



A STUDY OF POST OPERATIVE COGNITIVE DISORDER IN ELDERLY PATIENT UNDERGOING GENERAL ANAESTHESIA

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ABSTRACT Postoperative cognitive disorder (POCD) is measurable impairment of cognition measured with neuropsychological testing overtime which may affect (memory, attention and psychomotor function) This is the observational study to assess the association and incidence of post operative cognitive disorder (POCD) in patients aged 50 years or more who are undergoing general anesthesia. The Mini-Mental State Exam (MMSE) is a widely used test of cognitive function in the elderly. The Trail Creation Test is a visual attention and activity change test. The activity requires a subject to link a sequence of 25 consecutive targets on a sheet of paper. The purpose of the test is for the subject to finish as quickly as possible. The score is based on the time it takes to complete the test, the lower the better. The average time to complete is 29 seconds. POCD was significantly higher among patients of 71 to 80 years age group (71.4%) compared to patients in 51 to 60 years age group (24.4%) and 61 to 70 years age group (26.1%). POCD was found higher among female patients (30.8%) compared to male patients (28.6%), ($p>0.05$). POCD was significantly higher among illiterate patients (100%) compared to patients with primary (58.6%) and higher secondary education (10.7%). POCD was found higher with duration of anesthesia more than 180 min (54.5%) compared to duration of anesthesia less than 90 min (24.1%) and between 90 to 180 min (25.7%), ($p>0.05$). as conclusion the incidence of POCD showed a gradual decline with increasing age and the level of education emerging as a significant factor. In addition, gender and duration of anesthesia had an influence on incidence of POCD

KEYWORDS : POCD, MMSE, General anesthesia. , education

INTRODUCTION

Postoperative cognitive disorder (POCD) is measurable impairment of cognition measured with neuropsychological testing overtime which may affect (memory, attention and psychomotor function) postoperative memory that reduces the ability to learn, disturbances in attention or the speed of information processing, impaired motor skills and languages related to surgical and/or anesthetic factors. Postoperative cognitive disorder (POCD) is one of the best-known neuropsychological consequences of anesthesia. POCD refers to temporary cognitive impairment associated with postoperative surgery (13). POCD affects a wide variety of cognitive domains, such as attention, memory, executive function, and the speed of information processing [10]. The most visible subjective symptoms are memory deficits and a reduced ability to cope with intellectual challenges. Incidence of POCD diagnosed in 40% of all patients over 60 years of age at discharge. POCD predisposing factors can be patient related, e.g., age, coexisting disease, patient education, history of alcohol abuse, age, related to surgery eg. type of surgery, duration, blood loss, interval between two operations and related to anesthesia e.g., general anesthesia, spinal anesthesia, induction agents, opioids within 24 hours of surgery, organ ischemia due to hypoxia and hypoperfusion. Hip fracture patients 16- 62% with average 35% is high risk factor for POCD. C-reactive protein associated with impaired mental status Increased inflammatory activity play major role in early development of POCD.

AIMS AND OBJECTIVES

AIMS This is the observational study to assess the association and incidence of post operative cognitive disorder (POCD) in patients aged 50 years or more who are undergoing general anesthesia. **OBJECTIVES A:** Primary Objectives Evaluation of following factors: factors related to patient, anesthesia and surgery causing POCD after GA **B:** Secondary Objective: Memory, Attention, Perception, Language, Decision making, Problem solving. All objectives are assessed by Mini mental state examination (MMSE).

MATERIALS & METHODS.

All patients will be planned for pre anesthetic assessment, routine and specialized investigations with informed and written consent, patients fitting in the inclusion criteria will be included in the study. Inclusion criteria: Informed written consent age: 50 years and above Gender: Either Gender Patients posted for elective surgery under general anesthesia requiring endotracheal intubation / supraglottic airway., Ability to read and the absence of serious hearing or vision impairment. Exclusion criteria: Patient refusing for consent, Patients on drugs Disease of central nervous system. A history of dementia

Cardiac, carotid or intracranial surgery. Previous cerebral vascular accident with residual effect.

Preoperative preparation: (A Day before surgery) Patients will be fasted for 6 hours before surgery Patients will be explained about anesthetic and operative procedure in local language and informed and written consent will be obtained. Patient will be assessed with various neuropsychic - tests. Mini mental state examination (MMSE) Trail making test. In Post operative assessment: Patient will be assessed with various neuropsychological tests post operatively on the first and third postoperative days. Mini mental state examination (MMSE) Trail making test

STATISTICAL ANALYSIS

The data obtained in the study for various parameters are presented in the tabulated form. Intra group comparison was made using the unpaired t test. Inter group comparison of qualitative data will be done by chi square test. P value

SAMPLE SIZE

Sample size calculation assuming α error being 0.05 and β error being 0.20 with a power of study 80% showed that 50 patients will be required per study group to detect the differences in MMSE & trail making

RESULTS

As shown in Table 1. Age wise distribution of POCD patients on DAY 3 8/45 (17.7%) patients in age group of 51-60 years, 5/23(21.7%) patients in 61-70 years and 4/7 (57.1%) patients in 70-80 age group have POCD on Day 3. Age distribution was statistically significant ($p=0.037$) on Day 1, but insignificant on Day 3 ($p=0.464$)

As shown in Table 2 Gender wise distribution of POCD patients on DAY 3 Incidences of POCD on Day 3 observed more in, male patients- 11/49(22.44%) compares to female patients -06/26(23.07%). Gender wise distribution of POCD is statistically insignificant on Day 1 ($p=0.842$) and on Day 3 ($p=0.816$)

