



## IMPAIRMENT OF MEMORY IN PATIENTS GO THROUGH THE GENERAL ANESTHESIA ALONG WITH CONTRIBUTING FACTORS.

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### ABSTRACT

Modern anesthesia has an increasing number of made it viable to perform complicated surgical procedures and diagnostic strategies for patients with confidence and led to great advances inside the medical discipline. The aim of the study Impairment of memory in patients go through the general anesthesia along with contributing factors. This cross-sectional study was performed in a Swamy Vivekanandha Medical College Hospital and Research Institute, Patients with the American Society of Anesthesiologists (ASA) Class I, II, and III who were candidates for elective abdominal surgery were enrolled. Patients answered several questions based on the Wechsler Memory Scale– Revised V (WMS - R - V), a standardized questionnaire, minutes before entering the operating room (OR) and again after 24h post-operation, and the differences were recorded. Five hundred patients belonging to ASA Class I–III who were candidates for elective abdominal surgery and GA were enrolled in present study. Our study population consisted of 198 (40%) females and 302 (60.4%) males between the age of 8 and 18 years. GA affects the short-timeperiod memory, and its most impact is on range repeat. There has been general anaesthesia for non-obligatory surgical procedure in younger youngsters does no longer look like related to declines in working memory, processing velocity, and quality motor skills within the first 3 months postoperatively, even in kids who have prior exposure to general anaesthesia. GA notably reduces the patient’s short-term memory after the surgery.

**Key words** Elective Surgery, Working Memory, Anaesthesia, Fine Motor Skills.

### INTRODUCTION

Modern anesthesia has an increasing number of made it viable to perform complicated surgical procedures and diagnostic strategies for patients with confidence and led to great advances inside the medical discipline. For a durable, it turned into believed that generalized anesthesia (GA) exerted a transient, reversible effect at the central nervous system (CNS), returning to its authentic state as soon as it was discontinued.<sup>1</sup> Present, we realize that the lengthy-term effects, inclusive of cellular signal adjustments and their consequences, after exposure to anesthesia are plentiful, and these results can be favorable or undesirable. Anesthesia medicinal drugs acquired in the

course of surgery are related to cerebral disorder in young and old humans.

Anesthesia is referred to as a temporary memory disorder. Current research has also constantly strengthened the perception that anesthetics can motive morphological changes and long-term practical impairment.<sup>2</sup> POCD (Postoperative cognitive dysfunction) leads to cognitive and reminiscence impairment following surgery. Memory impairment and impaired learning ability are the maximum common scientific manifestation of POCD.<sup>3</sup>

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Despite the dearth of proof for the pathogenesis and molecular mechanism of POCD, studies suggest that POCD is a neurological ailment that effects from a combination of factors, together with surgical procedure, anesthesia, etc. Prior studies have proven that the occurrence of POCD 1 week after noncardiac foremost surgical procedure is 40% in elderly sufferers and it remains at about 10% even after three months of surgical operation.<sup>4</sup>

Anesthesia and its complications notwithstanding getting used for extra than a century nonetheless remain a thriller to the physicians. POCD is a commonplace difficulty of anesthesia and might occur up to 80% after cardiac surgery and 26% after noncardiac major surgical procedures,<sup>5</sup> in addition to a possible affiliation between POCD and expanded threat of Alzheimer’s ailment (AD). According to current research, identifying the reasons, expertise its precise mechanism, and trying to save you it from taking place is an critical precedence in public health. Surgery and anesthesia carry huge levels of pressure to the patient, and the use of anesthetic drugs and hemodynamic fluctuations and other OR(operating room) activities can have an effect on the affected person’s memory status and, consequently, cause patients’ dissatisfaction. This has led to full-size researches in sufferers undergoing nonneurologic surgical procedures.<sup>6</sup>

Memory and gaining knowledge of are a few of the most complex and crucial behavioral processes, and as the spectrum of anesthetic international use is expanding, expertise approximately the effects of those pills on the memory procedure is of specific significance. So a ways, no direct impact of anesthesia on any domain of the short-term memory has been investigated Therefore, we designed this take a look at to attain more wanted data approximately the outcomes of anesthesia on memory and have a look at each of the memory domains extra intently. The aim of this study was to Impairment of memory in patients go through the general anesthesia along with contributing factors.

**Material and methods**

This cross-sectional study was performed on patients who were ASA Class I, II, or III and had undergone GA and elective abdominal surgery. Patients younger than 18 abusive drug users, patients with a history of brain damage, seizures or other mental or psychiatric disorders, patients who took any neurological or psychological drug, and patients who did not consent to participate in the study were excluded. Random sampling was performed. The variables studied in this study consist

of age; gender and non-neurological diseases, as well as diabetes, hypertension, etc.

The study was carried out at the Department of Anesthesia of the Swamy Vivekanandha Medical College Hospital and Research Institute, Elayampalayam, Tiruchengode. All the patient information was kept confidential, and this study was performed based on the declaration of Helsinki.Written informed consent was obtained from the patients before entering the study.

