythematosus mass. The lesion had varying external appearance. In the preoperative photo, the lesion had a scabbed, coarse and dry surface (A). In the postoperative photo, the residual mass had more irregular contours with areas of necrosis, ulcerations, and minimal bleeding (B). Computed tomography 3D reconstruction from images taken in 2013 demonstrates the location of the external lesion (C) and the extent of the arteriovenous malformation (D). L - left.

patient could have either a lymphatic malformation, a venous malformation, or an arteriovenous malformation.

DIAGNOSTIC AND THERAPEUTIC APPROACHES

A diagnosis of AVM was considered based on history and physical examination. We did a cranial magnetic resonance imaging (MRI) to confirm our diagnosis. The results showed multiple tortuous and serpiginous flow voids in the scalp, predominantly in the right temporo-parietal region (Figure 2). Computed tomographic angiogram (CTA) (Figure 3A) and magnetic resonance angiogram (MRA) (Figure 3B) were also done, which revealed tangled clusters of tortuous, serpiginous, irregularly dilated vessels surrounding the cranial vault, as well as in the scalp, predominantly on the right side, with feeding vessels commencing at the right external carotid artery 5 cm above the common carotid artery. Draining vessels appear in the ipsilateral external jugular vein, with spongiform enhancement located in its communicating vessel. There is consequent thickening of the involved scalp tissue, with nodularity growing extrinsically. The smallest vessels are seen surrounding the scalp with no intracranial insinuation.

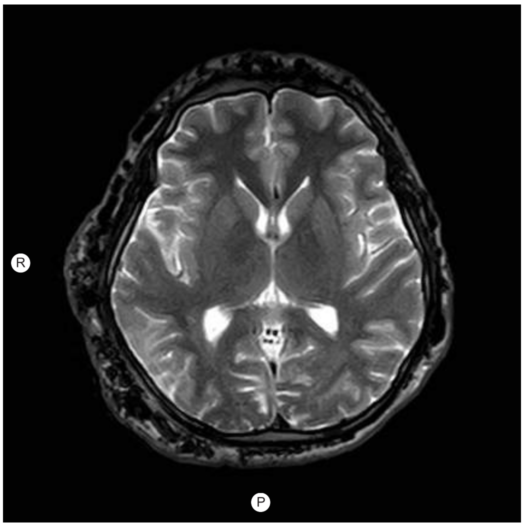

Figure 2 Magnetic resonance imaging on axial view, T2 sequence, showing thickened scalp with multiple curvilinear flow voids, predominantly in the right temporo-parietal region.

The Radiology and Surgery services co-managed the patient. Conventional angiography, the preferred imaging modality for AVM diagnosis, was requested by the managing teams to map the AVM nidus, which refers to the tangled blood vessels of the AVM, and the feeders, which are the arteries that supply the AVM nidus.[5] AVM mapping provides useful information for planning embolization and possible surgical excision of the AVM. During the course of the diagnostic procedures however, the patient accidentally scratched a friable portion of the mass, which subsequently bled profusely.

A radical surgical procedure was subsequently done on the patient to ligate major blood vessels on the right scalp. The patient lost approximately 4,500 mL of blood during the procedure which consequently required blood transfusion. A non-excisable residual lesion was left on the patient's right temporal region. A few days after the procedure, the patient was discharged improved and was given instructions to come back regularly for

Table 1 Timeline of the patient's signs and symptoms, with corresponding diagnostic and therapeutic approaches and clinical outcomes.*

Years	Signs and symptoms	Diagnostics	Therapeutic approach	Outcome
1986-2010	Gradually enlarging mass on the right temporo-parietal area	---	---	---
2011	Minimal bleeding of the mass	---	Manual compression	Control of bleeding
2012	Intermittent headache on exertion	---	Oral NSAIDs	Relief of headache
Early 2013	Admission for diagnostics	MRI/CTA/MRA: Scalp AVM with feeding vessels arising from three branches of the right external carotid artery	---	---
---	Profuse bleeding of the mass after a friable portion was accidentally scratched	---	Partial surgical excision	4,500mL blood loss; residual lesion at the right temporal area
Late 2015	Gradually enlarging residual scalp mass, intermittent headache and intermittent bleeding of the mass	Repeat CTA and MRA; Conventional angiography	Successful embolization of the right occipital artery; Successful embolization of the right posterior auricular artery four days after the first embolization; Attempt to embolize the right superficial temporal artery was unsuccessful	30mL blood loss; Discharged improved with instructions for regular follow up
Late 2016	Significant decrease in size of the AVM	---	---	Instructions for regular follow-up

*All signs and symptoms, diagnostics, therapeutics and outcomes pertain to the right temporo-parietal lesion.
AVM — arteriovenous malformation; CTA — computed tomographic angiography; MRA — magnetic resonance angiography; MRI — magnetic resonance imaging; NSAID — non-steroidal anti-inflammatory drugs.

monitoring of the lesion. The patient, however, did not immediately return for follow-up.

