

Factors Associated with Adverse Outcome in Elderly Patients Managed with Anticoagulants in Intensive Care Unit

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ABSTRACT

Objective: To look for the factors associated with adverse outcome in elderly patients managed with anticoagulants in intensive care units of a military hospital of Baluchistan.

Study Design: Prospective comparative study.

Place and Duration of Study: Department of Critical Care Medicine, Combined Military Hospital Quetta, Pakistan from Jan 2022 to Mar 2023.

Methodology: Patients more than 60 years of age admitted in medical and surgical intensive care units of our hospital and managed with anticoagulants were included. They underwent detailed evaluation at the time of admission in respective critical care unit and then followed up for two weeks to look for immediate outcome. Major bleed during the ICU stay, length of stay more than 2 weeks or death were taken as parameters of adverse outcome. Relevant clinical factors were associated with poor outcome in our study participants.

Results: Out of 48 elderly patients admitted in intensive care unit and managed with anticoagulation, 31(64.5%) had poor outcome while 17(35.5%) had good outcome. Mean age of the study participants was 65.21 \pm 2.16 years. GCS score <3 at the time of presentation and presence of acidosis at the time of presentation were the factors associated with adverse outcome (p -value>0.05) in elderly patients recruited in our study.

Conclusion: Adverse outcome was seen in considerable number of elderly patients admitted in medical or surgical intensive care unit and managed with anticoagulants. Acidosis at time of presentation and GCS score <13 at time of presentation were the factors associated with poor outcome in our study participants.

Keywords: Anticoagulation; Glasgow Coma Scale; Intensive care unit.

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INTRODUCTION

Geriatric medicine is still not a recognized specialty in Pakistan and mostly medical teams cater for the complex issues faced by this vulnerable group of population. Situation becomes worse when these elderly are admitted in hospital wards, high dependency units or critical care units.¹ Statistics worldwide suggest that mortality and morbidity after critical care unit admission is very high in elderly as compared to younger patients.² Number of factors may be responsible for high mortality and morbidity directly or indirectly related to aging in elderly patients.³

Prophylactic anticoagulation becomes necessary as per international guidelines in number of clinical situations.⁴ Prolonged immobility due to admission in high dependency unit or critical care unit becomes a pro-coagulation state which may lead to deep venous

thrombosis resulting in potentially life threatening conditions.⁵ Advancing age otherwise is a risk factor for thrombotic events. It therefore becomes extremely important for the treating teams to cater for this risk and start thromboprophylaxis.⁶

Use of anticoagulation in elderly especially those admitted in critical care units is always a sensitive area for clinicians and research teams. Gross *et al.* published an extensive article highlighting the delicate balance, clinicians need to achieve regarding risk of thromboembolism in patients who are not managed with prophylactic anticoagulation versus risk of bleeding in those who are managed with anticoagulants especially for long time in ICU settings.⁷ Launey *et al.* in 2022 studied factors related to poor outcome in elderly patients managed for traumatic injuries in ICU setting. They revealed that patients with traumatic brain injury and those with GCS score of less than 9 at the time of presentation were more at risk for poor outcome as compared to others.⁸ Ejaz *et al.* published a literature review which concluded that use of prophylactic anticoagulation

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had limited adverse effects and it actually was associated with better outcome by reducing the chances of thromboembolic events in patients who have been managed at intensive care units.⁹

With advances in health care sector and provision of services at rural areas, longevity is observed in our population. When more people are aging, need for specialized geriatric services is becoming more. Managing elderly patients in critical care settings for any indication and saving them from iatrogenic harm is a challenge for the treating team. A recent study carried out in whole Asia including Pakistan concluded that physicians in most Asian countries do not stick to guidelines when it comes to thromboprophylaxis therefore patients may suffer from serious consequences.¹⁰ We planned this study with the rationale to look for the factors associated with adverse outcome in elderly patients managed with anticoagulants in medical and surgical intensive care unit of a military hospital of Baluchistan.

