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MESSAGE FROM THE EDITOR-IN-CHIEF

Early this year, the Philippine College of Emergency Medicine through its research committee partnered with the Department of Science and Technology to conduct research protocol training for emergency medicine residents. The program aimed to equip our young practitioners to embark on quality research endeavors. Writing the research proposal is only the beginning of the research journey. One has to start with the end in mind --- and the end is the publication of a research paper.

"Research in Philippine emergency medicine is only beginning to grow with an increase in published articles observed just in the last 10 years."[1] This has been the finding in a scoping review by researchers from the University of the Philippines – Philippine General Hospital. The Philippine Board of Emergency Medicine (PBEM) has accredited 17 training institutions all around the country. Researches abound as case reports, analytical and interventional studies are required to complete emergency medicine. However, very few have seen publication. It thus, becomes important that generation of new knowledge translates to policy, impacts on practice guidelines and improves delivery of emergency care.

A research agenda for emergency medicine in the Philippines is an idea whose time has come. It is a priority for the incoming Board of PCEM because emergency medical services systems has become an important component, and indeed an integral part of the primary care and universal health care

The nation's experience with the COVID-19 pandemic revealed a weak primary health care program, a health system that is commercialized and hospital-centric, and in many areas, sharing of resources is hampered at the local level by a health system fragmented by devolution. The early implementation of the Universal Health Care Act would have provided every Filipino with an integrated provider network with a primary care provider as the navigator. The early passage of the EMS law would have also provided ease of transfer, rapid dispatch of critical and non-critical emergency services and rapid transport for patients.

Thus, the challenge has increased to address these crucial issues and research will play an important role. The Philippine Journal of Emergency Medicine seeks to be the medium by which a robust publication of collaborative research, practice guidelines, policy papers can be published by our colleagues. Other allied are also welcome to submit their completed research work.

We hope that EM residents, consultants and researchers will take this opportunity.

[1]Vista, Fatima Ericka, Alibin, P., Arevalo, PT., Gaerlan, FJM. Emergency Medicine research in the Philippines, a scoping review

Association Between Prolonged Length of Stay of Patients at a Tertiary Government Hospital Emergency Department and Development of Hospital Acquired Pneumonia: A Retrospective Study

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ABSTRACT

Introduction: Hospital Acquired Pneumonia (HAP) has been known to cause higher morbidity and mortality among patients not only in the ICU and is known as one of the leading hospital-acquired infections. Countless studies have been done to uncover its impact both in the intensive care and non-intensive care unit but not at the emergency department (ED) level, specifically in a tertiary level government emergency department where overcrowding is present on top patients having prolonged length of stay. This study aims to examine the prevalence and association of hospital acquired pneumonia in patients with prolonged length of stay at the ED.

Methods: A retrospective, chart review study was conducted in a 1,500-bed tertiary government hospital emergency department between Jan 2019 to March 2019. Adult patients under charity service who were admitted were chosen as study cases. Socio-demographic, clinical and disposition data were gathered among those included in the criteria.

Results: A total of 442 subjects were recorded for the study. To which a total of 38 (8.6%) were diagnosed with HAP and around 134 (30.4%) where noted to have stayed at the ED for 48 hours and more. Variables found to be statistically significant are the following: age (o-value = 0.002), admission to surgical services (p-value = 0.004), CCI scores of 1 to 2 (p-value = 0.011) and 3 to 4 (p-value = 0.003), no ward/ICU unavailability (p-value = 0.000), and low flow oxygen requirement (p-value=0.000) and being intubated (p-value = 0.008). Multivariate analysis showed that unavailability of beds (2.5x) patients on low-flow oxygen requirement (3x) were found to be independent risk factors for developing HAP. Results showed that there is significant statistical association between prevalence of HAP and prolonged length of stay at the ED.

Conclusion: The study suggests that the more patients stay at the ED especially for prolonged period (>48 hours) the more likely they are to acquire new onset Hospital Acquired Pneumonia. Additional studies are needed to further solidify the association and comparisons may be made with other hospital settings. Initially, HAP is mostly present in ICU and ward levels but rarely on how the emergency department may affect the development of the morbidity. It may be appropriate to reassess existing barriers and protocols to protect patients especially at the ED.

INTRODUCTION

The Philippine General Hospital (PGH) is a medical center for Filipinos seeking specialty and expert healthcare. This comes with a myriad of challenges especially for the emergency department (ED) that takes the bulk and is the primary receiving area for admitting patients. As with all other emergency departments, continuous quality care should be given to patients all year round with emphasis on critical care. Unfortunately, chronic problems have plagued emergency departments in general and have been a global concern. (Pascasie & Mtshali, 2014) May it be from the lack of personnel and equipment all the way to deficient clinical management. A common concern is overcrowding and high occupancy which is both synergistic with compromised patient care and prolong length of stay at the emergency department. (Hosseininejad & Aminiahidashti, 2017)

Inefficient triage systems, sudden surges in demand, delay in laboratory and diagnostic examination results, and high ward occupancy are some of the factors that contribute to overcrowding at the emergency area and consequently bear fruit to more dilemmas. Overcrowding often results to adverse patient outcomes and high morbidity rates secondary to nosocomial infections. Visits of patients to an emergency room can result to a three-fold increase in chances of acquiring an acute infection, much more in an overcrowded setting. (Carter & Pouch, 2014)

Hospital-Acquired Pneumonia (HAP), albeit not commonly studied at the ED level, is a type of nosocomial pneumonia developing after at least 48 hours of admission whether pneumonia was previously present; it has also been documented to increase patient mortality (Di Pasquale & Aliberti, 2016). This specific type of disease entity has been associated with advanced patient age, underlying diseases but most importantly, it also arises from breach in infection control protocols and cross contamination/exposure between patients, healthcare workers and the environment. (Di Pasquale & Aliberti, 2016) The latter being a common theme in PGH, patients are regularly exposed to the overcrowded, and undermanned setting.

Outside the setting of the emergency department, HAP has been proven to contribute to more severe and deadlier patient outcomes. In Philippine public hospital settings, this number equates to 5.4% a number higher than other Asian countries (Azmi, Aljunid, & Maimaiti, 2016), while prolonged length of stay has been documented in a tertiary private hospital in the Philippines mainly for patients classified as emergent and urgent. (Jimenez & Manzanera, 2018)

This interplay of organizational, medical and administrative factors has been documented to contribute to prolongation of length of stay at the ED and patient compromise in different settings around the globe and even in the Philippines. (Pines & Garson, 2008) Due to lacking data encompassing both prolonged length of stay of patients in a Philippines tertiary public hospital and the incidence of hospital acquired pneumonia in ED patients, this study aims to uncover if there is significant association between both factors and how they can contribute to patient outcome.

METHODOLOGY

This retrospective cohort study used written medical chart records of the emergency department admissions of patients at the University of the Philippines – Philippines General Hospital, a 1,500-bed tertiary government hospital. Data collected were from 01 January to 31 March 2019 and collection lasted 5 months from 01 June to 30 October 2022. Included in the study where charity service adult patients (19 years old and older) who were initially admitted to the Emergency Department and then into Medicine, Surgery (General Surgery, Neurosurgery, Orthopedics, and Otorhinolaryngology) and Neurology wards and the charity intensive care units (Medicine, Surgery and Neurology). Excluded were self-paying patients, pediatric patients, OB-Gyne and Ophthalmology service patients, and patients with a history of admission to other Hospitals within the past 90 days. Socio-demographic profiles such as age, sex, and clinical characteristics such as Charlson Comorbidity Index (CCI) score, oxygen requirement, advanced age (more than 60 years old) and decreased sensorium. Service disposition and patient outcomes were also noted in the data abstraction form. Patients were also tagged if they stayed at the ED for less or more than 48 hours. Together with factors contributing to their length of stay at the ED (ward/ICU availability, emergency severity index, and specialty service involvement). By using Slovin's formula, the available epidemiological data for the year 2019, and with a 5% margin of error and confidence interval of 95%, the adequate sample size to determine associations (logistic regression analysis) is 381.

Once the protocol was approved by the UP-Manila Review Ethics Board, collection of data was done manually and by reviewing patient chart or record while they were admitted at PGH. The data collection was done by the principal researcher and research assistant. All physical copies of the data gathered were stored in a secure box under lock and key and only accessible to the primary investigator and the research assistant. Likewise, digital copies of requests and data of participants were transferred to an excel file encrypted with a password that only the primary investigator and research assistant can access.

Data gathered was analyzed using the latest version (v.1.0.0.1406) of the Statistical Package for the Social Sciences (SPSS) software using several analytical tools. Normality of data gathered was evaluated using the Kolmogorov-Smirnov nonparametric test; Continuous variables was presented as medians and interquartile ranges and was compared using Student's T test (if data is normally distributed) or Mann-Whitney U Test (if data is not normally distributed); Categorical variables was presented as frequencies and percentages and was compared using chi square tests; Multivariate logistic regression model instead of Cox proportional regression was used to determine whether the prolonged length of stay was an independent risk factor for HAP. Level of significance considered is 5% (or P-values <0.05 will be considered statistically significant). Tabulation of data was done using tables and graphs and presented in percentages and frequencies. Categorical classification of data included length of stay at the ER, development of HAP, outcome of the patient, factors contributing to prolonged length of stay, CCI score and to which ward or unit was the patient admitted with their corresponding frequencies. Together with the gathered data, comparisons were done between patients who both developed HAP but either stayed for more than 48 hours at the ED or less than 48 hours.

The definition of Hospital-acquired pneumonia used for this study refers to evidence of new infiltrates per chest radiography after at least 48 hours after admission to the emergency department coupled with at least 2 other symptoms including: fever, dyspnea, cough, purulent phlegm, abnormal chest auscultation or deranged leukocyte count. Prolonged length of stay at the ED as per previous literature refers to patients who spend more than 6 hours at the ED undergoing assessment, management, and disposition but for purposes of this study, it was marked as those patients who have spent more than 48 hours at the ED for whatever reason that they have not yet been transferred to the appropriate ward/unit under their admitting service. This was done to delineate the development of new-onset Hospital Acquired Pneumonia.

RESULTS

This study aims to determine whether the development of hospital-acquired pneumonia is associated with prolonged length of stay at the Philippine General Hospital – Emergency Department. A total of 442 records of adult patients were utilized in this study.