Two years after the surgical intervention, the patient came back to our institution due to headache and intermittent bleeding episodes in the area of the scalp lesion. The residual mass in the patient's right temporal region also gradually enlarged within the time that he did not seek any medical attention. Except for hypokalemia at 3.32 mmol/L, which resolved spontaneously, all laboratory findings for complete blood count, creatinine and electrolytes were within normal limits. Repeat CTA (Figure 3C) and MRA (Figure 3D) revealed that the mass now measured 7.3 x 4.3 x 1.6 cm. There was substantial reduction in the number of multiple tortuous dilated vessels surrounding the cranial vault, face and scalp predominantly on the right. The residual lesion in the temporal region had feeding vessels all arising from the right external carotid artery—superficial temporal, posterior auricular and occipital arteries. We did a conventional angiography (Figure 4), and floor mapping of the AVM showed clear demarcation of the feeding vessels. The plan of the Radiology and Surgery services at this point was to do serial endovascular emboliza-tion prior to another surgical intervention to reduce the size of the lesion and prevent recurrence of hemorrhage.

We were able to successfully do endovascular embolization of the right occipital artery. Four days after, we also did the embolization of the right auricular successfully. For each vessel, we performed cannulation first with a French 3 (1 mm diameter) Progreat® microcatheter, primed with dextrose 5% in lactated Ringer's solution, then subsequently embolized a piece of Histoacryl® tissue glue to the vessel lumen to achieve distal infarction. An accumulated 30ml blood loss was noted during the two procedures. We attempted embolization of the right superficial temporal artery, but it was unsuccessful due to technical difficulties in cannulating the vessel. The plan then was to monitor the size of the right superficial temporal artery and attempt another embolization when the artery lumen enlarges to a size that can accomodate a 1-mm-diameter microcatheter.

OUTCOMES

The patient came back for follow-up consultation five months post-embolization. On physical examination, there was significant decrease in size of the remaining scalp AVM, which now measured 6.6 x 1.8 x 4.9 cm. There was no recurrence of spontaneous bleeding and headaches post-embolization, and since the scalp mass regressed in size, we decided to temporarily forego the repeat embolization of the superficial temporal artery and to continue monitoring the patient's condition.

DISCUSSION

AVM of the scalp is a rare condition that may involve the frontal, parietal and/or temporal regions. AVM is a consequence of abnormal hemodynamics causing progressive dilation of normal vessels in the region (i.e. supraorbital, carotid and occipital arteries). The vascular lesion, which is seen as a large pulsatile mass or a subcutaneous scalp lump, commonly presents as headache, local pain, and—for some—tinnitus.[6 7] Aside from these symptoms, hemorrhage, although uncommon, may develop in the event of large vascular malformations. Our patient presented with a gradually enlarging mass associated with intermittent headache and bleeding from the lesion.

