CLINICO-ETIOLOGIC PROFILE OF THE CRITICALLY ILL GERIATRIC PATIENTS ADMITTED TO THE MICU: AN OBSERVATIONAL STUDY

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ABSTRACT

Aim: To study the clinico-etiologic profile of the critically ill geriatric patients admitted to the MICU.

Materials and Methods: The present prospective observational study was conducted on 100 patients of age 60 years and above with dysfunction of at least two organ systems, admitted in medical intensive care unit of Dr DY Patil Medical College Hospital and Research Centre, Pimpri, Pune during the period from OCTOBER 2020– SEPTEMBER 2022. When determining the severity of a critical disease, the SOFA score system is utilized, and this evaluation takes place both upon admission and after 48 hours have passed.

Results: Majority of the male and female patients were in the age group 60-69 years followed by 70-79 years and >80 years. The mean TLC is 18069.0 (SD ±9690.35441), mean CRP is 39.76176 (SD ±7.00), mean ESR is 20.82028 (SD ±11.00) and the mean urea is 45.70459(SD ±20.00). The mean direct bilirubin is 3.11292±5.22386, mean ALT is 218.0900±364.13262, mean AST is 185.7400±336.44123, mean ALP is 167.5500±101.13980, mean INR is 1.6261±0.63524 and the mean APTT is 33.9960±9.44580. Majority of the patients were having myocardial infarction (23%) followed by Cirrhosis Liver (18%), chronic kidney disease (17%), Pneumonia (12%), Ischemic Stroke (10%), Hemorrhagic Stroke (6%) and 3% in Bacterial Meningitis & Pyelonephritis. The mean SOFA score at admission and 48 hours were 5.73 ±3.36 and 6.2 ± 4.06 respectively. The mean value of Delta SOFA score was 0.47±3.00.

Conclusion: The clinical assessment along with lab markers correlated well with the mortality and morbidity. Geriatric patients hospitalized with sepsis have a high prevalence of multiple organ dysfunction, septic shock, ICU occupancy, and need for advanced life support along with increased overall and ICU mortality rate.

Keywords: etiology, geriatric patients

INTRODUCTION

A natural corollary of the universal increase in life expectancy is a rapidly aging population.[1,2] It is estimated that by the year 2050, there will be five times as many persons aged 80 or older in the world as there are now, which is 70 million.

The definition of "elderly" has been debated extensively in the literature. With increasing longevity, we are now confronted with terms such as the "young old" and the "oldest old." Biologic age varies widely in relation to chronologic age, and there is a distinct need for methods to identify biologic age, not only at the patient level, but also at the organ-system level to better inform patient management and both basic and clinical study design.

However defined, aging brings with it an increased susceptibility to critical illness. For instance, severe sepsis is a quintessential disease of the aged.[3]

It is estimated that by 2025–2030, the population of elderly people over the age of 60 will grow 3.5 times as rapidly as the total population[1], which will lead to an increase in the number of hospitalizations as well as demand for intensive care unit (ICU) facilities for the elderly patient population. The elderly population is growing at a faster rate than the general population at the moment.

Inside of a hospital, there is a specialized area known as an intensive care unit (ICU) that treats patients who are in critical condition and need resuscitation efforts. Before admitting a patient to the intensive care unit, it is very necessary to do a comprehensive evaluation of the patient's condition in order to guarantee that the patient will get the most appropriate care and that the hospital will make the most efficient use of its resources. Greater consumption of medical services brought on by an ageing population is projected to place a burden on hospital services, particularly critical care units (ICUs).

In developing countries, the health-care resources are restricted. Therefore, it is necessary to have accurate prognostic markers justifying the transfer of geriatric patients to the ICU and guiding their treatment.