A. Demographics

The socio-demographic profile of patients identified that the overall mean age was 47 years old ($\pm$ 16.46) with almost equal distribution of sexes. Most of the patients who stayed for more than 48 hours at the hospital are male (n=158, 53.73%) with ages which fall between 51 to 60 years old (n=37, 27.61%) while most of those who stayed for 48 hours or less are female (n=158, 51.3) and have ages which fall between 19 to 30 years old (n=70, 22.73%). In terms of the length of stay, 61.94 percent of patients admitted to the internal medicine stayed for

48 hours or less are female (n=158, 51.3) and have ages which fall between 19 to 30 years old (n=70, 22.73%). In terms of the length of stay, 61.94 percent of patients admitted to the internal medicine stayed for more than 48 hours while 18.83 percent and 37.99 percent of patients admitted to neurology and surgical services, respectively, stayed for only 48 hours or less.

Comparing these demographics by the patient's length of stay, results suggest that there is a significant association between service admission and prolonged length of stay at ED (p-value=0.001). Table 1 summarizes the socio-demographic profile of the patients enrolled in the study, grouped according to the length of stay at the ED.

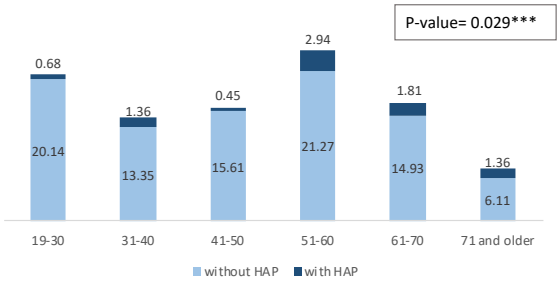
Table 1. Characteristics of Study Population

Characteristic		Total	%	Non-prolonged length of stay		Prolonged length of Stay		P-value
				N	%	N	%	
Age	(mean ± std. dev.)	47.484 ± 16.46		46.503 ± 16.735		49.739 ± 15.642		0.574
Age								0.396
	19-30	92	20.81	72	23.38	20	14.93	
	31-40	65	14.71	47	15.26	18	13.43	
	41-50	71	16.06	47	15.26	24	17.91	
	51-60	107	24.21	70	22.73	37	27.61	
	61-70	74	16.74	49	15.91	25	18.66	
	70 and above	33	7.47	23	7.47	10	7.46	
	Total	442	100	308	100	134	100	
Sex								0.331
	Male	222	50.23	150	48.7	72	53.73	
	Female	220	49.77	158	51.3	62	46.27	
	Total	442	100	308	100	134	100	
Outcomes								0.215
	HAMA/Not Admitted	1	0.23	0	0	1	0.75	
	Discharged	429	97.06	301	97.73	128	95.52	
	Mortality	12	2.71	7	2.27	5	3.73	
	Total	442	100	308	100	134	100	
Service Disposition								0.001***
	Internal Medicine	216	48.87	133	43.18	83	61.94	
	Neurology	80	18.1	58	18.83	22	16.42	
	Surgical service	146	33.03	117	37.99	29	21.64	
	Total	442	100	308	100	134	100	

Out of 442 patients, 24.21 percent of them were 51 to 60 years old, 20.81 percent were 19 to 30 years old, 16.74 percent were 61 to 70 years old, 16.06 percent were 41 to 50 years old, 14.71 percent were 31 to 40 years old, and 7.47 percent were 71 years old and older (see Table 1). Only 8.6 percent of the admitted patients (n=38) were diagnosed with HAP. It can be observed in Figure 1 that the prevalence of HAP is highest among patients 51 years old and older, wherein 2.94% of them are 51 to 60 years old (n=13), 1.81 percent are 61 to 70 years old (n=8), and 1.36 percent are 71 years old and above (n=6). Results of Pearson's chi-square test for association suggest that there is a significant association between age group and prevalence of HAP (p-value= 0.029). This means that the development of HAP is more prevalent in older age groups.

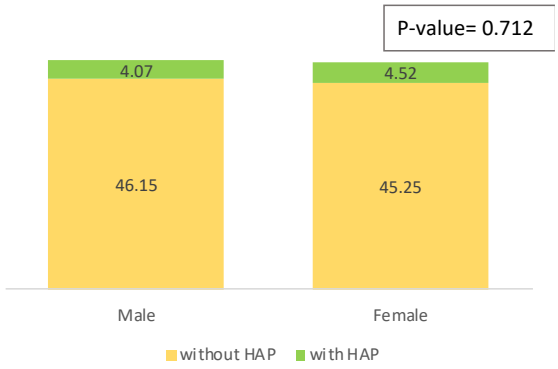
Meanwhile, 50.23 percent of the patients were male (n=222), and 49.77 percent are female (n=220). Despite the slightly higher distribution of male patients, only 4.07 percent were diagnosed with HAP (n=18) and 46.15 percent have no HAP (n=204). For females, 4.52 percent were diagnosed with HAP (n=20) and 4.25 have no HAP (n=200). A similar test for association suggests that there is no significant association between the sex of the admitted patient and the prevalence of HAP (p-value=0.712). This means that the development of HAP among patients does not depend on whether the patient is male or female.

Figure 1. Prevalence of HAP by Age Group



Note: *** - significant at 5% level

Figure 2. Prevalence of HAP by Sex



A. Length of stay at the Emergency Department

Factors affecting the prolonged length of stay were also tested against the prevalence of HAP among admitted patients. Results showed that among patients with HAP, 92.11 percent of them were discharged and 7.89 percent resulted in mortality. The same trend can be observed in patients without HAP, wherein 97.52 percent of them were discharged and 2.23 resulted in mortality.

In terms of bed availability, 77.72 percent of patients admitted within the shift once admitting orders were posted did not develop HAP and only 50 percent developed HAP. Of the patients who were not accommodated due to lack of bed availability upon posting orders, 50 percent were diagnosed with HAP and only 22.28 percent were not.

Further, 18.56 percent of patients who were not involved in any specialty service and 54.95 percent who were involved in at least two specialties did not develop HAP while 50 percent of patients involved in more than two specialties

Further, 18.56 percent of patients who were not involved in any specialty service and 54.95 percent who were involved in at least two specialties did not develop HAP while 50 percent of patients involved in more than two specialties developed HAP.

Table 2. Factors Affecting Prolonged Length of Stay (>48 hrs)

Factor	with HAP	%	without HAP	%	P-value
Outcome					0.116
HAMA/Not Admitted	0	0	1	0.25	
Discharged	35	92.11	394	97.52	
Mortality	3	7.89	9	2.23	
Ward/ICU Bed Unavailability					0.000***
Admitted within the shift	19	50.00	314	77.72	
No availability	19	50.00	90	22.28	
Involvement of specialty service					0.002***
None	1	2.63	75	18.56	
Less than or equal to 2 specialties	18	47.37	222	54.95	
More than 2 specialties	19	50.00	107	26.49	
ESI Classification of Triage of Patients					0.848
ESI 1	19	50.00	185	45.79	
ESI 2	19	50.00	218	53.96	
Others	0	0.00	1	0.25	
Total	**38**	**100**	**404**	**100**	

Note: *** - significant at 5% level

A. Risk factors for Hospital-Acquired Pneumonia

Most patients who only need room air and do not need any oxygen support were not diagnosed with HAP (n=354, 87.62%) while patients who have low flow systems and need nasal cannula and face mask (n=11, 28.95%), and patients who are intubated (n=4, 10.53%) were mostly diagnosed with HAP. The oxygen requirement of a patient, therefore, is significantly associated (p-value = 0.000) with HAP development.

Comparing the prevalence of HAP across the Charlson Comorbidity Index (CCI), 38.61 percent of patients without HAP also do not have a CCI score. Meanwhile, 65.79 percent of patients with HAP have a CCI score of 1 to 2, and 18.42 percent of them have a CCI score of 3 to 4. Patients, however, with CCI scores of at least 5 were all registered to not have HAP. Due to the sampling limitations, this may not have captured the true nature of the characteristic. Nonetheless, Charlson Comorbidity Index was found to have a significant relationship (p-value = 0.004) with the development of HAP.

Age was initially found to have a significant association with the development of HAP in the previous table. However, when grouped by advanced age, the difference between patients who are less than or equal to 60 years old without HAP (76.98 percent) and with HAP (63.16%) no longer yielded statistical significance (p-value = 0.057). This might be due to the fact the cutoff age to be classified under advanced age is 60 years old and the age group 51 to 60 recorded the highest prevalence of patients with HAP.

For sensorium, most patients with HAP have a GCS score of 15 (92.82%) while most patients without HAP have a GCS score of less than 15 (26.32%). This relationship was also found significant at the 5% level of significance (p-value = 0.000).

Service Disposition was also tested against the development of HAP. Results showed for patients who developed HAP, 60.53 percent of them were admitted to Internal medicine and 34.21 percent of them were admitted to Neurology. Of patients who did not have HAP, 35.64 percent of them were admitted to Surgical Services. Service admission was significantly associated with the prevalence of HAP (p-value = 0.000).

Table 3. Factors affecting the development of HAP

Factor	with HAP		without HAP		P-value
Oxygen requirement					0.000***
Room Air	23	60.53	354	87.62	
Low flow (Nasal Cannula and Face Mask)	11	28.95	38	9.41	
Intubated	4	10.53	12	2.97	
Charlson Comorbidity Index of HAP Patients					0.004***
None	6	15.79	156	38.61	
1 to 2	25	65.79	198	49.01	
3 to 4	7	18.42	31	7.67	
Greater than or equal to 5	0	0	19	4.7	
Advanced age					0.057
Less than or equal to 60 years old	24	63.16	311	76.98	
More than 60 years old	14	36.84	93	23.02	
Sensorium					0.000***
GCS score of less than 15	10	26.32	29	7.18	
GCS score of 15	28	73.68	375	92.82	
Service Disposition					0.000***
Internal Medicine	23	60.53	193	47.77	
Neurology	13	34.21	67	16.58	
Surgical Service	2	5.26	144	35.64	
Total	**38**	**100**	**404**	**100**	

Note: *** - significant at 5% level

Among patients with HAP, 55.26 percent of them stayed at ED for more than 48 hours while only 44.74 percent stayed for 48 hours or less. Meanwhile, among those without HAP, 72.03 percent of them did not stay long at ED and only 27.97 percent stayed for more than 48 hours. Table 4 below shows that there is sufficient evidence to conclude that there is a significant statistical association between the length of stay at the ED and the prevalence of HAP among patients. This suggests that more patients who stay in the ED for more than 48 hours develop HAP.