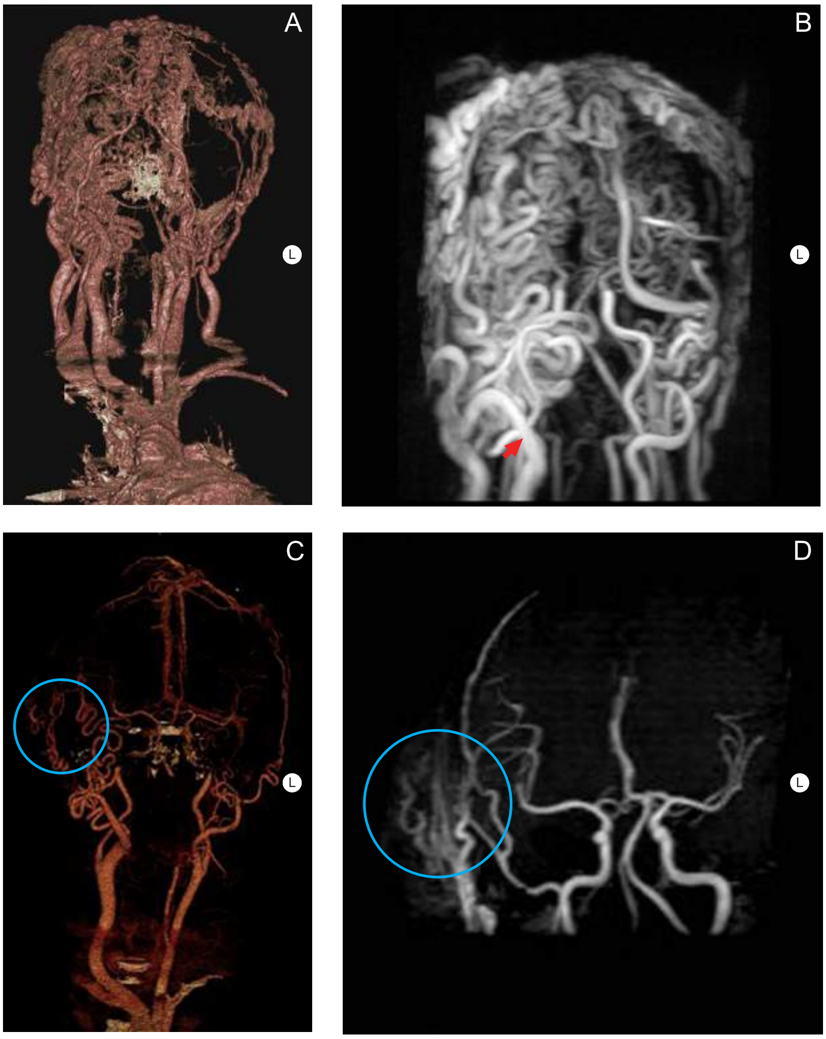

Figure 3 (2013) Initial computed tomographic angiography (CTA) (A) and magnetic resonance angiography (MRA) (B) done prior to surgery, showing extensive dilated and tortuous arteriovenous structures in the right temporo-parietal area. The major feeding vessels arise from the right external carotid artery (B: red arrow). (2015) Repeat CTA (C) and MRA (D) done two years postoperatively, showing significantly lesser arteriovenous structures. A group of tortuous dilated vessels representing the residual mass remains in the right temporal area (C and D: blue rings).

Differential diagnoses for scalp AVM, like the one found in our patient, include congenital hemangioma (CH) and vascular malformations (VM) such as venous malformation, lymphatic malformation and arteriovenous malformation. We used the modified International Society for the Study of Vascular Anomalies (ISSVA) guideline to differentiate CH and VM according to age of occurrence, sex predisposition, course of the lesion, auscultation, and palpation.[3] Both CH and VM are present at birth with no sex predisposition. In CH, the growth of the lesion is complete at birth or the lesion grows in proportion to the child's growth. Involution may occur rapidly within 6-12 months of life or not at all. In VM, the course of lesion growth may also be proportional to the child's growth, but the lesion does not usually involute. Thrills, bruits, or pulsations are not appreciated in CH, but are common in VM. Our patient's lesion did not involute, the enlargement had been proportional to his growth, and we were able to appreciate thrill on palpation and bruit on auscultation of the mass, so we were inclined to diagnose the lesion as a vascular malformation, particularly an arteriovenous malformation.

The choice of imaging modality for scalp AVM affects the quality of the diagnosis and the therapeutic management. Conventional angiography is the preferred modality for understanding the angioarchitecture of AVM lesions and for ruling out any intracranial component.[8] The procedure, however, remains underutilized because it is costly, time-consuming, and invasive. It also requires operator experience, and is associated with a 1.5-2% morbidity and mortality risk.[9]

CTA and MRA are excellent non-invasive and economical alternatives to visualize AVMs.[10] Both modalities can be carried out for the differential diagnosis of vascular lesions such as cavernous hemangioma, venous malformations, sinus pericranii, and aneurysms. Advantages of CTA include high image resolution, retrospective creation of thinner sections from source data, improved 3D rendering with minimal artefacts, and shorter procedure time. CTA can also demonstrate related bony structures.[9] MRA,