The SOFA (Sequential Organ Failure Assessment) score was developed following a consensus meeting in 1994, the stated aim of which was to create a score 'to describe quantitively and as objectively as possible the degree of organ dysfunction/failure over time in groups of patients or even individual patients'.[4] The score was designed to describe a sequence of complications of critical illness and not to predict outcome, although the authors acknowledged that any functional morbidity score must also be associated with mortality. Initially described as the sepsis-related

organ failure assessment, the utility of the score for the assessment of acute morbidity in a range of critical illnesses was recognized early and the title changed.

It is crucial to know the outcomes of elderly patients who are admitted to the intensive care unit (ICU) as well as the variables that contribute to these outcomes because of the growing demand caused by an ageing population in the midst of limited resources. The elderly are prone to many ailments, which are compounded by the fact that they face additional challenges due to social, psychological, and financial reasons. In addition to this, they are accompanied with sensory and cognitive deficits that compound the problem. Morbidity and mortality are both increased as a result of this cumulative effect. The evaluation of these parameters may be of assistance in lowering the mortality rate by facilitating the prompt application of remedies.

Materials and Methods

The present prospective observational study was conducted on 100 patients of age 60 years and above with dysfunction of at least two organ systems, admitted in medical intensive care unit of Dr DY Patil Medical College Hospital and Research Centre, Pimpri, Pune during the period from OCTOBER 2020– SEPTEMBER 2022.

Inclusion criteria

- All critically ill elderly patients
- Age ≥60 years
- Both male and female patients in MICU

Exclusion criteria

- Age <60 years
- Patients on readmission are not taken into study
- Patients who did not give consent

Ethical approval and Informed consent

The protocol for the study was examined by the hospital's Ethical Committee, and they determined that it did not violate any ethical standards. Following the presentation of the objective of the research as well as its specifics, a written informed permission was collected.

Methodology

The study was carried out on a total of one hundred patients who fulfilled the qualifying requirements and were admitted to the hospital's medical intensive care unit. Every single one of our patients gave their consent after receiving adequate information. A comprehensive clinical examination, which included both general and physical examinations, was performed on each and every patient. Assessment of the patient's degree of consciousness as well as their score on the Glasgow coma scale were taken at the time of admission for each patient. The severity of an issue is graded according to the GCS as follows: severe (GCS score of 8), moderate (GCS score of 9–12), and mild (GCS score of 13 or lower) (GCS score of 13–15).

Investigations

When determining the severity of a critical disease, the SOFA score system is utilized, and this evaluation takes place both upon admission and after 48 hours have passed. A complete blood count, an erythrocyte sedimentation rate (ESR), blood urea, blood sugar, serum creatinine, serum electrolytes, a liver function test (LFT), an X-ray of the chest, an electrocardiogram, an Elisa test for human immunodeficiency virus (HIV), a CRP test, and a VDRL test are all examples of additional investigations. Each patient had a coagulation profile carried out on them, which included measurements of their bleeding time, clotting time, prothrombin time, and activated partial thromboplastin time.

Statistical Analysis

The collected data was entered into a spreadsheet application (Microsoft Excel 2010) and then transferred to the data editor in SPSS version 20. (SPSS Inc., Chicago, Illinois, USA). Percentages, averages, and standard deviations were all computed as part of the descriptive statistics process.

Results

Table 1: Age wise distribution of the gender in the study

		Gender		Total	p-value
		Female	Male		
Age (In Years)	60-69	26	42	68	0.781 (NS)
		68.4%	67.7%	68.0%	
	70-79	9	17	26	
		23.7%	27.4%	26.0%	
	>80	3	3	6	
		7.9%	4.8%	6.0%	
Total		38	62	100	
		100.0%	100.0%	100.0%	

Test applied: Chi-square test

The above table shows statistically non-significant (p = 0.781) distribution between age and gender. Majority of the male and female patients were in the age group 60-69 years followed by 70-79 years and >80 years.

Table 2: Hematological assessment of the study population

Parameters	N	Minimum	Maximum	Mean	Std. Deviation
TLC	100	800.00	39600.00	18069.0000	9690.35441
CRP	100	190.00	62.5310	39.76176	7.00
ESR	100	89.00	55.5300	20.82028	11.00
Urea	100	320.00	76.0000	45.70459	20.00

In the present study, it was observed that the mean TLC is 18069.0 (SD ±9690.35441), mean CRP is 39.76176 (SD ±7.00), mean ESR is 20.82028 (SD ±11.00) and the mean urea is 45.70459(SD ±20.00).