As shown in table 3 Education wise distribution of POCD patients on DAY 3 2/2(100%) illiterate, 12/29(41.37%) primary, 3/28(10.7%) secondary, 0/15(0%) graduate and 0/1(0%) post-graduate patients have POCD on Day 3. Education wise distribution of POCD was statistically significant ($p=0.0001$) on Day 1,

As shown in table 4. 5/29(17.24%) - duration 180min patients have POCD on Day 3. Duration of anesthesia wise distribution of POCD is

statistically insignificant on Day 1(p= 0.137) and on Day 3(p= 0.342)

DISCUSSION

Postoperative cognitive impairment (POCD) is one of the best-known neuropsychological consequences of anesthesia and surgery. Post-operative deterioration in cognitive function including short-term and long-term memory, mood, consciousness, and circadian rhythm. In the elderly patient's central nervous system (CNS) dysfunction has been recognized as an alarming complication after surgery. Post-operative CNS derangements range from post-operative cognitive dysfunction (POCD) to dementia. The risk of POCD may be increased in older adults due to physiologic, pharmacokinetic, and pharmacodynamic changes that are associated with aging. These changes may result in increased sensitivity and susceptibility to the insult from the surgical experience, anesthetic agents, and other drugs that are administered before, during, and after surgery and are known to cause negative cognitive outcomes (e.g., highly anticholinergic and sedativehypnotic drugs). POCD after non-cardiac surgery has been associated with increased mortality, decreased quality of life, risk of early withdrawal from the workforce, and increased dependency. Early cognitive dysfunction may complicate recovery. Delayed physical and emotional rehabilitation may postpone hospital discharge and return to work. Postoperative cognitive dysfunction (POCD) is usually self-limiting and rarely persists in the longer term. A persistent degree of cognitive impairment has been noted in up to 10% of elderly patients up to three months after a surgical procedure [16]. Central nervous system inflammation provoked by anesthesia and surgery plays an important role in POCD. Anesthesia and surgery have been shown to increase the brain concentration of interleukin (IL)-6, leading to neuronal apoptosis [14], and to provoke the release of the pro-inflammatory cytokine tumor necrosis factor (TNF)-α. S-100β protein is an acidic calcium-binding protein Indian Journal of Applied Research Website: www.worldwidejournals.com (ISSN 2249-555X) found in the central nervous system and when detected in the systemic circulation is considered a biomarker of acute brain injury. In present study, majority of the patients (60%) were between 51 to 60 years of age and the mean age of the patients was 59.8 ± 6.8 years and 65% were male. Majority of the patients were studied up to primary (38.7%) and higher secondary (37.3%) school, 2.7% were illiterate and 21.3% were highly educated. TRAIL Making Test Score was performed on 75 patients and was found more than 35 seconds suggesting POCD in 37.3% of the patients on day 1 post operation and 30.7% of the patients on day 3 post operation. Based on MMSE Test, POCD was found in 5.3% of the patients before operation, 28.9% of the patients on day 1 post operation and 22.4% of the patients on day 3 post operation. Kotekar N et al. also showed a gradual decline of POCD incidence with 12% at day 3, 8% at day 7

LIMITATION OF STUDY

Patient selected are only of geriatric age group, so cannot extrapolate the result across the all the age group. 1. Sample size of our study is small because of COVID- 19 pandemic related decrease in surgeries and delay in Ethical clearance. 2. Single observer in the study leads to delay in observation simultaneously at multiple OT. 3. We followed up patients only for 3 days postoperatively. 4. Only patients who received General Anesthesia were taken into study, can't extrapolate the result of POCD in regional anesthesia. 5. Anesthetic drug specific study was not carried out, so drug specific POCD can't evaluate. 6. Due to COVID-19 pandemic, there was difficulty and 7. delay in conducting the study

CONCLUSION

The incidence of POCD showed a gradual decline with increasing age and the level of education emerging as a significant factor. In addition, gender and duration of anesthesia had an influence on incidence of POCD. The cause of postoperative cognitive problems has not been clearly elucidated because it is a heterogeneous and multifactorial disorder involving a complex interrelationship between a vulnerable patient with preoperative risk factors and numerous precipitating factors in the perioperative period. Mechanisms, contributing clinical and environmental factors and strategies to reduce POCD risk in low-education patients warrant detailed research. We recommend that anesthetists and surgeons consider routine ascertainment of patients' level of education in geriatric surgery

APPENDICES

TABLE NO 1 Age wise distribution of POCD patients on DAY 3

Age (years)	Present	Total	P value
51 to 60	08(17.7%)	45 (100%)	0.464
61 to 70	05(21.7%)	23 (100%)	
71 to 80	04(57.1%)	7 (100%)	
Total	17(22.6%)	75 (100%)	

TABLE NO 2 : Gender wise distribution of POCD patients on DAY 3

Gender	Present	Total	P value
Female	06(23.07%)	26 (100%)	0.816
Male	11(22.44%)	49 (100%)	
Total	17(22.6%)	75 (100%)	

TABLE NO 3 Education wise distribution of POCD patients on DAY 3

Education	Present	Total	P value
Illiterate	2 (100%)	2 (100%)	0.113
Primary	12 (41.37%)	29 (100%)	
Secondary	3 (10.7%)	28 (100%)	
Graduate	0 (0%)	15 (100%)	
Post graduate	0 (0%)	1 (100%)	
Total	17 (22.6%)	75 (100%)	

TABLE NO 3 Education wise distribution of POCD patients on DAY 3

Duration of anesthesia	Present	Total	P value
≤90 min	5(17.24%)	29 (100%)	0.342
91 to 180 min	7(20%)	35 (100%)	
>180 min	5(45.45%)	11 (100%)	
Total	17(22.6%)	75 (100%)	

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