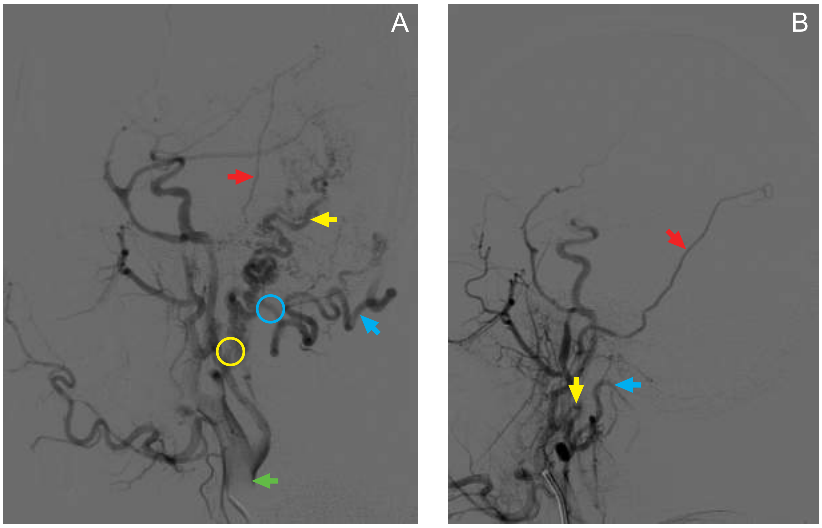

Figure 4 Pre-embolization conventional angiographic image (A), showing the branches of the right external carotid artery (A: green arrow)—the superficial temporal (A: red arrow), posterior auricular (A: yellow arrow) and occipital (A: blue arrow) arteries—supplying the lesion. The points in the posterior auricular artery (A: yellow ring) and the occipital artery (A: blue ring) where Histoacryl® tissue glue was introduced during embolization are also shown. Post-embolization conventional angiographic image (B) demonstrates absence of blood in the areas originally supplied by the right occipital (B: blue arrow) and right posterior auricular (B: yellow arrow) arteries, and consequent dilatation of the right superficial temporal artery (B: red arrow).

on the other hand, can differentiate scalp AVMs from other malformations.[7]

Our patient's CTA and MRA revealed multiple tortuous and intensely enhancing vessels on the right side of the scalp, which is indicative of scalp arteriovenous malformation. We were able to identify the vessels that feed the malformation as three arteries that arise from the right external carotid artery—the superficial temporal, occipital and posterior auricular arteries. There was no evidence of communication of the malformation with the intracranial circulation.

The management approach to scalp AVMs remains a challenge because of the high shunt flow, complex vascular anatomy, and cosmetic changes associated with the lesion.[6 11 12] Cosmetic correction and bleeding prevention are the goals of therapy.[13-15] Ligation of feeding vessels, embolization, electrothrombosis, and introduction of sclerosant into the AVM nidus are the suggested approaches.[7 16] In general, preoperative embolization of the nidus and feeders of an AVM greatly helps in reducing the size of the lesion, decreases the risk of massive hemorrhage, and facilitates subsequent surgical treatment.[7 17] Surgical excision after successful embolization or ligation of the AVM nidus is an effective method in dealing with large scalp vascular lesions.[7] Although embolization followed by surgery has been proven to be beneficial, cure rates are low unless the AVM is focal and located in a safe anatomic area.[18]

For our patient, we planned to initially do conventional angiography, which would guide us in planning for embolization and eventual surgical excision. Our patient underwent radical surgical excision before conventional angiography could be done because of persistent bleeding of the lesion. We were able to surgically control the bleeding and ligate some vessels, but a non-resectable portion of the lesion remained and even grew in size. The patient did not submit to regular monitoring postoperatively and only returned when headache and bleeding of the growing residual lesion occurred.

The actual recurrence rate of AVM is unknown, but recurrence is more common among children and rarely occurs among adults with AVM.[19] Several possible mechanisms of AVM recurrence have been proposed including persistence and proliferation of an initially occult portion of the AVM that was not removed during surgery, and *de novo* AVM formation.[20] One or a combination of these reasons may explain the growth of our patient's resected AVM two years post-surgery.

AVM lesions require preoperative conventional angiography to adequately visualize the lesion and plan for therapeutic interventions. Embolization of the nidus and major feeders of the lesion minimizes blood loss during surgical excision. We had to perform surgical ligation on our patient's scalp AVM before we could do conventional angiography and embolization. This resulted in significant intraoperative bleeding. To properly manage our patient's postoperative residual scalp mass, which later grew in size, we performed serial embolization two years after the surgery. We were able to successfully embolize two of the three identified feeders, and—as of this writing—we are looking to perform another embolization on the third feeder.

Acknowledgments
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Patient consent
Obtained

Reporting guideline used
CARE Checklist
(http://www.care-statement.org/downloads/CAREchecklist-English.pdf)
Article source
Submitted

Peer review
External

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None declared

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Life from both sides

Nina Custodio[1]

An ophthalmologist talks about life lessons from experiencing the crucible of cancer.

