

Original Research Article

Analytical study of mortality in Intensive Care Unit

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ABSTRACT

Background: Intensive care Unit is the one place where we come across various medical critical cases and high number of deaths. In spite of so many deaths occurring at this unit, cause of death is poorly reported. We studied the different causes for deaths in ICU which includes single and multiple factors for cause of death.

Methods: A retrospective study performed between January 2017 to January 2018 at Rajiv Gandhi Institute of Medical sciences, Kadapa, A.P. This study includes 260 deaths among patients admitted in ICU of our institute during this duration. We gathered data at various levels like clinical evaluation and investigations.

Results: A total of 260 deaths were recorded during this study. Among these 215 (82.69%) are female and 45 (17.30%) are male. At the time of death 174 (66.92%) patients has single systemic cause 86 (33.06%) had more than one systemic cause. Cardiovascular death 50 (19.23%) is the most common cause of death among all in which CAD 28 (10.76%) are major portion and congestive cardiac failure 20 (7.6%) are the remaining portion of the cardiac deaths. Chronic kidney disease 37 (14.2%) is the next highest deaths recorded and cerebro vascular 35 (13.46%) deaths follows the next in line.

Conclusions: Majority of ICU patients were present with at least one organ failure at the time of death. What we have concluded in this study is that there are more number of deaths with single systemic cause than multiple systemic causes.

Keywords: Mortality causes, Multi organ failure, ICU

INTRODUCTION

Intensive care Unit (ICU) is a specialized discipline where we see all types of critical cases. In the last decade, there has been tremendous growth of intensive care units and hospitals provide such services in India.¹ ICU is the one place where medical errors are most likely to occur because of the complexity of care. In spite of the best care given to these patients they are highly vulnerable to experience adverse outcomes due to the severely ill nature. There are very few studies in our country on ICU Mortality. We studied the different causes for deaths in ICU which includes single and multiple factors for cause of death. Our aim is to evaluate the common causes of

death among critically ill patients in ICU at Our Institute which will give a scope to improve the services. However, there are scant data on various types of cases, various practices at ICU, Mortality rates in Indian Intensive Care Units Most of the available information comes from either single-centre studies or studies in specific groups of patients or conditions.^{2,3} It is essential to have data from several Indian ICUs to reflect the vast and diverse spectrum of critical care illness, services, and practices. Such information may be useful to identify deficiencies in the organization of care and to identify targets for improvement of services in both public and private sector, medical education and research. This study would provide baseline estimates of disease prevalence and mortality.

METHODS

It is a retrospective study conducted between January 2017 to January 2018 at Rajiv Gandhi Institute of Medical sciences, Kadapa, A.P. This study includes 260 deaths among patients admitted in ICU of our institute during this duration. We gathered data at various levels like history taking, clinical evaluation and investigations to do logistic analysis in determining the cause of death. All other studies collected data only based on APACHE or SOFA score.⁴ Whereas we included only Medical cases and excluded all surgical, post operative and trauma cases. All these cases are grouped according to the ICD-10(International Statistical classification of Diseases and related health problems) Score. We included all age group patients >14 years and no maximum age limit.

RESULTS

A total of 260 deaths were included during this study period which occurred in ICU, RIMS, Kadapa. Among these 215 (82.69%) are female and 45 (17.30%) are male (Table 1).

Table 1: Total number of patients with sex ratio.

Male	Female
45(17.31%)	215(82.69%)

Table 2: Comparison of single systemic and multiple systemic causes with sex.

Cause of death	Male	Female
Multiple systemic cause	26	67
Single systemic cause	19	148

We grouped deaths in to two major groups i.e. Single systemic cause and multiple. Single systemic cause at the time of death are 174 (66.92%) and 86 (33.08%) had more than one systemic cause (Table 2).

Various systemic conditions are evaluated as cause of death in this study which involves both single systemic and multiple systemic cause. Those are cardiovascular, cerebro vascular, respiratory, multi organ dysfunction (MODS), diabetic ketoacidosis (DKA), heat stroke and immunodeficiency (I.D) and so many other (Table 3).