Table 3: Hepatological assessment of the study population

Parameters	N	Minimum	Maximum	Mean	Std. Deviation
Direct Bilirubin	100	0.08	29.28	3.11292	5.22386
ALT	100	13.00	1575.00	218.0900	364.13262
AST	100	11.00	1585.00	185.7400	336.44123
ALP	100	48.00	489.00	167.5500	101.13980
INR	100	0.96	3.70	1.6261	0.63524
APTT	100	20.00	60.00	33.9960	9.44580

In the present study, it was observed that the mean direct bilirubin is 3.11292±5.22386, mean ALT is 218.0900±364.13262, mean AST is 185.7400±336.44123, mean ALP is 167.5500±101.13980, mean INR is 1.6261±0.63524 and the mean APTT is 33.9960±9.44580.

Table 4: Distribution of etiological spectrum of study population

		Frequency	Percent
Etiology	Myocardial Infarction	23	23.0
	Cirrhosis Liver	18	18.0
	Chronic Kidney Disease	17	17.0
	Pneumonia	12	12.0
	Ischemic Stroke	10	10.0
	Hemorrhagic Stroke	6	6.0
	Bacterial Meningitis	3	3.0
	Pyelonephritis	3	3.0
	Congestive Cardiac Failure	2	2.0
	CVST	2	2.0
	Dilated Cardiomyopathy	1	1.0
	Gangrene Foot	1	1.0
	OPC Poisoning	1	1.0
	Ulcer Foot/Septicemia	1	1.0
	Total	100	100.0

The distribution of cases according to etiology shows that majority of the patients were having myocardial infarction (23%) followed by Cirrhosis Liver (18%), chronic kidney disease (17%), Pneumonia (12%), Ischemic Stroke (10%), Hemorrhagic Stroke (6%) and 3% in Bacterial Meningitis & Pyelonephritis. The other etiological factors were Congestive Cardiac Failure & CVST 2% and 1 % had Dilated Cardiomyopathy, Gangrene Foot, OPC Poisoning and Ulcer Foot/Septicemia.

Table 5: Distribution of mean value of SOFA score in the study

SOFA Score	N	Minimum	Maximum	Mean	Std. Deviation
At admission	100	0.00	18.00	5.7300	3.36306
At 48 hours	100	0.00	19.00	6.2000	4.06761
Delta SOFA	100	-5.00	8.00	0.4700	3.00321

The mean SOFA score at admission and 48 hours were 5.73 ±3.36 and 6.2 ± 4.06 respectively. The mean value of Delta SOFA score was 0.47±3.00.

Discussion

It's crucial to think about a number of factors when creating a score system like SOFA to evaluate and track organ failure.

There were more men than women in this survey (62% to 38%). There were 65.3% males and 34.7% females in a study with similar methods by Ferreira FL et al.[5] Mukhopadhyay A et al. observed comparable demographics (61.2% of men and 38.8% of females).[6]

The ages of the patients ranged from 60 to 79, with 68% of them falling into that range, 26% between 70 and 79, and 6% being older than 80. An examination of the correlation between age and gender reveals no significant difference (0.781). Similarly, Mukhopadhyay A et al. found that 54.6% of their patients were younger than 65, whereas 45.4% were older than 65.[7]

It was found in this investigation that the mean TLC is 18069.0 (SD ±9690.35441), mean CRP is 39.76176 (SD ±7.00), mean ESR is 20.82028 (SD ±11.00) and the mean urea is 45.70459 (SD ±20.00). The mean value of hemoglobin in males and females was 10.80±3.044 and 9.82±2.06. It was found in this investigation that the mean direct bilirubin is 3.11292±5.22386, mean ALT is 218.0900±364.13262, mean AST is 185.7400±336.44123, mean ALP is 167.5500±101.13980, mean INR is 1.6261±0.63524 and the mean APTT is 33.9960±9.44580.