I was in residency training then, busy with duties inherent in my job. I also had additional responsibilities, being the most senior resident in Ophthalmology Department at that time. There were good days and bad days. After all, it is true, training is a "baptism of fire" for any resident's future life in private practice. So, I said, "bring it on!"

I believe that in the heart of each doctor is the desire to be of service to others, to heal people, and to make them feel better. My father, a doctor himself, never failed to stress the importance of healing patients holistically. He often reminded me to always treat the whole person. He used to say, "Take good care of not only your patients' ailing physical bodies, but also their wounded souls." I know that line by heart, and I always made it my guiding principle when dealing with patients. Never did it occur to me that one day, circumstances would have me at the receiving end of such a transaction, and my father's words would gain a deeper meaning.

It happened one unassuming day in August a few years back. I had a routine upper gastrointestinal series with follow through, which unusually took about two hours. I dismissed this irregularity of course, thinking that my doctors were just being extra careful, but by the end of the procedure, I learned that I had a colonic mass. Dumbfounded, I walked around the hospital aimlessly, dazed and numb, and not really feeling the gravity of this totally unexpected development right away.

This was a serious finding and we needed to work fast.

I went through several other diagnostic tests in the days that followed. I could see the trepidation in my colleagues' eyes as they desperately tried to allay my fears. It was all good. I know that doctors commonly resort to technical jargon when they want to keep their patients calm before a definitive diagnosis is made. When my doctors approached me this way, I realized it was in my best interest, but I really just wanted to know the truth. No sugarcoating. Just the hard facts.

After the battery of tests, my worst fears were confirmed. I had colonic cancer.

I could only imagine how a patient, who is not from the medical field, would feel given the same situation. I, a doctor, had suddenly become the patient wishing to get well and hoping for the best. My doctors told me that my cancer was in Stage IIIA. In the months that followed, I had surgeries and chemotherapy sessions. Quite honestly, the thought of it still makes me cringe. It was indeed an ordeal for me.

I decided to temporarily put aside my role as a doctor. It was the best thing to do because my medical knowledge and clinical experience had become liabilities that reminded me of the possible grim scenarios that could follow. I became a full time patient, letting my doctors take charge of my treatment. I would sit patiently outside my doctors' clinics and wait for my turn to be seen. I have come to dread my hospital admissions. I would throw up and suffer from extreme body malaise from the chemotherapy, just like most cancer patients. But I never lost my hair.

I had to walk away from my daily grind. During those times spent in treatment, and even while recovering, I certainly felt that my life was put on hold, and the world went on without me.

Many people remain under the notion that doctors are disease-proof. The fact is, we are as frail as any patient can be. I remember a particular time in between chemotherapy sessions when I was sitting with other patients outside my oncologist's clinic. Her secretary, who knew me before I became a patient, chatted with me for a while and addressed me as "Doc," which the other patients in the room heard.

A few minutes later, one of the patients asked me, "Hi, Doc! Why are you here?" She must have been curious, as I was in t-shirt and shorts, not in the usual doctor get-up.

I told her calmly, "Ma'am, I am not a doctor today. I am a patient—just like you."

She looked at me with disbelief and replied, "What? You have cancer? But you're a doctor!"

I smiled and told her, "Ma'am, I'm also human. I get sick just like everyone else."

We sat in awkward silence for a few minutes, and then she turned to me and said, "You underwent chemotherapy?"

I nodded.

"But you did not lose your hair," she said.

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I told her that my particular regimen did not have that side effect.

She quietly took out an old picture of her before her diagnosis and showed it to me. "I miss my hair. Before all this, I had beautiful long black hair."

I looked at her. She was wearing a wig that clearly did not do her any justice. I wanted to cry because I know how it feels if something so dear is taken away from you. When the unthinkable happens, life seems to stop. Somehow, I managed to hold back the tears and, with the brightest smile I could muster, I reassured her that, when she would get better, when the "chemo" would be over, all her hair would grow back and be even more beautiful than it was before.

As I began to stand up to see our doctor, she held my hand and said, "Doc, thank you very much. Thank you for taking the time to talk to me. I feel better now."

I replied, "You are welcome. Let's try to get well soon. Let's follow the doctor's orders." I reassuringly patted her shoulder, before I went inside the doctor's clinic for my check up.