We delineated multiple systemic cause death from Multi organ dysfunction syndrome. Those diagnosed as MODS reflects all system failure with septic shock. Multiple systemic cause in our study includes any patient who is diagnosed with more than One systemic cause which can be two or more systems involved.

Four major causes of death are in the decreasing order are cardio vascular, renal, cerebro vascular, MODS (Figure 1). Cardio vascular causes 50(19.23%) is the major cause of death. Among the cardiovascular deaths CAD

28(10.76%) plays major portion and congestive cardiac failure 20(7.6%) is the causative factor for remaining. Two sudden cardiac death are noted one each male and female. Next most common cause of death is chronic kidney disease 37(14.23%) and cerebro vascular 35(13.46%) deaths follows the next in line. Whereas Multi organ dysfunction syndrome (MODS) causes 18 (6.92%) deaths which is lesser than any major 4 single organ failure causes. DKA, immunodeficiency 11 each (4.2%) which share almost the same percent (Table 3).

Table 3: Various causes of death noted in our study.

Diagnosis	Male	Female	Total	
Cardiac	CAD	4	16	20
	CCF	7	21	28
	SCD	1	1	2
CKD	5	32	37(14.23%)	
Cerebrovascular	CVA-H	7	9	16
	CVA-I	4	15	19
MODS	5	13	18(6.92%)	
ID	-	11	11(4.23%)	
DKA	2	9	11(4.23%)	
Heat Stroke	1	10	11(4.23%)	
Anaemia	1	9	10(3.8%0	
PTB	4	5	9(3.4%)	
COPD	3	6	9(3.4%)	
Meningitis	1	7	8(3.07%)	
Pneumonia	2	5	7(2.69%)	
OP	1	5	6(2.3%)	
AKI/AKA	-	5	5(1.9%)	
Carcinoma	2	2	4(1.53%)	
Epilepsy	3	1	4(1.53%)	
Infection	1	3	4(1.53%)	
Rat Poison	-	3	3(1.11%)	
Viral Fever	1	2	3(1.11%)	
Other Drugs	-	3	3(1.11%)	
Hanging	-	2	2(0.76%)	
Alprazolam poison	-	2	2(0.76%)	
Malnutrition	-	2	2(0.76%)	
Pyrexia	-	1	1(0.38%)	
Dengue Fever	1	-	1(0.38%)	
Snake bite	-	1	1(0.38%)	
Pesticide poisoning	-	1	1(0.38%)	
Malaria	-	1	1(0.38%)	
Haematological	-	1	1(0.38%)	

Next most important thing highlighted in this study is Most of the deaths 144(55.38%) occurred in ≤ 24 hrs duration. Among the remaining duration of stay ≤ 48 Hrs are 38(14.6%) and ≤ 72 Hrs is 21 (8.07%) and ≥ 72 hrs is 57(21.92%) (Table 4).

It is reflecting the more than 50% deaths are expected and reflecting the true mortality rate of ICU is less than originally depicted in the study. Age relation to the death are 172 in <65 years is more than >65years patients (88) which generally vice versa in ICU (Table 5).

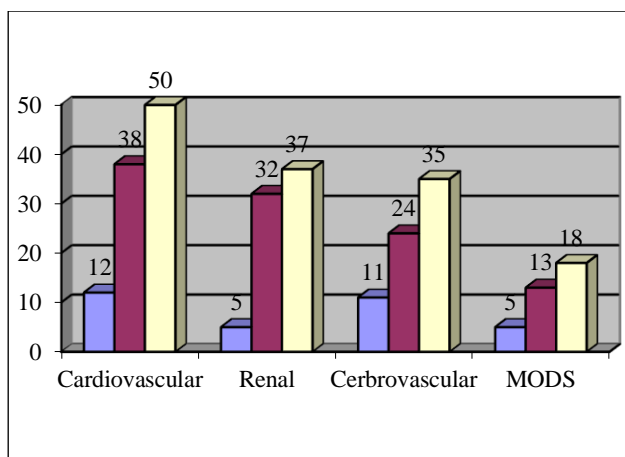


Figure 1: Four major cause of deaths with sex.