In our study, the laboratory parameters creatinine, Total Bilirubin, Platelet, PaO2/Fio2, GCS and MAP have a mean difference 2.3421±2.24111, 2.7932±4.23410, 183100.0000±103492.30196, 376.9200±68.32671, 11.8300±3.78475 and 75.2900±12.69876 respectively at the time of admission. At 48 hours after admission, mean Creatinine, Total Bilirubin, Platelet, PaO2/Fio2, GCS and MAP is 2.3421±2.24111, 2.7932±4.23410, 183100.0000±103492.30196, 376.9200±68.32671, 11.8300±3.78475 and 75.2900±12.69876 respectively.

Myocardial infarction accounted for 23% of instances, followed by cirrhosis of the liver (18%), chronic renal disease (17%), pneumonia (12%), ischemic stroke (10%), hemorrhagic stroke (6%) and bacterial meningitis and pyelonephritis, each accounting for 3% of cases. Comparing SOFA levels at admission and after 48 hours, researchers discovered a statistically significant ($p = 0.001$) disparity by aetiology. Gupta et al. conducted a similar study on 84 geriatric patients admitted to a tertiary care ICU, and they found that stroke was the most common aetiology among critically ill geriatric patients.[8]

Conclusion

The clinical assessment along with lab markers correlated well with the mortality and morbidity. Geriatric patients hospitalized with sepsis have a high prevalence of multiple organ dysfunction, septic shock, ICU occupancy, and need for advanced life support along with increased overall and ICU mortality rate. This signifies the need for specialized geriatric ICUs and focused policymaking and allocation of health-care resources for geriatric care.

References

[1] Ageing and health. https://www.who.int/news-room/fact-sheets/detail/ageing-and-health. (cited on 18/06/2022)

[2] Milbrandt EB, Eldadah B, Nayfield S, Hadley E, Angus DC. Toward an integrated research agenda for critical illness in aging. Am J Respir Crit Care Med. 2010 Oct 15;182(8):995-1003.

[3] Angus DC, Linde-Zwirble WT, Lidicker J, Clermont G, Carcillo J, Pinsky MR. Epidemiology of severe sepsis in the United States: analysis of incidence, outcome, and associated costs of care. Crit Care Med. 2001 Jul;29(7):1303-10.

[4] Vincent JL, de Mendonça A, Cantraine F, Moreno R, Takala J, Suter PM, Sprung CL, Colardyn F, Blecher S. Use of the SOFA score to assess the incidence of organ dysfunction/failure in intensive care units: results of a multicenter, prospective study. Working group on "sepsis-related problems" of the European Society of Intensive Care Medicine. Crit Care Med. 1998 Nov;26(11):1793-800.

[5] Ferreira FL, Bota DP, Bross A, Mélot C, Vincent JL. Serial evaluation of the SOFA score to predict outcome in critically ill patients. JAMA. 2001 Oct 10;286(14):1754-8.

[6] Mukhopadhyay A, Tai BC, See KC, Ng WY, Lim TK, Onsiong S, Ee S, Chua MJ, Lee PR, Loh ML, Phua J. Risk factors for hospital and long-term mortali-ty of critically ill geriatric patients admitted to an Intensive Care Unit. Bio med Res Int. 2014; 960575:1–10.

[7] Mukhopadhyay A, Tai BC, See KC, Ng WY, Lim TK, Onsiong S, Ee S, Chua MJ, Lee PR, Loh ML, Phua J. Risk factors for hospital and long-term mortali-ty of critically ill geriatric patients admitted to an Intensive Care Unit. Bio med Res Int. 2014; 960575:1–10.

[8] Gupta V, Karnik ND, Agrawal D. SOFA Score and Critically Ill Geriatric Pa-tients. J Assoc Physicians India. 2017;65(7):47-50.