Table 4. Prevalence of HAP among Patients

	with HAP		without HAP		P-value
Length of Stay	N	%	N	%	
48 hours and below	17	44.74	291	72.03	0.000***
More than 48 hrs	21	55.26	113	27.97	
Total	38	8.60	404	91.40	

Note: *** - significant at 5% level

A. Multivariate Analysis

Logistic regression was employed to assess the factors affecting the development of HAP. Variables with p-value less than or equal to 0.05 in the univariate analysis were subjected to multivariate logistic regression to identify independent factors for the development of HAP.

Variables found to be statistically significant are the following: age (p-value = 0.002), admission to surgical services (p-value = 0.004), CCI scores of 1 to 2 (p-value = 0.011) and 3 to 4 (p-value = 0.003), no ward/ICU unavailability (p-value = 0.000), and low flow oxygen requirement (p-value=0.000) and being intubated (p-value = 0.008) (see Table 5).

In the multivariate analysis, the unavailability of ward/ICU and patients with low flow systems were found to be independent risk factors for the development of HAP (p-value < 0.05). Specifically, having no bed availability upon posting of admitting orders increases the odds of developing HAP by 2.5 times compared to those who are admitted within the shift once admitting orders are posted (OR = 2.582; p-value = 0.012). Further, patients with low-flow oxygen are three times more likely to develop HAP than those who only require room air (OR = 3.143; p-value = 0.009).

Table 5. Multiple Logistic Regression

	Univariate Analysis			Multivariate Analysis		
Factors	OR	P-value	95% CI	OR	P-value	95% CI
Age	1.035	0.002***	1.012-1.058	1.018	0.359	0.980-1.056
Sex (base: Male)						
Female	1.133	0.713	0.582-2.206			
Outcome (base: mortality)						
Discharged	0.266	0.055	0.069-1.030			
Service Admitted (base: internal medicine)						
Neurology	1.628	0.193	0.781-3.394	1.778	0.184	0.761-4.155
Surgical Services	0.117	0.004***	0.027-0.502	0.227	0.057	0.049-1.045
Charlson Comorbidity Index Score (base: none)						
1 to 2	3.283	0.011**	1.314-8.200	1.910	0.201	0.695-5.248
3 to 4	5.581	0.003***	1.847-18.663	2.835	0.123	0.754-10.653
>= 5	1	(empty)		1	(empty)	
Ward/ICU Availability (Base: admitted within the shift)						
No availability	3.489	0.000***	1.772-6.871	2.582	0.012***	1.234-5.404
ESI Classification (base: ESI 1)						
ESI 2	0.849	0.629	0.436-1.651			
Others	1	(empty)				
Oxygen Requirement (base: room air)						
low flow	4.456	0.000***	2.017-9.842	3.143	0.009***	1.331-7.426
intubated	5.13	0.008***	1.634-17.164	2.822	0.187	0.743-10.723
Advanced Age (base: 60 yrs old and below)						
above 60 yrs old	1.951	0.061	0.910-3.923	0.912	0.872	0.298-2.790

Note: *** - significant at 5% level

DISCUSSION

From the total of 442 study patients, 134 (30.32%) had prolonged length of stay at the ED with the incidence of 21 (15.57%) for new-onset HAP and those who did not develop HAP (113, 84.33%) accordingly. On the other hand, only 17 patients who did not have prolonged length of stay at the ED (308) developed new-onset HAP and the remaining 291 patients did not acquire HAP. This revealed a significant (p-value of 0.000) association between prolonged stay of more than 48 hours and the prevalence of new onset HAP suggesting that length of stay may indeed lead to development of HAP. As of the writing of this study, we have not come across a study that specifically tackles the association between new-onset HAP and prolonged length of stay at the ED although in a paper by (Ackroyd-Stolarz, Guernsey, MacKinnon, & Kovacs, 2015), they determined an association between the risk of an adverse event (nosocomial infections, and procedure-related incidents) to be increased the longer an elderly patient (65 years and older) stayed at the emergency department leading also to prolonged in-hospital stay.

Prolonged Length of Stay

Breaking down the factors contributing to prolonged length of stay, patients who were admitted and not transferred to their appropriate wards on the same 8-hour shift were noted to be of higher risk in developing HAP. Patients who were also referred to more specialty services had higher prevalence of HAP compared to those referred to none or 1 to 2 specialty services. In studies that focus on ED prolonged length of stay, the same factors (advanced/older age, numerous para-clinical tests ordered, case severity/urgency level, and hospital crowding/bed unavailability) pop up as the same significant determinants for increasing time and delay of disposition at the ED. (Brouns & Stassen, 2015) (Mahsanlar & Parlak, 2014) Patients who present at the ED with higher severity also undergo more clinical/diagnostic tests and are also referred to more services for assessment leading to more diagnostics and procedures increasing their stay at the ED. From there we may argue that numerous extrinsic factors also contribute to their susceptibility for adverse effects and infections as stated by Hosseininejad S. in their study (Hosseininejad S. e., 2017). No significant differences were noted between the outcomes of patients who had prolonged length of stay to those who did not. Most of the patients were discharged upon the end of their admission.

As the bulk of study case patients were admitted under Internal Medicine (48.87%), this can be directly related to why majority of those who had prolonged length of stay (61.94%) were also under this service and yielded a significant association. The same study by Mahsanlar & Parlak, noted that most initial patient complaints at the ED are medical in origin (chest pain, dyspnea, tachycardia) and consequently admitted to their appropriate ward; this may lead to a quicker increase in bed occupancy and inpatient boarding at the ED due to lack of bed availability.

Socio-demographic characteristics
In terms of socio-demographic profile, there is a slight preference towards male patients (53%) who stayed for more than 48 hours at the ED while the predominant age group where those between 51 to 60 years old. (Brouns & Stassen, 2015) On their paper regarding organizational factors that contribute to prolonged length of stay at the emergency department. Elderly patients (aged 65 and above) experienced a longer length of stay due to more extensive tests, received more medication, and underwent more procedures than younger patients. In a non-ICU setting where a patient has developed HAP, advanced age was also a major factor. (Brouns & Stassen, 2015) Results from this study using a Pearson's Chi-square test also suggested an association between older age groups and the development of HAP albeit not as apparent within patients with advanced age which may boil down to the number of study patients retrieved. Using this same test however yielded no significant association between the sex of the patients in terms of the development of HAP. This is true in some studies that also tackled the occurrence of HAP in a non-ICU setting; there were an even number between male or female patients that acquired pneumonia. (Di Pasquale & Aliberti, 2016) (Sopena, 2014)

Clinical characteristics and service disposition
Of the clinical characteristics gathered for this study, a significant statistical result was gathered for those requiring oxygen, those with decreased sensorium, the presence of a Charlson comorbidity index, and service disposition in association with the development of HAP. In line with similar studies, those with a higher comorbidity index (greater than or equal to three), and those with changes in consciousness were noted to be of higher risk for developing HAP in non-ICU settings (Di Pasquale & Aliberti, 2016). The same study also showed that depending on the service where the patient was admitted, they became more predisposed to develop HAP specifically those admitted to the medical and surgical services.

Interestingly, it was noted in this study that those there were more patients with intact sensorium who developed HAP compared to those with a GCS score less than 15. Despite this contradiction with other studies, the result was still statistically important noting that there was a higher percentage of patients with decreased sensorium who developed HAP compared to those with decreased sensorium and did not develop HAP. Varying results with other study may have been due to limitations in gathering study data. Internal medicine and Neurology were the top services in which HAP developed in patients, compared to other studies that showed medical and surgical services with the highest risk for HAP pointing out that procedures such as thoracic and upper abdominal surgery or those that may impair respiratory function and clearance. (Min, 2018) It may be noted that majority of Neurology patients are post-stroke and may have impaired swallowing function predisposing them to possible aspiration leading to development of HAP, not to mention the presence of impaired sensorium brought about by a stroke event.

The oxygen requirement of a patient during their stay at the emergency department was noted to be also statistically relevant in the development of HAP. Most of the patients who did not develop HAP where in room air while those on low flow (nasal cannula, face mask) and those intubated had higher incidence of HAP with the former being significantly higher (28.95%). In a study done in the same tertiary hospital setting, association was tested between hospital acquired infections (not limited to pneumonia) and type of ventilation (mechanical vs natural) in both ward and ICUs settings of pediatric and adult wards; being in a mechanical ventilation was deemed to have been a higher risk in the development of hospital acquired infections in both ward and intensive care unit settings especially in immunocompromised patients. (Vergeire-Dalmacion, Itable, & Baja, 2016) But as a whole, the type of ventilation was deemed not to be a risk factor for the development of HAP. In an overcrowded setting such as in this tertiary government emergency department. Those in a natural/non-invasive type of ventilation may be of more risk for the development of HAP due to reduced precautionary measures and the addition of extrinsic procedures such as suctioning and nebulization. While ventilatory care may be more aggressive and effective, this was not part or has been tackled in this study.

Looking into independent risk factors that lead to hospital acquired pneumonia, the use of multivariate analysis revealed that prolonged length of stay due to unavailability of ward/ICU at the time of admission and patients who were given low flow oxygen management at the ED constitutes a 2.5x and 3x risk respectively of developing HAP. Coupled with other significant associated risk factors, these patients may already have higher CCI score which means presence of heart failure, stroke, anemia, COPD which predisposes them the need for higher oxygen requirement and a more susceptible immune system. Above all these, the unavailability of bed at the ward/ICU exposes them to even more risk factors/adverse events at an already overcrowded setting, overwhelmed staff, and inadequate safety measures of a tertiary hospital emergency department.

Limitations
Unfortunately, due to circumstances brought about the recent COVID-19 pandemic, changes to the retrieval structure of the Medical Records Division resulted to reduced manpower available to adequately retrieve charts from storage within the allotted data gathering period and extensions, limiting the total number of charts recovered 443, a shy over the minimum sample size. Lacking digital/electronic ED chart and coding system at the period that data was collected resulted in inconsistent data (ED diagnosis/time intervals) and difficulty in retrieving information (storage).

An accurate tool and criteria for measuring overcrowding at the ED may be a focus of further research to standardize results between studies looking to measure its effects on emergency department length of stay. The results coming from this tertiary hospital may not be suitable compared to other hospital settings and facilities and may be a point of further research.