METHODOLOGY

This Prospective comparative study was conducted at departments of medicine and surgical intensive care unit in Combined Military Hospital Quetta from January 2022 to March 2023. Sample size was calculated by WHO Sample Size Calculator with population prevalence proportion of adverse outcome in elderly patients in ICU in first week as 90%,¹¹ and keeping level of significance as 10%. Non probability Consecutive sampling technique was used to gather the sample from medical and surgical critical care units of CMH Quetta.

Inclusion Criteria: All patients of more than 60 years of age admitted in medical and surgical intensive care unit due to any underlying cause and were managed with anticoagulation were recruited for this study.

Exclusion Criteria: Patients who were suffering from any types of cancers that may be primary or secondary, solid or hematopoietic in origin were not included. Those patients whose relatives took them to other hospitals from ICU of our hospital were also not included. Those whose anticoagulation could not be done due to any reason during the course of admission were also not made part of this study.

Ethical approval was sorted for this study from relevant board committee and it was granted via letter no CMH QTA-IRB/058. Written informed consent was taken from primary caregivers of all the potential participants of this study before recruitment. Both

medical and surgical ICUs were targeted to recruit the patients of more than 60 years of age admitted due to any reason and fulfilling criteria for this study. They were evaluated in detail at the time of admission in ICU by ICU team. All clinical records were handed over to ICU team from concerned team. Baseline and relevant clinical investigations were performed at baseline in all the study participants and then at regular intervals as suggested by ICU consultant. Routine thromboprophylaxis was provided in form of low molecular weight heparin or warfarin or Apixiban as advised by the concerned physician after taking into account whole clinical scenario.¹² Patients were assessed in detail on twice daily basis by one of the team members. Adverse outcome was considered if there was any major bleeding event, length of ICU stay more than 2 weeks or death.¹³ Acidosis was defined if pH at time of presentation was <7.314

Characteristics of participants were described by using the descriptive statistics. Frequency and percentages were used to describe the outcome patterns among elderly patients admitted in critical care unit. We used Pearson Chi-square test to look for association of various factors with adverse outcome in our study participants. All of the statistical analysis for our study was performed by using Statistics Package for Social Sciences version 24.0 (SPSS-24.0). Association between the variables were considered significant if *p*-values were less than or equal to 0.05.

RESULTS

All elderly patients were targeted for this study but a total of 48 elderly patients were recruited in final analysis after application of criteria. Out of 48 elderly patients admitted in intensive care unit and managed with anticoagulation, 31(64.50%) had poor outcome while 17(35.50%) had good outcome. Mean age of the study participants was 65.21±2.16 years. Table-I summarized the general characteristics of elderly patients admitted in medical and surgical intensive care units of our hospital. Out of total study participants 33(68.75%) were male while 15(31.25%) were female. From medical intensive care unit 30(62.50%) patients were recruited while from surgical intensive care unit 18(37.50%) participants were recruited in this study.

Table-II showed the results of statistical analysis. It was revealed that Glasgow Coma Scale score of less than 3 (*p*-value-0.014) at the time of presentation to intensive care unit and presence of acidosis (*p*-value-0.014) at the time of admission in intensive care unit

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were the factors significantly associated with adverse outcome in elderly patients recruited in our study. It has also been demonstrated that deranged liver function tests (p -value-0.861) and deranged renal function tests (p -value-0.884) were not statistically significantly associated with adverse outcome in our study participants.

Table-I: Characteristics of Study Participants Recruited from Medical and Surgical Intensive Care Units (n=48)

Study Parameters	Values
Age (years) Mean + SD	65.21 ±2.16 years
Gender	
Male	33(68.8%)
Female	15(31.2%)
Type of agent used	
Enoxaparin	16(33.3%)
Rivaroxiban	12(25.0%)
Heparin	20(41.7%)
Critical Care Unit	
Medical	30(62.5%)
Surgical	18(37.5%)
Complications	
Major bleeding	12(25%)
Stay in Intensive care unit for >2 weeks	14(29.2%)
Death	5(10.4%)

