CORRELATION OF RISK FACTORS ASSOCIATED WITH POST OPERATIVE DELIRIUM IN CARDIAC SURGICAL INTENSIVE CARE UNIT

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ABSTRACT

Objective: The objective of the present study is to determine the frequency of delirium and the associated factors in patients undergoing open heart surgery.

Study Design: Descriptive cross sectional study.

Place and Duration of Study: Armed Forces Institute of Cardiology and National Institute of Heart Disease, from October 2016 to December 2016.

Materials and Methods:A descriptive cross sectional study was conducted on 328 patients, who underwent elective open heart surgery at intensive care unit of AFIC/NIHD, over 3 months spanning from October to December 2016. The patients who underwent elective coronary artery bypass graft (CABG) surgery during the specified study period are included in inclusion criteria and age of over 18 years. While patients with the history of psychiatric illness were excluded.Samplings were performed by non-probability consecutive sampling technique. Patients were assessed for delirium byusing the DSM IV Criteria for diagnosis of Delirium. Chi- square statistics and Pearson correlation were used as a test of significance.

Results: The frequency of immediate post surgical delirium was found to be 5.0%. The patients mean age was found to be 55 (53±14) and most frequent age group was >50 yearsi.e. 200 (61.0%) while number of patients in <50 years were 128 (39.0%). Among these patients, 245 (72.0%) were male and 95 (28.0%) were females. Of these patients, 246 (72.0%) had coronary artery bypass graft (CABG) and 60 (18.0%) underwent valve replacement. Risk factors such as age, ventilator time, intra-aortic balloon pump, intensive care unit stay, need for ionotropes, arrhythmias, number of reopen procedure and mortality were positively correlated with delirium (*p*-value <0.05).

Conclusion: Diagnosis of delirium is of greatest value; therefore, further studies are essential to clarify the risk factors because controlling them will help prevent delirium.

Keywords: Arrhythmia,Delirium, DSM,IABP, POD, PACU.

INTRODUCTION

According to the diagnostic and statistical manual of mental disorders-IV-text revision (DSM-IV-TR), delirium is a cognitive and consciousness disorder which develops over a short period and has certain features such as decreased level of consciousness, attention disorders (e.g. loss of concentration and memory), orientation disorder, rapid onset (a few hours to a few days), short duration, and prominent fluctuation[1]. The main characteristic of delirium is inattention. It can also be termed intensive care unit or ICU delirium[2]. Delirium is categorized as either hyperactive or hypoactive[3]. Hyperactive delirium puts the patient at greater risk of self-extubation,of accidental removal of life saving/invasive catheters, and of worsening patient ventilatorsynchrony[3]. On the other hand, hypoactive delirium can result in a quiet butneglected patient given the decreased motion (hypoactive delirium suggests a worse prognosis)[3]. Any delirium that occurs after surgery may be called "postoperative delirium[4,5]," it may also be termed as ICU delirium. Delirium in ICU patients in the postoperative period from cardiac surgery varies from 8.4% to 41.7%[6].

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Delirium in ICU patients postoperatively has shown to increase ICU mortality, increase length of ICU stay, and increase ICU costs[2,3,6]. In patients who are post cardiac surgery, delirium can increase postoperative complications such as respiratory insufficiency, sternum instability, and needfor reoperation of the sternum[6].

CAM ICU (Confusion Assessment Method of the ICU) is most commonly used to evaluate the prevalence of delirium, though many studies willalso use the DSM IV Criteria for Delirium. In our study we will use the DSM IV Criteria for diagnosis of Delirium. The American Psychiatric Association's Diagnostic and Statistical Manual 4th Edition (DSMIV) Criteria for Delirium[7]:

Disturbance of consciousness (reduced clarity of awareness of the environment) with reduced ability to focus, sustain, or shift attention.

A change in cognition or the development of a perceptual disturbance that is not better accounted for by a pre-existing, established, or evolving dementia.

The disturbance developed over a short period oftime (usually hours to days and tends to fluctuate during the course of the day.

There is evidence from the history, physical examination or laboratory findings that the disturbance is caused by the direct psychological consequences of a general medical condition.

MATERIAL AND METHODS

This was a descriptive crossectional study conducted on 328 patients, whom underwent elective open heart surgery at intensive care unit of AFIC/NIHD, over 3 months spanning from October to December 2016. The patients who underwentelective coronary artery bypass graft (CABG) surgery during the specified study period are included in inclusion criteria and age of over 18 years. While patients with the history of psychiatric illness were excluded. Samplings were performed by non-probability consecutive sampling technique. Selection of patients was done by Armed forces nursing staff that were trained and informed about the inclusion and exclusion criteria. Patients were assessed for delirium byusing the DSM IV Criteria for diagnosis of Delirium, American Psychiatric Association's Diagnostic and Statistical Manual 4thEdition (DSMIV) Criteria for Delirium. A checklist of post-surgical factors and demographic information was completed for each patient. Approval from Institutional ethical review board was taken before proceeding. Due to ethical considerations, any patient with symptoms of delirium was reported to the head of the ward for treatment.