Organizational factors such as presence of infection-control barriers, hand-washing areas, proper staffing, patient arrival time at the ED, etc. were not included in as risk factors for acquiring HAP at the ED. This may be a point of interest for further study in the future. Several demographics were not included in the study such as for pay patients, pediatric patients and OB-Gyne patients which may be used for further studies in the future. A prospective type of study may also be of benefit to this topic and setting. As mentioned earlier, retrieval of data was painstakingly inefficient and lacking in some terms which may be avoided in a prospective type of study of following patients once they are admitted at the ED until their admission and development of HAP. Risk factors as well may be followed

Extrinsic factors were not included in the study, examples of which are invasive procedures (NGT insertion, PPE), bedside procedures (suctioning, thoracentesis, minor surgeries) that may as well play a part in the progression of hospital acquired infection. Additional information could have been included to increase the sensitivity of the data abstraction form such as increase in age ranges for elderly patients, a more specific range for time and date of admission of the patient to the ward/ICU or inclusion of other risk factors such as lack of infection-control barriers, use of ICD codes to specify the diagnoses of the patients, etc.

CONCLUSION

Patients who overstayed at the emergency department are more likely to develop hospital acquired pneumonia. Of these patients, those that were older, with a higher oxygen requirement and those admitted under internal medicine had increased risk of developing HAP. Unavailability of ward or ICU bed can not only prolong the stay of the patient at the ED but also increase their risk for hospital acquired pneumonia.

Hospital acquired infections, specifically pneumonia have been a major cause of morbidity and mortality among hospitalized patients. With the incorporation of this study, we have determined that the emergency department can be a contributing factor to its development, especially those who have overstayed. Although, emergency department crowding or overstaying is already a widespread burden among hospitals, there is further backing that this problem needs to have a solution sooner. Numerous patients, especially the elderly and those with urgent complaints seek the refuge of the emergency department and are more susceptible to complications especially in a government setting tertiary hospital.

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The Effect of the COVID 19 Pandemic on the Philippine General Hospital Emergency Medicine Residency Training Program

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ABSTRACT

Introduction. The COVID-19 pandemic affected not only the operations of hospitals but also the residency training programs of these medical institutions, particularly in the field of emergency medicine. Being in the frontline in the fight against the novel virus, emergency departments had to adapt and develop strategies to maintain the quality of training in emergency medicine while providing medical care in a global health crisis.

Objective. To determine the effect of the COVID-19 pandemic on the Philippine General Hospital emergency medicine residency training program.

Methods. A cross-sectional study was carried out using the mixed methods on the effect of the COVID-19 pandemic on the Philippine General Hospital emergency medicine residency training program.

Results. Procedure logbooks of residents who trained from 2017 to 2020 were reviewed. There is no sufficient evidence to conclude that there is significant difference in the median number of procedures performed and recorded by the emergency medicine residents pre-pandemic and during the pandemic. There was a significantly lower number of basic and advanced life support performed and recorded by the emergency medicine residents compared pre-pandemic and during pandemic to the approximate yearly PBEM requirement. Based on key informant interview, major changes included shifting to virtual platforms for the academic activities and removing required rotations in other specialty departments to concentrate on providing care to COVID -19 patient . There was a paucity and less variety of cases seen at the emergency department, particularly during the first year of the pandemic. Surgical cases were limited, including trauma, thus limiting exposure to surgical specialty cases.

Conclusion. The COVID-19 pandemic affected the emergency medicine residency training program at the Philippine General Hospital in a number of ways. Although the general number of procedures done did not significantly change, there was a lower number of certain life-saving procedures performed. Major changes in the training program implemented by the department were made to support the operations of the hospital as a COVID referral center while providing the necessary support system to enable the residents to meet the requirements of the specialty training.

Introduction

The Emergency Medicine practice, being a relatively young discipline, has developed standards in training and is currently being evaluated by international bodies. In 2010, the IFEM came out with a document describing the curriculum that defined the different aspects for emergency medicine training programs. With the advent of the Coronavirus disease 2019 (COVID-19) pandemic, training of physicians in the different specialties has been disrupted. Emergency departments all over the world have had to adapt quickly to the situation brought about by the pandemic in terms of patient care protocols, staffing, education of trainees, and research work.

Medical facilities all over the world had to revise existing patient management protocols at a rapid pace as the spread of the new infection became inevitable. Hospital operations and services became the focus of daily hospital meetings and discussions. The training of healthcare providers, particularly of physicians and specialists, was severely disrupted. A study in Singapore identified lack of time and learning activities for residents during the pandemic as the greatest challenge during this global health crisis, as medical services became the top priority for healthcare institutions.[8]

Describing the effects of the pandemic on the residency training programs in emergency medicine in the Philippines is a step toward empowering the trainees and the educators in the different institutions. There is a need to maintain the quality of the training programs while ensuring the provision of emergency care services that the public requires and deserves during this crucial period and for similar public

health emergencies in the future.

At the forefront of the health response to this biological emergency are the emergency physicians. With little information about the virus initially, the medical teams working in the emergency units of medical facilities across the country had to activate existing emergency preparedness protocols that required constant revision as new information was provided by local and international health authorities. Working with a variety of professionals daily - infectious disease specialists, infection control personnel, critical care specialists, public health professionals, and allied medical professionals - became the norm. Health care workers are being subjected to a tremendous amount of physical, spearheading the standardization of the curriculum under the leadership of the Philippine College of Emergency Medicine (PCEM), the national organization of emergency physicians in the country.

The shift to managing patients with COVID-19 in the emergency departments led to a general decrease in ED volume as patients tended to avoid going to the ED to avoid exposure to the possible COVID-19 cases. This situation has led to less clinical exposure for the residents.[9]

This pandemic has placed health care workers at the forefront of the battle to contain it. The effects of this global emergency on emergency medicine personnel, particularly trainees in this specialty, are coming into fore. Thus this study determined the effect of the COVID-19 pandemic on the Emergency Medicine residency training program of the largest general hospital in the Philippines.

Materials and Methods

A cross-sectional study was carried out using the mixed methods on the effect of the COVID-19 pandemic to the Philippine General Hospital Emergency Medicine Residency Training Program. The mixed method is composed of qualitative and quantitative methods.

The Philippine General Hospital was chosen as the study site. It has an emergency medicine training program accredited by the Philippine Board of Emergency Medicine and recognized by the Philippine College of Emergency Medicine. Physicians are systematically trained and supervised to become emergency medicine specialists.

Data were reviewed as to the kind and number of procedures done by each resident trainee documented in their individual procedure logbooks. These were collated and averaged per year level. The same kind of data were taken and averaged in the last 3 years before the pandemic, This was done to compare the procedures done before (2017 to 2019) and during (2020) the pandemic which were presented as median.

The minimum required kind and number of procedures were taken from the Philippine Board of Emergency Medicine (PBEM) implementing rules and guidelines manual for residency training programs which was revised and released in 2021.

To determine if the median number of procedures performed and recorded by the emergency medicine residents were significantly different between pre-pandemic (2019) and during pandemic (2020, a two-sided Mann-Whitney U test was performed. To determine if the median number of procedures performed and recorded by the emergency medicine residents during the new normal situation (2020) was lower than the approximate yearly PBEM requirement, one-sided one-population sign test was performed. Data analysis was performed using Stata version 17.0. All tests of hypothesis were evaluated at significance level of α=0.05.

The training officer of the PGH Department of Emergency Medicine residency training program gave her consent to undergo key informant interviews (KII) to determine experiences during the pandemic and planned changes, if any, on the training curriculum of the resident-in-training, for the coming year.

Results

Data were gathered from the procedure logbooks of residents who were in training during the study period. However, not all logbooks were included as some were not available in the department files.

Table 1 shows the number of residents per year level who had their log books available for the study. It should be noted that the number of residents accepted into the residency training programs yearly vary for the period of the study.

Table 1. Number of emergency medicine residents who have a record of performed procedures and were included in the study according to training level during years 2017-2020.

Level	2017	2018	2019	2020
First year	0	6	6	7
Second year	0	0	6	6
Third year	1	0	0	6

Table 2 reveals that resuscitation procedures such as basic and advanced life support and airway management were performed and recorded by the majority of the residents. These procedures are competencies at all levels of the training program.

Table 2. Number of emergency medicine residents who have performed and recorded each of the PBEM required procedures among those included in the study during years 2017-2020.

Procedure	2017 n = 1	2018 n = 6	2019 n = 12	2020 n = 19
Head and Neck Procedures	0	3	4	8
Ophthalmology Procedures	0	0	2	0
Ortho Procedures	0	0	3	5
Log roll	0	0	1	4
Intravenous insertion peripheral adult and pediatric	0	1	1	6
Intravenous insertion central	0	0	3	2
Intraosseus insertion adult & pediatric	0	0	3	2

Trauma management	1	2	4	2
Wound management	0	1	2	4
Pericardiocentesis	0	0	1	3
Basic & Advanced Life Support	0	4	8	9
Advanced airway management	0	5	8	13
Use of non-invasive ventilation	0	0	3	3
Use of defibrillation & synchronized cardioversion	0	2	3	7
Thoracentesis	0	2	3	1
Obstetric Procedures	0	0	3	4
Bedside ultrasound	0	2	4	5
Nerve or hematoma block anesthesia	0	0	0	0
Procedural sedation	0	1	5	3

In Table 3, the median number of procedures performed and recorded by the emergency medicine residents was not significantly different between pre-pandemic (2019) and during pandemic (2020) periods.

Table 3. Comparison of median number of procedures performed and recorded by the emergency medicine residents during the years 2017-2020.

Procedure	PBEM requirement		2017	2018	2019	2020	p-value	
	Total	Approx. per year					2019 vs 2020	2020 vs Required
Head and Neck Procedures	8	3	-	4	6.5	3	0.3838	0.5000
Ophthalmology Procedures	4	2	-	-	3.5	-	-	-
Ortho Procedures	45	15	-	-	5	5	>0.9999	0.1875
Log roll	20	7	-	-	2	3	0.8000	0.0625
Intravenous insertion peripheral adult and pediatric	15	5	-	19	5	8	0.8571	0.9688
Trauma management	6	2	1	2	3	3.5	>0.9999	0.7500
Wound management	25	9	-	3	24.5	12.5	0.5333	0.9375
Pericardiocentesis	1	1	-	-	2	1	0.5000	>0.9999
Basic & Advanced Life Support	157	53	-	19	14.5	11	0.5249	0.0020
Advanced airway management	55	19	-	37	20.5	14	0.3438	0.1938
Use of non-invasive ventilation	2	1	-	-	5	1	0.2000	>0.9999
Use of defibrillation & synchronized cardioversion	20	7	-	6.5	5	2	0.5833	0.0625
Thoracentesis	1	1	-	5	2	2	>0.9999	>0.9999
Obstetric Procedures	4	2	-	-	6	4.5	0.2857	1.0000
Bedside ultrasound	17	6	-	3.5	3.5	4	0.7619	0.0312
Nerve or hematome block anesthesia	1	1	-	-	-	-	-	-
Procedural sedation	5	2	-	4	19	3	0.4286	>0.9999

The years 2019 vs 2020 were used as the pre-pandemic and pandemic comparison, since there were not many recorded procedures during 2017 and 2018.