My experience as a patient has allowed me to see what is on the other side of the doctor-patient relationship. It also allowed me to feel the ups and downs of being diagnosed with cancer, a disease that terrifies everyone. I have seen and experienced the difficulties that come with the disease—not only the physical struggles, but also the ones that involve emotions, coping, adjusting, worrying, and all the other dark feelings that come with such an infirmity. Believe me, it is not easy. It is very difficult to entrust your life to another person and to fully rely on them for your survival. It is difficult to agree to treatments that you do not understand. Sometimes, it is impossible to reconcile how you actually feel with what the doctors and caregivers tell you. In truth, even when you know fully that the chemotherapy aims to make you well, the side effects of the treatments seem to make you feel otherwise.

Being a patient also made me realize that the gift of healing is indeed a privilege. We doctors understand the importance of medication, of vigilance and surveillance in the treatment protocols of any given disease. We strive to do our best to stop the disease at its source, but we often forget to act on the other aspects of the person that are affected by the illness. When our patients put on a sad face, we are only seeing the tip of the iceberg of extreme anguish that beset them. We have to realize that our patients are not merely their diseased parts but an entire person needing to be healed wholly. We do not have to do anything grand. Sometimes, all we need to do is resist speaking in medical jargon, hold our patients' hands and ask them how they are doing. Sometimes, that is all it takes to make patients feel better. When their doctors listen to their thoughts and feelings, it makes them feel like human beings and not just afflicted bodies that are trying to be saved. When we genuinely connect with our patients, the healing effect is much greater than when we merely prescribe drugs or administer regimens. Connecting heals wounded souls, regenerates hope, and pushes patients to try to live more meaningfully each day.

There are only a few experiences in my life that persist as prominent guideposts from which I take directions to let me live the rest of my life. Going through cancer as a patient is one of them. Seeing illness from the other side taught me countless things, which I would not have learned had I not become a patient myself. That experience has totally changed my narratives of illness, my approach to patients, my views on my career, and my life in general.

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I wish to thank all the people who have made it possible for me to continue living—my family, friends and all my doctors—and showed unwavering support and care throughout my ordeal and even beyond it. My special thanks to Dr Sean Española who bombarded me with requests to tell my story. In more ways than one, writing this has provided me with the catharsis that has allowed me to acknowledge and finally rise from this challenging experience with much hope and positivity for the future.

Article source

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External

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None declared

On the road to universal health care

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The Medical Director of Southern Philippines Medical Center reports on the hospital's contributions towards attaining universal health care.

Southern Philippines Medical Center (SPMC) has gone through a positive change. We have taken the challenge of pursuing the Universal Health Care (UHC) or *Kalusugan Pangkalahatan* (KP) agenda of the Department of Health,[1] which aims to improve access to quality health care services among Filipinos, especially those in the lower socioeconomic strata. As the Medical Director of SPMC, I have always been confident in accepting this challenge since the agenda is perfectly aligned with our mission to provide equitable and affordable health care services.

Financial risk protection through health care insurance is the cornerstone of UHC.[2] SPMC has documented a steady increase in Philippine Health Care Insurance Corporation (PhilHealth) coverage rate among the patients that we saw, from 33.02% in 2009 to 82.18% by the end of 2015. SPMC had subsidized the excess health care costs of 58,927 patients through the PhilHealth no-balance-billing (NBB) scheme[3] from 2014 to 2015. This hospital subsidy to patient care has been increasing since 2014, with a mean annual cost of PHP 188M in 2014 to 2015, or 34% of the mean annual actual health care cost for the patients on NBB (PHP 554M) during those years. From 2012 to 2015, a total of 155 patients in SPMC have also availed of the PhilHealth Z-Benefit Packages for illnesses and procedures with exceptionally high costs of health care (i.e., breast cancer, acute lymphocytic leukemia, coronary artery bypass graft, ventricular septal defect, tetralogy of Fallot, and kidney transplant).[4] We have also implemented the PhilHealth Point of Care (POC) enrolment program[5] in SPMC. So far, we have purchased the health insurance premiums of 24,472 patients since the start of the POC enrolment implementation in 2013 up to the end of 2015. Finally, through the SPMC Medical Assistance Program (MAP), we have spent a total of PHP 178M to cover the health care costs of 72,238 patients who availed of the program benefits from 2014 to 2015.

We envision for SPMC to be "a world-class, service-oriented medical center." I believe that, in pursuing the UHC agenda, we are given the opportunity to realize the practical purpose of our vision—to play a major role in delivering world-class health services to the poor and disadvantaged.