Table-II: Association of Various Clinical Factors with Poor Outcome Among Elderly Patients Included in our Study (n=48)

Factors	Good Outcome n=17	Poor Outcome n=31	p -value
Deranged Liver functions			
No	13(76.4%)	23(74.2%)	0.861
Yes	04(23.6%)	08(25.8%)	
Glasgow Coma Scale score at presentation			
<13	16(94.1%)	20(64.5%)	0.014
13 or more	01(5.9%)	11(35.5%)	
Deranged Renal Function			
No	14(82.3%)	25(80.6%)	0.884
Yes	03(17.7%)	06(19.4%)	
pH at Time of Presentation			
<7.3	16(94.1%)	20(64.5%)	0.014
7.3 or more	0(5.8%)	11(35.5%)	

DISCUSSION

Acidosis and low GCS score at time of presentation were the factors associated with poor outcome of our study participants. Elderly patients are a group of population which are more prone to even iatrogenic harm. When multiple systems of the body tend to fail and need support due to any reason and patients are admitted in critical care units, multiple treatment related factors may prone them towards adverse outcomes. Anticoagulation is a common

procedure done in almost all the patients admitted in ICU due to number of reasons. It is done in controlled manner and patients is observed closely for any untoward effects. Elderly patients may get more adverse effects form this procedure and may need more close monitoring from the treating team. We conducted this study with an aim to look for the factors associated with adverse outcome in elderly patients managed with anticoagulants in medical and surgical intensive care unit of a military hospital of Baluchistan, Pakistan. Korayem *et al.* in 2021 published a paper with an objective to look for efficacy and safety of thromboprophylaxis used in elderly patients. They revealed that in patients in which it was appropriately used bleeding events were very less but if used inappropriately it could lead to serious adverse effects.¹⁵ We studied elderly patients admitted in ICU and observed considerable number of patients had bleeding and prolonged ICU stay in our study.

Another study published by Mishra *et al.* studied factors related to poor outcome in critically ill patients who underwent Warfarin use. It was concluded that body mass index > 30, hypotension, presence of intracranial bleed and mechanical ventilation were the factors associated with adverse outcome in their study participants.¹⁶ Low GCS score at time of presentation and acidosis were the factors associated with poor outcome in critically ill elderly patients undergoing management with anticoagulants in our study. A retrospective cohort study published in 2021 studied adverse effect rates with early and late use of anticoagulants. Holbrook *et al.* found out that in elderly people switching of anticoagulant agents was associated with more adverse effects.¹⁷ Our results showed that adverse outcome was seen in considerable number of elderly patients admitted in medical or surgical intensive care unit and managed with anticoagulants. Acidosis at time of presentation and GCS score <13 at time of presentation were the factors associated with poor outcome in our study participants.

A study was published from Turkey which analyzed the factors associated with factors affecting mortality in patients using warfarin. It was concluded that male gender, advanced age, and liver and kidney malfunction were associated with mortality of elderly patients.¹⁸ Acidosis and low GCS at presentation turned out to be predictors of mortality and poor outcome in our study participants and deranged liver and renal function tests were not significantly

associated with poor outcome in our study. Elderly population is otherwise a vulnerable group of population and more prone to iatrogenic harm. Our study results revealed that more effort should be put in patients who have acidosis or low GCS at time of presentation at critical care unit.

LIMITATIONS OF STUDY

Patients were followed up for only two weeks so long term outcome could not be ascertained and this is one of major limitations of this study. Elderly patients otherwise frail and multiple factors other than anticoagulation may be responsible for their adverse outcome therefore cause and effect relationship could not be established with our study. Studies involving multiple intensive care units of different hospitals may reveal better results.

CONCLUSION

Adverse outcome was seen in considerable number of elderly patients admitted in medical or surgical intensive care unit and managed with anticoagulants. Acidosis at time of presentation and GCS score <13 at time of presentation were the factors associated with poor outcome in our study participants.

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Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

MA & RA: Conception, study design, drafting the manuscript, approval of the final version to be published.

AK & SZ: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

MA & SFM: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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