There is no sufficient evidence to conclude that there is significant difference in the median number of procedures performed and recorded by the emergency medicine residents pre-pandemic and during the pandemic.

There was a significantly lower number of basic and advanced life support performed and recorded by the emergency medicine residents compared pre-pandemic and during the pandemic to the approximate yearly PBEM requirement.

There was a significantly lower number of bedside ultrasound performed and recorded by the emergency medicine residents compared to the approximate yearly PBEM requirement.

There is no sufficient evidence to conclude that there is significant difference in the median number of other procedures (aside from the two above) performed and recorded by the emergency medicine residents compared to the approximate yearly PBEM requirement.

The key informant interview revealed the changes in the training program that were implemented because of the pandemic.

In the first year of the pandemic, the department shifted to a 2 weeks on and 2 week off duty schedule to allow for quarantine. The quarantine period became shorter as vaccines became available.

As a designated COVID referral center, the hospital needed to boost the manpower for the COVID wards and intensive care units (ICU) early in the pandemic. Residents from other departments, including emergency medicine, went on rotations in these areas to augment the internal medicine residents and fellows taking care of the COVID patients.

At the Department of Emergency Medicine, the emergency medicine residents rotated at three different posts. The main task is at the emergency department where they manage both COVID and non-COVID patients. They also have assignments at the emergency medical services section, where they join the team of emergency medical technicians in transporting both COVID and non-COVID patients, and provide prehospital care if needed. Lastly, they were posted at the Transfers Command Center, the newly created service unit of the hospital, where they received calls and provided medical direction for pre-hospital and inter-facility transfers. The residents were also given tasks as part of the hospital's COVID vaccination team, handling the post-vaccination monitoring.

Key changes included shifting to virtual platforms for didactics, conferences, clinical audits, and examinations. Skills training in the form of workshops, simulation-based exercises, and other hands-on activities was severely affected. Bedside preceptorial was also limited.

There was a paucity and less variety of cases seen at the ED, particularly during the first year of the pandemic. Surgical cases were limited, including trauma, thus limiting exposure to surgical specialty cases.

Research work took a backseat as the department tried to ease the training requirements as a way to address the mental health issues that came with pandemic work. The Philippine Board of Emergency Medicine, to assist the trainees, gave consideration and allowed two residents to work on a research paper. Mental health issues among the residents were monitored and counselling sessions were scheduled with the Department of Psychiatry.

There were no extensions given to residents in terms of accomplishing requirements for graduation, except for research. The evaluation tools and the breakdown of evaluation were modified. Rotations in other specialty departments were suspended during the first two years of the pandemic.

The future direction of the program includes continuation and expansion of the mental health programs developed during the pandemic and a review of the clinical rotations to provide more opportunities for hands-on skills training.

Discussion

The COVID-19 pandemic affected the services of medical facilities worldwide, with hospitals having to deal with operational and staffing issues, particularly for the designated COVID referral centers. For academic and training hospitals like PGH, the impact of the pandemic on the education of residents became a concern.

The study tried to capture the effect of the pandemic on the type and number of procedures that were done by the residents during pre-pandemic and pandemic periods. Data was taken from the procedure logbooks submitted. It was noted that few procedures were documented for 2017 and 2018. One reason is that not all logbooks of residents who were in training during the study period were obtained as these logbooks were not required to be submitted to the department after their training.

Additionally, there is no standard nomenclature used for the procedures required and documentation of the procedures done by each resident was not strictly observed. This is understandable as it was only in 2021 that Philippine Board of Emergency Medicine released its most recent set of implementing rules and regulations (IRR) pertaining to requirements for residency training accreditation, which included a list of required procedures and the number of procedures that must be accomplished at the end of the training period.

Based on the results of the study, procedures such as basic and advanced life support and bedside ultrasound were found to be significantly lower than the number required by PBEM. The low count for the basic and life support procedures may lie on failure of the residents to document every single procedure done on patients requiring resuscitation.

The changes to the residency training program that were implemented by the department were designed to support the role of the hospital as a COVID-19 referral center while providing the structure for the residents to meet the basic requirements of the specialty training.

Rotations in the COVID intensive care units were added to the emergency medicine resident's clinical duties. In addition to managing both COVID and non-COVID patients in the emergency department, they were also assigned duties in the hospital's emergency medical services section. This service became a crucial part of the pandemic operations of the hospital due to the high demand for inter-facility and community-facility transfer of critically-ill COVID patients. The residents provided medical direction to the EMS teams, supported by the emergency medicine consultants. Another service unit that the residents provided additional manpower to was the Transfers Command Center, a newly-created unit that facilitated calls for inter-facility transfer as well as providing medical advice to the callers regarding COVID infections and other inquiries.

Didactics, conferences, and clinical audits were transformed to online activities. It was challenging for both the trainees as well as the faculty to adapt to virtual platforms. Over time everybody was able to adjust. However, other academic activities such as bedside preceptorials and simulation sessions had to be put on hold for the sake of compliance to infection control measures.

Mental health support was an aspect of the residency training program that was given utmost importance given the magnitude and level of stress that healthcare workers have had to face during this global public health emergency. Clinical work hours were revised to give time for the trainees to undergo quarantine and allow for adequate rest periods. Requirements of the program were adjusted particularly in terms of research as this became less of a priority at the time when the number of patients with COVID-19 required more hands in the patient care areas, particularly in the emergency department and intensive care units.

Despite the challenges to the trainees and faculty members brought about by the pandemic, the global health emergency provided many learning and teaching opportunities. The more senior residents had the chance to be part of teams that developed and designed the different hospital and prehospital pathways for the management of patients with COVID-19. It was also a chance for professional and personal growth. With severely limited resources, especially during surges, emergency personnel had to confront difficult choices such as prioritizing patients to be

given the last mechanical ventilator or talking to the families about the condition of their loved ones who they cannot physically see because of infection control measures.

Even though the nature of the cases seen at the emergency department considerably changed during the early part of the pandemic, the environment became an opportunity for the trainees to increase their knowledge on the novel virus and its clinical management. Learning how to protect themselves, their teams, and their loved ones, given the changing information about the infection may have been intimidating and stressful at first. The essence of teamwork, practical decision-making, and ethical considerations in a crisis situation became part of the lessons learned in this pandemic.

Conclusion

There is no sufficient evidence to conclude that there is significant difference in the median number of procedures performed and recorded by the emergency medicine residents pre-pandemic and during the pandemic. However, it was noted that resuscitation procedures like basic and advanced life support and bedside ultrasound were noted to be less than the required number required by PBEM. Factors such as missed documentation and inconsistent use of nomenclature may play a role in the accuracy of assessment of the data source.

The changes in the training program implemented by the department were made to support the operations of the hospital as a COVID referral center while providing the necessary support system to enable the residents to meet the requirements of their specialty training. Shifting to online platforms was one of the major challenges during the pandemic. Supporting the mental health status was an important consideration in decisions to cut back on research work and in adopting a new clinical duty schedule. Other factors that affected the training program included a decrease in the number and type of cases seen in the emergency department. This was however replaced by additional knowledge and skills gained in managing COVID cases, and opportunities for growth in the context of teamwork, crisis management, and mental health.

Recommendations

This study recommends that residents be oriented on the requirements set by the Philippine Board of Emergency Medicine and how to properly document them. Use of standard or specific names of procedures need to be emphasized. Regular review of the logbooks by the faculty may help address issues such as failure to document cases or not providing enough details on cases done.

The changes and innovations implemented by the department during this pandemic and the impact on the trainees should be well-documented as these experiences will serve as templates for future use should another public health emergency of this magnitude occur. This will make for a flexible and responsive environment for emergency medicine trainees.

Lastly, the study should be done on a nationwide basis to determine the true picture of the Emergency Medicine training program during the pandemic.

Limitations of the Study

One of the limitations include unavailability of some logbooks for the study since residents are not required to submit them. Variability in the names of procedures and absence of details for many entries in the logbooks made it difficult to count the number of times the procedure is done.

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Severe Multiorgan Involvement in Acute Methotrexate Toxicity

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ABSTRACT

Background: Severe acute toxicity from methotrexate (MTX) with multiorgan involvement is a rare and extremely fatal condition. Case reports on patients with systemic lupus erythematosus (SLE) and MTX toxicity is very limited as MTX is not a common first-line treatment for SLE.

Objectives: We aim to present a case of severe multiorgan involvement due to acute MTX toxicity and its successful multidisciplinary management.

Case Presentation: A 34-year-old Filipina diagnosed with SLE was brought to the emergency department due to progressing throat pain. She was recently prescribed with MTX at 10 mg once weekly for SLE. However, the patient mistakenly took MTX daily for eight consecutive days for a total of 80 mg. She then developed generalized body pain and swelling with erythema of the submandibular area which prompted her to consult with an otorhinolaryngologist and her rheumatologist. She was managed as drug induced stomatitis, otitis externa, and MTX overdose given supportive care and folinic acid. In the interim, progression of limitation in oral intake and development of high-grade fever prompted emergency department consult. Antidotal therapy with leucovorin and empiric antibiotics for sepsis were promptly initiated at the emergency department. She was further managed as MTX toxicity, septic shock secondary to soft tissue infection of the neck, multifactorial acute renal failure, and SLE. She was admitted in the intensive care unit, mechanically ventilated, and underwent continuous renal replacement therapy (CRRT). The patient was discharged stable and recovered after 72 days of hospitalization.

Discussion: Reports of acute MTX toxicity presenting as multiorgan failure is exceptionally rare and fatal. Significant nephrotoxicity may occur in high doses at >40mg/m2 with acute renal failure developing in 2-12%, but occurs very rarely, if at all, in patients on low dose regimen. A report on two cases of psoriasis patients with MTX toxicity resulting in death discussed one case presenting as mucositis and myelosuppression, while the other presented as altered renal function and bone marrow suppression. In our case, the patient presented with mucositis, septic shock, acute renal failure, severe neutropenia, and heart failure. But unlike in existing case reports, our patient had an excellent recovery. Critical problems were promptly recognized and managed through the administration of leucovorin, empiric antibiotics, and recombinant human granulocyte colony-stimulating factor, as well as mechanical ventilation and CRRT.