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Article source
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External

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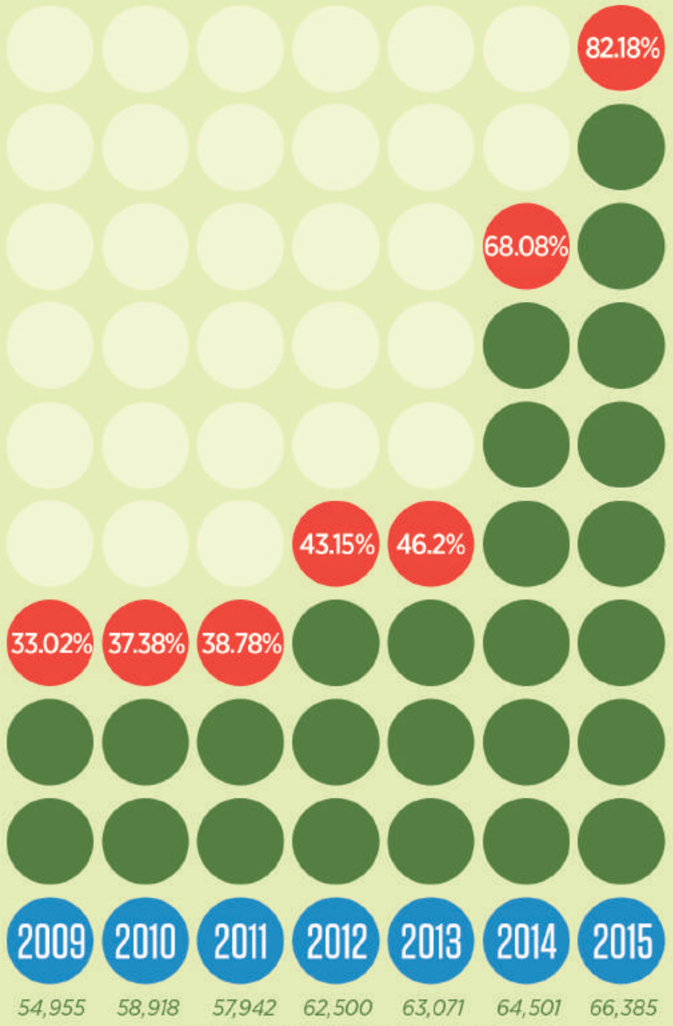
UNIVERSAL HEALTH CARE AGENDA

implementation in **SOUTHERN PHILIPPINES MEDICAL CENTER**



NUMBER OF PATIENTS DISCHARGED

PHILHEALTH COVERAGE

PHIC COVERAGE AMONG DISCHARGED PATIENTS

HOSPITAL SUBSIDY THROUGH **NO BALANCE BILLING** *SCHEME*

2014 20,065 PATIENTS

₱ 108,304,356.72

2015 38,862 PATIENTS

₱ 268,867,674.38

CORONARY ARTERY BYPASS GRAFT
ACUTE LYMPHOCYTIC LEUKEMIA
BREAST CANCER
Z PACKAGE
TETRALOGY OF FALLOT
VENTRICULAR SEPTAL DEFECT

NUMBER OF PATIENTS WHO AVAILED OF THE ***Z-BENEFIT PACKAGES***

2012	14 PATIENTS
2013	31 PATIENTS
2014	39 PATIENTS
2015	71 PATIENTS

NUMBER OF PATIENTS GIVEN INSURANCE THROUGH **POINT OF CARE ENROLMENT**

2013	2014	2015
636 PATIENTS	10,096 PATIENTS	13,740 PATIENTS

SPMC *MEDICAL ASSISTANCE PROGRAM*

2014 APRIL-DECEMBER	P 44,281,515.62 IN FINANCIAL ASSISTANCE	21,728 PATIENT BENEFICIARIES
2015 JANUARY-DECEMBER	P134,560,706.06 IN FINANCIAL ASSISTANCE	50,510 PATIENT BENEFICIARIES

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All article submissions, including commissioned ones, should be sent using the submission feature of the *SPMC Journal of Health Care Services* website (http://spmcpapers.com/index.php/jhcs/user/register).

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Authors should follow the CARE Checklist (Table 1) in preparing the manuscript for case report.

Case report submissions should contain the following sections:

1. Title: should state the final diagnosis
2. Authors and affiliations
3. Abstract: up to 250 words (refer to the CARE Checklist for specific contents)
4. Keywords: 2 to 5 words or phrases that do not repeat the title
5. Introduction
6. Clinical features
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12. Acknowledgments

Please use 2000 words or less for the main text of the report (excluding title, abstract, tables, figures, references, and acknowledgments).