Table 4: Hospital stay duration comparison with sex.

Duration of hospital stay	Male	Female	Total
<24hrs	24	120	144
<48hrs	5	33	38
<72hrs	5	16	21
>72hrs	11	46	57

Table 5: Deaths with sex and age ratio.

total no. death patients	Male	Female
<65	31	141
>65	14	74

DISCUSSION

It is a single centre and Tertiary care public hospital study. So results cannot be generalised to all centres. There are very few studies in our country among critically ill patients. The study is limited by insufficient resources and severe illness. This study is different from others in the collection of data in general risk factors of death.^{5,6} Some studies has the age, sex ratio and others compared percentage of patients with sepsis.⁷ Some studies evaluated severity illness score SOFA or APACHE and analysis.⁸ Our study is based on analysis of the patient condition, signs and symptoms, Investigations, prognosis of the condition and Provisional or Final diagnosis. A total of 260 deaths were noted and 215(82.69%) are Female which is not consistent with other studies.⁹

The majority of patients presented with at least one organ failure at the time of death. This result is consistent with studies showing an association between organ failure and outcome similar to studies by Mayr et al, Vincent et al.¹⁰

Most common cause of death was cardiac cause which is inconsistent with other studies Mayr et al which shows multi organ failure is the frequent cause of death.

Cardiac is the major and renal is next in order is similar to study conducted by Omar MAK et al, Aram FO et al, Banafa NS et al.¹¹ Cardiac is the major and respiratory comes next in the study conducted by Orban JC et al.¹²

Cerebrovascular, respiratory failure in the order also not consistent with other studies by Orban JC et al.¹² Among cerebro vascular we have seen deaths in hemorrhagic cases is less than Infarct cases which is generally vice versa in any setting.

There is also deaths due to DKA, immunodeficiency, heat stroke and anaemia also plays major role of each consisting of 11 cases in the entire death toll. These are also similar to other centre causes and also by WHO reports too. This study shows multi organ failure in the fourth place which is against the study conducted by Orban JC et al.¹²

WE noted there are more number of unexpected deaths than expected ones which is inconsistent with Orban JC et al.¹² Unexpected deaths recorded are 144(55.38%). These are the same that happened in hospital stay is less than 24 hrs.^{9,10,13,14}

Absence of adequate facilities in the hospital may lead to inadequate or delayed care or may necessitate transport that may increase the risk of complications, with consequent increase in mortality.¹⁵ Patients died less than <65Yrs age are more in number than >65Yrs is also not consistent with other studies by.¹⁶

Our study is a public hospital study where there is lack of facilities and staff is the limitation for our study in giving best outcome.¹⁷⁻¹⁹ So it cannot be generalized to private tertiary care centres and other where they can get best services. Although the case mix appears to represent a general ICU population, our results cannot be applied to different healthcare settings where withdrawal of treatment is permitted.^{20,21} Last, our study was not designed to find parameters predicting the type of death. Such factors could be interesting for the communication with relatives. Further studies could meet this objective in the near future.

CONCLUSION

In general, most of the ICU patients present with at least one systemic cause which is same in our ICU too. We came across mostly two types of deaths, that are anticipated and unexpected deaths in which unexpected occurs in early stage. Generally single systemic cause is seen in anticipated deaths and some may progress to multi organ failure in due course. Among patients who presented with multi organ failure at presentation early deaths are noticed.

Authors have concluded in this study that there are more number of deaths with single systemic cause than multiple systemic causes at our centre. It also noted that

at least one organ failure or systemic cause is noted in all deaths. We also noted more number of deaths (Un expected deaths) within 24hrs of hospital stay which highlighted research should focus on health awareness and improvement of primary and secondary care health services.

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