Conclusion and Recommendation: Thus, we present a case of severe multiorgan involvement secondary to MTX toxicity and its successful treatment. Early recognition of MTX toxicity, timely administration of the antidotal therapy, and a collaborative multidisciplinary approach to management facilitated an excellent outcome for our patient.

INTRODUCTION

Methotrexate, a folate antagonist, has anti-inflammatory and immunomodulating properties leading to its use in for a broad range of therapeutic indications across multiple specialties, as well as antitumor activity leading to its use to a variety of malignant conditions [1]. One of its indications would be for systemic lupus erythematosus (SLE), a chronic, occasionally life-threatening, multisystem immune-mediated disorder. The cornerstone of lupus' medical management is hydroxychloroquine which was initially prescribed to the patient in this case but was later shifted to methotrexate due to blurring of vision [2]. Treatment of SLE is individualized based on patient preferences, clinical manifestations, disease activity and severity, and comorbidities [1]. This usually involves close follow up with a rheumatologist, and those with multiorgan involvement require multidisciplinary care. Early cutaneous ulceration of methotrexate toxicity may be mistaken for a flare of psoriasis leading to erroneous increase in methotrexate use by either patient or physician [2]. There have been case reports for methotrexate toxicity that presented as oral ulcers where physicians were able to immediately cease the following doses of methotrexate to prevent toxicity. However, those reported to have severe clinical presentation eventually succumbed to death [3]. In

this case report, a present a rare case of severe multiorgan involvement in acute methotrexate toxicity and its successful management in an SLE patient.

CASE PRESENTATION

The patient is a 34-year-old Filipino female with known SLE, who came in the emergency department for throat pain for 17 days leading to progressive decrease in oral intake due to difficulty in swallowing. The patient was prescribed methotrexate 2.5 mg per tablet, 2 tablets orally twice a day every Wednesday for her SLE. However, the patient mistakenly took her methotrexate daily for eight straight days for total of 80mg. Seventeen days prior to admission, after three days of mistakenly taking her methotrexate dose daily, the patient began experiencing throat pain with associated odynophagia as well as pain, swelling, and erythema on the submandibular area. She self-medicated with mefenamic acid which provided only minimal relief. Seven days prior to admission, she consulted with an Otolaryngologist who managed the patient as drug-induced stomatitis and otitis externa. The patient was prescribed fluocinolone + polymixin B + neomycin (Apolysn) otic drops, benzydramine, and Kamillosan throat spray, and was advised follow up with her attending rheumatologist. Five days prior to admission, still with the same symptoms, she consulted her rheumatologist at another institution. She was then managed as drug-induced stomatitis, otitis externa, and methotrexate overdose and was prescribed prednisone 20 mg/tablet, one tablet once a day for one week, folinic acid 5 mg/capsule one capsule twice a day for one week, then 5 mg/capsule, one capsule once a day for one week, mefenamic acid and mometasone cream. One day prior the patient still noted progression of throat pain, was unable to tolerate eating solid food, and now developed with high-grade fever, hence emergency department (ED) consult.

The patient was previously maintained on hydroxychloroquine but was shifted to methotrexate due to blurring of vision. Her medications for her SLE included methotrexate 2.5 mg/tablet, two tablets orally twice a day once weekly every Wednesday and prednisone 20 mg/tablet one tablet once daily. She also has bronchial asthma with her most recent attack two years ago and is maintained on olodaterol inhaler. She reports to be taking levothyroxine 25 mg/tablet once daily. The patient denied having previous thyroid surgery nor thyroid disease, hypertension, diabetes, heart disease, nor kidney disease. She does not have any previous surgeries. She is allegedly compliant with her medications but erroneously took the recently prescribed methotrexate only stopping once the dispensed one-month supply was consumed. She has a family history of hypertension, diabetes, and SLE. She is a non-smoker and non-alcoholic beverage drinker. The patient's rheumatologist and other previous physicians were from another institution hence no previous records were available at the time of consultation.

The patient arrived in the ED with blood pressure of 96/59 mmHg, tachypneic with a respiratory rate of 28 bpm, normal heart rate and oxygen saturation, afebrile, with pain scale of 10/10 of the whole body. She was triaged to the urgent section. Upon physical examination she had swollen bilateral auricles, tender with hyperemia, both external auditory canals swollen, narrowed, causing non-visualization of the tympanic membrane. Her tonsils were grade I with patent airway, no stridor, and no hot potato voice noted. There was a diffuse swelling of the anterior neck with overlying bullae formation and erythema as well as swelling in the preauricular area bilateral. There were petechial cutaneous lesions over the chest and both upper extremities, and maculopapular lesions over the face. Rhonchi bilateral on chest auscultation is noted as well as tenderness all over the body.

Due to the history of methotrexate ingestion, the case was immediately referred to the National Poison Management and Control Center. Arterial blood gas showed compensated metabolic acidosis with pH 7.361 PCO2 17.1 mmHg PO2 180 mmHg Bicarbonate 9.7 mmol/L Oxygen saturation 100% in room air. Complete blood count showed pancytopenia with severe neutropenia with an Absolute Neutrophil Count of 442. Multiple electrolyte imbalances (hypomagnesemia, hypocalcemia, hyponatremia) were also noted. Serum creatinine was elevated at 3.92 mg/dl with an estimated Glomerular Filtration Rate (eGFR) of 14 mL/min/1.73 m2. Liver function tests were within normal range. Serum procalcitonin and lactate were elevated significantly at 88 ng/mL and 8.2 mmol/L, respectively. Blood culture showed growth of Pseudomonas aeruginosa. Computed tomography of the neck showed extensive soft tissue swelling and edema surrounding the neck extending to the right supraclavicular region, signs of bilateral parotitis, and multiple prominent sized lymph nodes, bilateral.

Leucovorin therapy was intravenously initiated at 52.8 mg and was adjusted to 17 mg every six hours. Intravenous empiric antibiotics with piperacillin-tazobactam 2.25g every six hours, clindamycin 600 mg IV every eight hours, and vancomycin 1g every 24 hours were initiated to cover for sepsis secondary to soft tissue infection of the neck. Norepinephrine and vasopressin were subsequently started as the patient developed septic shock. Intravenous hydrocortisone 100 mg every 12 hours for was initiated for SLE. A total of 3 doses of Filgrastim at 300 mcg subcutaneously once a day was administered for severe neutropenia. The patient had episodes of desaturation with peripheral oxygen saturation as low as 88% in room air. With increasing oxygen support requirement and failure to adequately oxygenate, the patient was eventually intubated for airway protection and was placed on mechanical ventilatory support. Leucovorin antidotal therapy was administered until the third hospital day, when determination of serum methotrexate level was done and was determined to be 0.004 µmole/L. With target serum methotrexate level of less than 0.01 µmole/L already achieved, leucovorin therapy was discontinued. Continuous renal replacement therapy (CRRT) was started on the second hospital day and then shifted to sustained low-efficiency dialysis (SLED) every other day completed for a total of five sessions. Piperacillin-tazobactam was shifted to meropenem 500 mg intravenously every eight hours (completed 7 days). Wound debridement was done on the ninth hospital day. Operative findings showed necrotic neck (with growth of Candida albicans) and inguinal (with growth of Pseudomonas aeruginosa) wounds. Intravenous fluconazole 200 mg every 24 hours was given for seven days and was subsequently shifted to oral form. After completing meropenem, she was given levofloxacin 750 mg/tablet one tablet every 48 hours for seven days. After 14 days in the hospital, blood culture, urine culture, and sputum cultures showed no growth. On the 17th day, the patient was already for discharge but developed hospital acquired pneumonia and was given another course of IV antibiotics. On further work-up, official two-dimensional echocardiography showed hypokinesia of the anteroseptal and septal walls from base to apex with depressed systolic dysfunction (38.6%). The cardiology service attributed these findings from to the methotrexate toxicity.

Physical rehabilitation was started during her hospital stay, but the patient eventually refused later sessions due to financial difficulties. During her last session of therapy, she was able to ambulate around the room with a walker. Upon discharge, the patient's acute renal injury was resolved. She was prescribed prednisone 20 mg/tablet, one tablet twice daily for the SLE, and mycophenolate mofetil 500 mg/tablet, one tablet twice daily for lupus nephritis. She was also maintained on valsartan, amlodipine, and carvedilol. Levothyroxine was continued for hypothyroidism. Seven months after discharge, we were able to communicate with the patient via electronic mail. Currently, she is able to follow up with her physicians and is continuously taking the prescribed maintenance medications. Physical rehabilitation is still ongoing for her continuing recovery.

DISCUSSION

Reports of acute methotrexate toxicity, especially low dose (10-40 mg/m2) presenting as multiorgan failure is rare [10]. Significant nephrotoxicity may occur in high doses (>40mg/m2), with acute kidney injury developing in 2-12%, but occurs very rarely, if at all, in patients on low dose regimens [11,12]. A report on two cases of psoriasis patients with methotrexate toxicity resulting in death discussed one case presenting as mucositis and myelosuppression, while the other presented as altered renal function and suggestive bone marrow suppression [5]. In our case, one patient presented with mucositis, soft tissue infection, acute kidney injury, severe neutropenia, and heart failure, and unlike the existing case reports, had a good outcome. The critical problems of the patient were managed by administration of leucovorin, empiric antibiotics, and filgrastim, as well as early intubation and CRRT initiation.

The biologic effects of methotrexate can be reversed by administration of the reduced folate leucovorin or by L-leucovorin, which is the active enantiomer [3]. The rationale for using leucovorin is that it improves the therapeutic index of methotrexate, rescuing normal cells from toxicity by providing folates. The reason why leucovorin selectively rescues normal but not malignant cells is incompletely understood [1]. High doses of leucovorin should be administered until methotrexate has been eliminated, preferable within an hour of overdose [13]. Leucovorin has been a cornerstone of high dose methotrexate (HDMTX) treatment and is particularly effective in preventing myelosuppression, gastrointestinal toxicity, and neurotoxicity [11]. When given at high doses, methotrexate can precipitate in the renal tubules and directly induce tubular injury. The major risk with methotrexate-induced renal dysfunction is that methotrexate clearance is severely compromised resulting in delayed excretion of the drug and increased systemic toxicity [1]. Extracorporeal techniques to remove excessive methotrexate have been used although retrospective analysis of differing approaches without control groups, including plasmapheresis, charcoal hemoperfusion, high-flux hemodialysis, conventional hemodialysis, and peritoneal dialysis make it difficult to identify one optimal strategy [9]

Myelosuppression is the major dose-limiting side effect of HDMTX but is infrequent in low-dose therapy. Occasionally, anemia, leukopenia, or thrombocytopenia may occur without significant reduction in other cell lines [12]. To prevent these complications, routine peripheral blood count should be performed, which was not advised to the patient. Myelosuppression with low dose methotrexate is more likely if renal function is impaired or if methotrexate is taken daily instead of weekly [12], both of which experienced by the patient.