We used descriptive statistics (percentage, mean, median, and mode) to describe the variables related to the patient's variables and the frequency of delirium was using chi- square for

Table-I: Demographics and basic information.

Variables	Delirious Cases
Gender, n (%) Male=245 (72.0%) Female=95 (28.0%)	16 (5.0%)
Hypertension, n (%) 153 (45.0%)	14 (4.0%)
Diabetes mellitus, n (%) 92 (27.0%)	10 (3.0%)
Type of surgery, n (%) CABG = 246 (72.0%) Valve = 60 (18.0%)	10 (3.0%) 6 (2.0%)

continuous variables. Correlation of risk factors for delirium was determined using Pearson correlation. SPSS version 22 was used for tatistical analysis and $p<0.05$ is considered statistically significant.

RESULTS

The frequency of immediate post surgical delirium was found to be 5.0%. The patients mean age was found to be 55 (53±14) and most frequent age group was >50 years i.e. 200(61.0%) while number of patients in <50 years were 128(39.0%). Among these patients, 245(72.0%) were Male and 95(28.0%) were females. Of these patients, 246 (72.0%) had coronary artery bypass graft (CABG) and 60 (18.0%) underwent valve replacement. Demographics of patients are shown in table-I.

In this study, a few things were taken into consideration such as age, ventilator time, intra-aortic balloon pump, intensive care unit stay, cardiopulmonary bypass time, need for inotropes, Arrhythmias that require intervention care, number ofreopen procedure and mortality were positively correlated with delirium (p-value <0.05) (tableII).

DISCUSSION

According to the findings of the present study, frequency of delirium was found to be 16 (5.0%) after the surgery. Different studies have reported the incidence of delirium to be 46.0%[8], 32.0%[9], 16.0%[10] and 10.0%[11] which is comparable with the frequency of delirium observed in our study is 16(5.0%). These differencesmay be a sign of the variation in sample size, study duration, delirium assessment tools, study environments, and timing of evaluations.In another study[12], most common cited risk factors were found to be older age, sepsis, co-morbidity, and heavy alcohol. In this study, age was found to be significantly linked with frequency of delirium with p=0.03 and its similar with another study[13]in which older age is considered a highly significant risk factor for delirium due to a reduced synthesis of cerebral neurotransmitters. Fluctuations in the neurotransmitter levels lead to damage in neurotransmission, resulting in increased weakness to delirium in older patients.

Our findings have shown that patients who developed delirium were intubated for a longer time as compared to those who were not intubated. Furthermore, the relationship between ventilator time and delirium was established statistically significant (p=0.01). Long term intubation, which affects the cerebral function, may be the result of poor physical conditions, respiratory failure, or overuse of muscle relaxants and anesthetics. Hypoxia during surgery may be linked with cerebral ischemia and development of cognitive disorders[10]. Findings of this study, in which the average intubation time was 11 hours and 25 minutes, support those of previous studies. For example, an earlier study suggests that intubation more than 24 hours is directly correlated to the development of delirium[10,14].

Most patients in our study followed a natural route after surgery and did not require re-surgery (93.0%). On the other hand, those who were indicated for re-surgery during the first 24 hours had higher incidences of delirium and the

Table-II: Clinical factors correlated with post operative delirium using pearson's correlation test.

Variable	p-value
Age (Mean± SD)= 55 (53.0±14.0)	0.03
Ventilation time	0.01
ITC stay (hrs)(160±69.0) 10 days	0.01
IABP6 (2.0%)	0.05
Ionotropes need14 (4.0%)	0.58
Dysrythmia25 (8.0%)	0.57
Reopen in 1st 24 hours= 6 (27.0%)	0.05
Mortality of Delirious cases = 8(3%)	0.01

difference was statistically significant (p=0.05). This is in consistent with findings of a previous study on delirium after cardiac surgery[10].

In another study[15], a mortality rate of 15.8% at 6-month follow-up was observed and post operative delirium (POD) was an independent risk factor for mortality as well as other observed risk factors namely congestive heart disease, severity of disease scores (higher SAPS II and APACHE II) and longer length of stay at the post anesthesia care unit (PACU) and in the hospital[16]. It is in accordance with mortality rate of our study i.e. 24 (7.0%).

In our study, prolong length of ICU stay is found to be significant factor of delirium with (p-value=0.01) and it is comparable with other studies[17-19]. Delirium in ICU patients postoperatively has shown to increase ICU mortality, increase length of stay, and increase ICU costs.

CONCLUSION

In this study, age, ventilator time, intra-aortic balloon pump, intensive care unit stay, cardiopulmonary bypass time, need for inotropes, arrhythmias that require intervention

care, number of reopen procedures and mortality ($p<0.05$).

In patients with high risk of developing delirium, it may not be promising to prevent it, but its early recognition can be beneficial. Thus, risk factors found in this study can be considered by means of systematic observations of the patients' behavior. This ensures that patients can be treated efficiently and the postoperative morbidity and mortality can thereby be reduced.

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CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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