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Authors should follow the appropriate EQUATOR Network checklist for reporting research. Listed in Table 1 are the common study types and their corresponding checklists. Please visit the EQUATOR Network website for a complete list of reporting guidelines and checklists.

Research report submissions should contain the following sections:

1. Title
2. Authors and affiliations
3. Abstract: up to 250 words; should generally include, as applicable, the subheadings: Background, Objectives, Design, Setting, Participants, Interventions (if any), Main Outcome Measures, Main Results, and Conclusion; for subheadings of abstracts of specific study types, please refer to the reporting checklist
4. Keywords: 2 to 5 words or phrases that do not repeat words in the title
5. Introduction
6. Methods
7. Results
8. Discussion
9. References
10. Acknowledgments

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Ethics approval

The conduct of research involving humans must have been reviewed and approved or favorably endorsed by an Institutional Review Board or Ethics Review Committee (IRB/ERC). Please submit a copy of the Certificate of Approval or Certificate of Favorable Endorsement if the research has been declared excempt from review, a Certificate of Excemption from Review issued by an IRB/ERC may be submitted in lieu of an approval or endorsement to conduct the research along with the research report.

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Reviews of books relevant in health care services and the health professions may be submitted for publication. Book review submissions should contain the following:

1. Book details: title and author/s or editor/s of the book, ISBN
2. Author of the book review and affiliation
3. General contents and scope of the book
4. Significance of the book to its readers
5. (Optional) comparison of the book with other books within the same area or topic
6. References
7. Acknowledgments

Please use 2000 words or less for the main text of the review (excluding title and references).

D. Clinical images

Images of unreported, unexpected or unusual physical examination, intra-operative, histopathologic, radiographic or other medical imaging findings may be submitted for publication. Up to four photos can be used to describe a condition.
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Table 1 **List of reporting guidelines and checklists (http://www.equator-network.org/)**

Study Types	Checklists and diagrams
Randomized controlled trial	CONSORT Checklist; CONSORT Flow Diagram
Observational studies (cohort, case-control, cross-sectional)	STROBE Checklist
Meta-analysis and systematic reviews	PRISMA Checklist; PRISMA Flow Diagram
Diagnostic accuracy studies	STARD Checklist; STARD Flow Diagram
Prediction model for individual prognosis or diagnosis	TRIPOD
Qualitative studies	COREQ
Economic evaluation	CHEERS

2. Authors and affiliations
3. Brief clinical description, which should include: patient’s age and sex, chief complaint, brief history, physical examination findings, relevant diagnostics, final diagnosis, relevant therapeutics, outcomes, description of the individual photos
4. Acknowledgments

Please use 300 words or less for the brief clinical description.

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These articles are usually commissioned, but we welcome submitted editorials on topics relevant to health care services. Please use 1000 words or less for the main text of the article (excluding title and references). In the submission, include a list of authors and their affiliations, statements of competing interests and, as appropriate, an acknowledgment section.

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These are brief essays based on personal experiences with health care services. We welcome submissions from different stakeholders of health care. Please use 1000 words or less for the main text of the article (excluding title and references). In the submission, include a list of authors and their affiliations, statements of competing interests and, as appropriate, an acknowledgment section.

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4. The text is single-spaced; uses a 12-point font; employs italics, rather than underlining (except with URL addresses); and all illustrations, figures, and tables are placed within the text at the appropriate points, rather than at the end.
5. The text adheres to the stylistic and bibliographic requirements outlined in the Author Guidelines, which is found in About the Journal.
6. If submitting to a peer-reviewed section of the journal, the instructions in Ensuring a Blind Review have been followed.
7. If submitting a Case Report or Clinical Image, the properly accomplished Affidavit of Consent to Publish is available for uploading as a supplementary file (in Step 4 of the five-step submission process).
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- SPMC JHCS Editorial Team

Errata

In: Vinson RCKT, Baruiz CP, Pelegrino M. Biopsychosocial factors affecting the treatment outcomes of pulmonary tuberculosis among patients enrolled in TB DOTS Clinics. SPMC J Health Care Serv. 2015;1(1):14-19.

In the third paragraph in the "Results," the "95 CI%" in the second sentence should have been "95% CI."

In Table 1 of the printed journal, "Mean age, years ± SD" has no corresponding value, it should have been 44.0 ± 16.8.

In Table 4, column 1 - Family history of PTB should be on the first row; Multiple Symptopms should be on the second row.

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