Methotrexate is not significantly immunosuppressive in low doses and is usually not associated with opportunistic infection unless the patient is also taking high-dose glucocorticoids, DMARD, or biologic agents [12]. There has been a report of an elderly with multiple comorbidities developing septic shock with low dose toxicity which resulted in death [14].

Acute cardiac toxicity has been reported in HDMTX. Cardiovascular effects of methotrexate are complex and frequently incorrectly understood. Several clinical trials even showed decreased major cardiovascular adverse events and benefits on survival. [15]. Common gastrointestinal problems in LDMTX use includes nausea, stomach upset and loose stools [12]. There has been a reported case of an elderly female developing severe gastrointestinal mucosal necrosis after 8 years of treatment with LDMTX [16].

Early detection of methotrexate toxicity and timely administration of the antidote, as well as immediate multidisciplinary involvement helped in preventing clinical deterioration of this patient. However, all these complications could have been prevented if early detection and immediate intervention was done during the patient's initial outpatient consult.

Conclusion and Recommendation

Thus, we present a case of severe multiorgan involvement secondary to MTX toxicity and its successful treatment. Early recognition of MTX toxicity, timely administration of the antidotal therapy, and a collaborative multidisciplinary approach to management facilitated an excellent outcome for our patient.

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I've Got My Eye On You : Rare Case Of Rhegmatogenous Retinal Detachment

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Keywords: Rhegmatogenous retinal detachment, Loss of Vision, Ultrasound

INTRODUCTION

Rhegmatogenous retinal detachment is the retinal break (hole or tear) where subretinal fluid (SRF) seeps and separates the sensory retina from its pigmenting epithelium. It is the most common type of retinal detachment, albeit retinal detachments being a rare occurrence altogether.

METHODS

We describe the case of a middle-aged man, who had presented to our Emergency Department with an acute presentation of loss of vision of the nasal quadrant of his right eye.

OBJECTIVE

To enable emergency medicine practitioners to effectively identify and detect rhegmatogenous retinal detachment when it presents to the Emergency Department, with the use of Ultrasound machine modality.

CASE PRESENTATION

Mr. A is a 44 year old gentleman, is a known case of diabetes mellitus, hypertension and psoriasis. He presented to our Emergency Department with the complaint of loss of vision in his right eye acutely over 3 days. He had loss of vision of the nasal lower quadrant of his right eye.

Upon examination, his GCS was 15/15, BP 125/77mmHg, HR 97bpm, SpO2 was 98% under room air with temperature of 36.6° C, his pupils were 3mm equal and reactive. He was noted to have strabismus and left lateralization of the right eye. Otherwise, all other examinations were normal and unremarkable. A CT brain was done to rule out any cerebrovascular events, yet the findings were normal.

Subsequently, a bedside ultrasound of the right eye was done in our Emergency Department setting and revealed retinal detachment of the right eye.

He was then referred to the Opthalmology team, where further assessment revealed right eye superior bullous rhegmatogenous retinal detachment with the macula off.
The patient then underwent right eye pars planar vitrectomy with endolaser and internal limiting membrance removal to surgically correct his condition, and was discharged well with Opthalmology Clinic follow up appointment.

DISCUSSION

Despite being a rarely seen condition (In Asian studies, the reported annual incidence rates were 8, 14.4, 10.5, 10.4, and 10.4/100,000 for Beijing, Shanghai, Singapore, Japan, and Korea, respectively), rhegmatogenous retinal detachment has a multitude of predisposing factors, among which are age group 40-60, male patients, having myopia and retinal degenerative conditions such as lattice degeneration.
Early onset symptoms patients may experience include (but not limited to) dark spots (floaters) which are caused by rapid vitreous degeneration and photopsia.
Once the retina has detached, patients will experience localized relative loss in the field of vision, which may progress to a total loss of vision when detachment gradually encroaches the macula area of the eye.

CONCLUSION

Without prompt diagnosis in the Emergency Department setting, rhegmatogenous retinal detachment can quickly result in total loss of vision as it advances to the macular area.

As such, it is the responsibility of Emergency Department Physician/Residents to be able to maximize the resources available (eg, ultrasound modality) to identify and diagnose this condition promptly, and ensure the Ophthalmology team is duly notified, to facilitate surgical correction to be carried out, for the effectiveness of patient care.

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"Shorewars: Rogue One" - A 42-Year-Old Male Victim Of Airway Impaction Caused By Foreign Body Ingestion: A Case Report

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ABSTRACT
Airway obstruction is where there is an anatomic occlusion or narrowing of the airway which leads to decrease in the ability for ventilation. According to the National Safety Council's statistics, foreign-body airway obstruction (FBAO) is the fourth leading cause of unintentional death, resulting in 5,051 documented deaths in 2015. Airway obstruction secondary to a foreign body is often easily treated. However, airway obstruction from the ingestion of a live fish can be fatal. Acute causes of airway obstruction, either partial or complete, require emergency intervention such as manual extraction of foreign body with a use of forceps, emergency bronchoscopy, or emergency needle cricothyrotomy. This is a case of a 44-year old male who was brought to the emergency department due to foreign body airway obstruction which resulted to the patient's temporary demise during the pre-hospital setting. Upon arrival in our department, advance cardiac life support was initiated but efforts of cardiopulmonary resuscitation was ineffective due to inability to establish airway due to presence of a foreign body. With the use of Suction Assisted Laryngoscopy and Airway Decontamination (SALAD) technique, foreign body was identified and immediately extracted from the airway. Immediately after removal, patient was intubated and attained return of spontaneous circulation.

INTRODUCTION

The problem with foreign body obstruction in aerodigestive tract has been in society since time immemorial. Foreign body aspiration is the second most common cause of life threatening airway obstruction and is perceived as an unusual cause of Out of Cardiac Arrest (OHCA) only accounting to approximately 1.4% of all OHCA.[1]

Incidence of foreign body ingestion is usually greatest in children 6 months to 6 years of age. In Adults however, foreign bodies are usually ingested accidently together with food. [2] Some studies cited that the most common foreign body ingested are fish bones, chicken bones, meat bolus, denture in adults and coins in children hence incidence of live fish obstruction is unique and rare. [2] There are only a few case reports found from world literature with regards to live fish aerodigestive obstruction and among the few cases reported from the pool of literatures, there are a fewer reports on patients suffering from asphyxial cardiac arrest due to live fish obstruction. [3]

The uniqueness of this case will anchor on the best approach towards foreign body obstruction with respect to patient status, site of obstruction, by-stander knowledge and competency, prehospital management, and promptness to transfer patient to a higher facility. It hopes to promulgate community sensitivity, awareness, and training as to increased livelihood of survival of these patients.

OBJECTIVES

1. To discuss a unusual case of airway obstruction secondary to accidental ingestion of Mullet Fish
2. To discuss the clinical presentation, early recognition and technique used to remove the impacted fish from the upper airway
3. To describe the Pre-Hospital and ED management of foreign body obstruction

CASE PRESENTATION

A walk in patient, 44-year old male, was brought to Southern Philippines Medical Center Emergency Department due to unresponsiveness. Patient was immediately categorized as Emergency Severity Index (ESI 1). Blood was seen on patient's oral mucosa oozing out towards his upper chest. No pulse appreciated upon arrival as well. Immediately started high quality cardiopulmonary resuscitation (CPR). Simultaneously patient was hooked to cardiac monitor and two peripheral intravenous access line of plain lactated ringers was immediately established. Bag-valve ventilations were started while preparing for endotracheal intubation. Initial rhythm check was asystole.

Patient was given one dose of epinephrine 1mg IV plus 20 NSS flushing. Capillary blood glucose taken which revealed 121mg/dl. Endotracheal intubation was attempted. Tongue was blocking airway upon assessment. However, bloody secretions were obscuring the view of the airway. Suctioning was performed. No foreign body found in the oral pharynx.

On the second rhythm check, asystole was still appreciated. High-quality chest compressions were continuously performed. Hypoxia was highly considered as cause of arrest at this point and a second attempt at endotracheal intubation was made. Suction-assisted laryngoscopy airway decontamination (SALAD) was performed for better visualization of airway. Repositioning of the laryngoscope revealed scales. At this point, Kelly forceps were obtained to attempt to remove the foreign body.

Pre-oxygenation was again done. Rhythm check revealed asystole. Continued high quality CPR and after a minute, given 3rd dose Epinephrine 1mg IV plus 20cc NSS bolus. Airway opened using laryngoscope with visualization assisted by SALAD approach. Forceps were used to extract foreign body from the airway. Once removed, epiglottis was visualized and arytenoids were seen. Endotracheal tube 7.0 inserted at level 20 and checked placement. Equal lung expansion with equal breath sounds appreciated on both lung fields. Foreign body extracted was a Mullet fish with a size of 9cm x 1cm. Patient immediately achieved return of spontaneous circulation.

Rhythm check revealed sinus rhythm. Post-arrest vitals revealed BP of 60/40mmHG, heart rate of 69 beats per minutes, 97% oxygen saturation, and GCS of 3. Initial fluid hydration and vasopressor treatment with norepinephrine was started which improved the blood pressure to 110/80mmHg, 74bpm heart rate, and GCS score of 3. However, due to the prolonged transit time of 30 minutes, patient already had fixed dilated pupils. Rhythm check revealed sinus rhythm. Post-arrest vitals revealed BP of 60/40mmHG, heart rate of 69 beats per minutes, 97% oxygen saturation, and GCS of 3. Initial fluid hydration and vasopressor treatment with norepinephrine was started which improved the blood pressure to 110/80mmHg, 74bpm heart rate, and GCS score of 3. However, due to the prolonged transit time of 30 minutes, patient already had fixed dilated pupils.

FIGURE 1: Mullet Fish Obstructing Patient's Airway

A brief history from companions revealed: 30 minutes prior to admission, patient was with his fellow fishermen by the shore preparing bait for a day's work. As claimed, patient, while working on a bait on hand, patient saw another bait in the sea. Patient placed head of the bait on hand in his mouth and bit the head part while trying to catch a new fish bait. During the process, fish on the bait squirmed in towards patient's mouth which resulted to choking. Patient was seen by his fellow fishermen struggling and trying to cough out fish while pointing to his neck. Patient attempted to cough out fish but was unsuccessful. No efforts were attempted by fellow fishermen to address the choking incident instead decided to bring patient to our institution. On the way, patient's sensorium was decreased and upon arrival at the ED, patient arrested.

Post-resuscitation orders were as follows: Patient was then hooked to a mechanical ventilator and referred to ENT for further evaluation. The otorhinolaryngology service performed a flexible nasopharyngolaryngoscopy. Laboratory requests ordered which included Chest Xray AP, cervical APL, 12L ECG, CBC with platelet, PT, APTT, Serum creatinine, Serum electrolyte, and COVA, ABG was extracted which revealed metabolic acidosis with a pH of 6.8. Given bolus of Sodium Bicarbonate 200meqs as bolus and another 200meqs drip. Repeat ABG after 30 minutes resulted to a fully compensated metabolic acidosis with adequate oxygenation.

Soon after, the patient manifested with tonic-clonic seizures. Diazepam was given. Persistence of post-arrest seizures were controlled by phenytoin. Antibiotics were started. Patient was given Clindamycin 600mg and Ceftriaxone 2g both via intravenous route.

Reassessment of the patient revealed a GCS of 3, pupils reactive to light and stimulation, absent of corneal reflex, blood pressure sustained to 110/80mmHg, pulse of 92 beats per minute with sinus rhythm seen on cardiac monitor.

The clinical working impression was Hypoxic Ischemic Encephalopathy secondary to Acute Respiratory Failure Type 1 secondary to Foreign Body Obstruction (Mullet Fish)

DISCUSSION

Foreign body aspiration is the second most common cause of life threatening airway obstruction and is perceived as an unusual cause of Out of Cardiac Arrest (OHCA) only accounting to approximately 1.4% of all OHCA. [1] According to the National Safety Council's Statistics, foreign-body airway obstruction (FBAO) is the fourth leading cause of unintentional death, resulting in 5,051 documented deaths in 2015. [4] Therefore a myriad of factors such as early recognition of obstruction by-standers, pre-hospital management, prompt patient transfer and emergency room advance life support is crucial to patient survival.

Incidence of foreign body ingestion is usually greatest in children 6 months to 6 years of age. [9] In Adults, foreign bodies are usually ingested accidently together with food. Some studies cited that the most common foreign body ingested are fish bones, chicken bones, meat bolus, denture in adults and coins in children. [2] While fish bone is one of the most common foreign bodies ingested, airway obstruction from the accidental ingestion of whole live fish is rare.

Time is gold. Foreign body ingestion causing airway obstruction is a clinical emergency and if not managed promptly, consequences would be debilitating. In this case, during the pre-hospital assessment, obstruction was immediately discovered by by-standers since the victim was seen grabbing his neck with both hands. This action is the universal sign for an airway obstruction. Unfortunate for this patient, despite early recognition of obstruction, no management was done to relieve obstruction. Though

prompt decision by by-standers to transport patient in our institution was admirable, the distance only worsened cerebral hypoxia. Upon arrival in our institution, patient was already cyanotic and arrested.

Circulation precedes airway. Studies which report Sudden Cardiac Arrest (SCA) due to either suspected or incidental discovery of foreign body obstruction, cardiopulmonary resuscitation (CPR) should not be delayed. [6] In this case, upon arrival of the victim in our department and after identifying for pulselessness, advance life support was immediately instituted. Cardiopulomnary resuscitation performed, intravenous access line was established and Epinephrine was immediately administered.

During the events of early resuscitation, patient was not responsive to CPR and administration of Epinephrine. Rhythm seen on the cardiac monitor remained asystole in despite two cycles of CPR and 2 doses of Epinephrine. Hypoxia, which deems to be a possible culprit for sudden cardiac arrest, was addressed right after circulation was secured but airway management in this case presented a bit of a challenge. Initial differential upon receiving the patient with blood oozing from his oral mucosa was either due to trauma or upper gastrointestinal bleeding. Obscurity due to presence of active bleeding delayed securement of airway. Upon introduction of a laryngoscope and intermittent assistance of a suction catheter, a mass like structure was identified. Application of Suction Assisted Laryngoscopy and Airway Decontamination (SALAD) technique was then decided on performing. Suction Assisted Laryngoscopy and Airway Decontamination technique (SALAD) was developed to address airway obscurity secondary to massive contaminated airway either by food debris, blood, or emesis. [10] Study by Jensen concluded that SALAD technique will lead to shorter intubation time and increased likelihood for successful intubation. SALAD technique is done in a step-wise approach. [11] After positioning patient in a way optimal laryngoscopy can be achieved, ideally a rigid suction catheter is preferred in performing this technique but in this case, a single non rigid suction catheter was inserted while laryngoscope was introduced. The Macintosh laryngoscope was used to displace tongue towards the left side while the suction catheter is slowly advanced ahead of the blade. Once patient's epiglottis was visualized and lifted, tip of the catheter was positioned on the esophagus with the use of the laryngoscope. With clearance of the contaminated airway, a foreign body was discovered. Silver scales were initially observed. With continuous suction and manipulation, the tail of the fish was visualized. A fish was lodged in the oropharynx of the patient. Attempts to intubate was put to halt. Using a Kelly forceps and with application of SALAD technique, the fish tail was grasped and once secure enough to be pulled out, foreign body was removed.

Once impaction was relieved, endotracheal intubation was performed and was successful. Assessment patency resulted to equal chest expansion with equal breath sounds heard upon auscultation of bilateral lung fields. The moment airway was secured, patient's cardiac rhythm seen on the cardiac monitor started showing QRS complexes. On rhythm check, pulse was appreciated from the carotid artery and a sinus tachycardia rhythm was on the cardiac monitor. Patient achieved return of spontaneous circulation.

Had it been for this patient, during the pre-hospital event, when the universal sign of airway obstruction was identified, maneuvers to relieve foreign body obstruction such as subdiaphragmatic abdominal thrust (Heimlich Manuever) which was ideal for relieving obstruction due to solid objects in conscious patients was performed, obstruction would have been relieved. If blind finger sweep was performed by by-standers, it might have worsened the obstruction which then led to asphyxial cardiac arrest. Had it been this were the case, if early cardiopulmonary resuscitation (CPR) was performed on site by bystanders, this would have increased survival likelihood of patient to 2-8%. Early CPR delayed defibrillation increased patient survival to 2-8%. [7]

Unfortunately, foreign body ingestion causing complete obstruction will eventually lead to asphyxia resulting to cerebral hypoxia. A study made by Vintila, Filip and Rociu came up with a table presenting the manifested clinical signs in congruence to duration of cerebral hypoxia. [8]

Tabel no. 2. Clinical signs which occur depending on the duration of cerebral hypoxia

Duration of hypoxia	Clinical signs
Up to 1 minute	Unconsciousness, convulsions, miosis, abolished pupillary reflex
After 2 minutes	Mydriasis, the abolition of corneal reflex
After 5 minutes	Cerebral cortex suffering irreversible damage
After 15 minutes	Irreversible damage at brain stem and the spinal cord

On following up this patient, patient might have sustained return of spontaneous circulation but prognosis was already low due to the prolonged transit time. Patient had another arrest on the his 3rd hospital day and remained unresponsive in despite resuscitation.

What makes this case unusual are these following points. First, the rarity of the case. Only few studies were made about airway obstruction secondary to live fish ingestion. What makes it even rarer is that most of the studies on live fish obstruction caused only partial obstruction and patients arrive in the emergency department still conscious. Different ED management approach was performed and patient was sent eventually home. But for this case, the patient already came in arrested which led to a different management approach in the emergency department.

Second, the length of the Mullet fish in relation to the length of the oropharynx would deem inevitable for obstruction and this presents as another challenge in emergency management. Estimated length of the Mullet fish was 9cm obstructing majority of the length of the pharynx (which is an estimate of 11-14cm in length). This resulted to a complete foreign body airway obstruction. The anatomy of the fish also presents as a challenge since the attachments of the fish's external fins and scales to the esophageal and tracheal mucosa limit the removal when impacted. Had it been this patient was alive upon arrival, prompt flexible bronchoscopy could have been performed to confirm diagnosis and retrieve the foreign body. If flexible bronchoscopy is not available, foreign body extraction can be done using a Magill forceps once foreign body is visualized.

SALAD technique, which is not often performed in our emergency department, was applied during resuscitation This technique has aided visualization and identification of foreign body hence prompt management and extraction relieving patient of his hypoxic state.

CONCLUSION

Pre-hospital intervention and Layman's knowledge on basic life support is crucial to a victims survival. Had it been the patient's fellow fishermen were knowledgeable of performing Heimlich maneuver after seeing the patient manifesting the universal sign for chocking, attempts of Heimlich maneuver would have relieved the patient's airway obstruction. Prompt activation of the EMS team would have also increased chances of livelihood had it been cardiopulomonary resuscitation (CPR) was started on site and continuously on the way to a higher institution.

Suction Assisted Laryngoscopy and Airway Decontamination (SALAD) technique proved to be pivotal in airway management. Had it been this technique was not performed, foreign body would have not been identified, airway would have not be secured immediately and in despite efforts to do CPR; patient would have not achieved return to spontaneous circulation.

Safe occupational practices should also be part of laymen education. Studies show that some minority around the world would report killing of fish baits by biting off the fish head is a practice among fishermen. Though obstruction by live fish is rare, majority of the reports made would also include unsafe practices of holding on to a fish bait between their mouths while obtaining another fish bait on sea. These are the common predispositions of patients being brought to the emergency department.

Accidents are avoidable but they tend to happen. These are the incidents which will then lead us to aspire for a CPR ready Philippines where in lay persons can identify people in distress, can perform maneuvers to relieve distress and in this case, Heimlich maneuver would have been warranted, and can perform CPR on site once arrest is identified.

CPR-awareness campaigns has started already in Davao City. An Automated External Defibrillators (AED) Ordinance has been proposed and is currently awaiting approval. Introduction of Basic life support in schools or work areas has been started. Even children can be taught to identify people in distress and perform CPR. These are the small steps that will lead to bigger changes for the community. There is a significant social impact if the community is empowered to respond to these kinds of emergencies. Basic life support has been designed in a way that even lay persons can understand, identify and perform life saving acts. The vision to one day be a CPR ready city and eventually, country, will cascade to a socially involved community with regards to health and preservation of life.

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