In this study, the Wechsler Memory Scale– Revised V (WMS-R-V) questionnaire was used to measure recent memory. Due to cultural and environmental effects, the WMS-R V questionnaire was modified and standardized in Persian. Patients responded to a specified number of questions minutes before entering the OR, and the questions were asked again 24 h after the surgery, and their differences were recorded. In addition to determining the total score, which is the total state of memory, this test has five subtests, each of which determines the status of separate parts of memory. These five subtests include personal information, orientation to time and place, mental control, logical memory, and number repeat.

Data were analyzed by the Statistical Package for the Social Sciences (SPSS) software, version 22 and Excel 2021 statistical software. The analysis was performed using T-independent and Chi-square tests with Pearson’s coefficient and Fischer’s exact test and Man–Whitney test with  $P < 0.05$  was considered significant.

**Results**

Five hundred patients belonging to ASA Class I– III who were candidates for elective abdominal surgery and GA were enrolled in present study. Our study population consisted of 198 (40%) females and 302 (60.4%) males between the age of 8 and 18 years, with the mean age of 14.2 years. We categorized our study population based on sex, the presence of comorbidity such as diabetes, hypertension, previous surgical history, etc.), and age to measure their effect on short-term memory impairment after GA. The results showed that 169 patients (33.8%) had no comorbidity and 331 (66.2%) had one or more comorbidities. Of the 198 female patients, 86 had no comorbidities and 112 had comorbidities.

In men, out of the 302 patients, 86had no comorbidities and 217 had comorbidities. The results of the Chi-square test showed that there was no significant difference between the two groups in terms of male and female comorbidities ( $P > 0.327$ ).

**Table 1: Pre and post-anesthesia mean score differences**

Variable	Mean difference	P value
Personal information	030	<0.001
Orientation	0.49	<0.001

Mental control	0.77	<0.001
Logical memory	2.43	<0.001
Number repeat	3.20	<0.001
Total Score	5.88	<0.001

Our results confirmed that there are statistically widespread differences between pre and postanesthesia in terms of the imply rankings for brief-time period memory domains. For the overall score, the suggest ratings earlier than and after anesthesia have been 45.37 and 32.49, respectively. According to Table 1, there is a tremendous distinction among the level of short-term memory not simplest in the total rankings however additionally in every different 5 domain names of our take a look at.

The results showed that GA influenced the total score of 39.6%, However, it had the highest effect on number repeat (54.2%) and the least effect on personal information (26.2%). No significant correlation between gender or comorbidity and short-term memory impairment was found ( $P = 0.18$ ,  $P = 0.138$ , respectively). However, there has been a significant correlation between age and short-term memory impairment ( $P < 0.001$ ).

**Discussion**

Given the impact of anesthetics on the feature of memory and the growing use of these capsules, it's far important to know the extent of those modifications and how they're affected. Therefore, diverse studies were carried out round the sector to recognize the effect of GA on reminiscence and the way it's far used. Previous research have confirmed the definitive impact of anesthesia on brief-term memory, but its unique mechanism has no longer been determined, and in most previous research, there has been no clean association among anesthesia and lengthy-time period POCD.<sup>8</sup>

Most research have observed that there's no considerable courting among anesthesia and long-term memory impairment. According to the results of previous research showing that anesthetics briefly have an effect on patients' memory and given the significance of other uncertain and unproven content in this place, we did a study that identifies the effect of GA on distinctive areas of the memory. In this look at, we also tested the variables of intercourse, comorbidity and age, and their dating with postanesthesia reminiscence impairment.<sup>7</sup>

Researchers on the University of Toronto investigated the consequences of anesthetics on reminiscence loss receptors of the mind. According to their examine, even after the disappearance of anesthetics, these receptors stay active for a while and affect the memory. A 2008 look at by way of Rasenberg et al.,including 1064 sufferers over 18 years of age on the Florida Hospital observed factors, inclusive of older age, lower schooling level, records of vascular problems, and former POCD, are related to cognitive impairment in the first 3 months after the surgical treatment. We also tested the age and

concluded that older age acts as a danger issue for reminiscence dysfunction in all one of a kind domain names of reminiscence. However, we did no longer look at the education level as a variable.<sup>9</sup>

In the have a look at by means of Wilmore D W,et al., the prevalence of POCD within the first week became stated to be 19.2% as compared to 4.Four% within the manipulate topics. The occurrence of cognitive impairment after three months changed into 6.2%, which became not substantially higher than the control group (4.1%) and turned into not able to prove proof of POCD after 3 months of surgical operation. In this study, we assessed sufferers' quick-time period reminiscence throughout the first 24 h after anesthesia, which showed the effects of preceding research however did not look into the long-term outcome. William et al.<sup>10</sup>located that GA will increase the risk of POCD more than local anesthesia, which we did not evaluate. A have a look at by the Department of Anaesthesia of Denmark and lots of different research located that there has been no sizeable dating among anesthesia and long-time period POCD.

In this examine, we examined each of the reminiscence domains more closely which had no longer been accomplished in preceding research. As in preceding research,<sup>11</sup> we observed a extensive relationship among the effect of GA on quick-time period reminiscence of patients and as we showed a greater reminiscence impairment within the area of wide variety repeat which corresponded to operating reminiscence, and fewer reminiscence modifications in the area of personal data which corresponded to reference reminiscence. As a result, we discovered that anesthesia affects running memory more, confirming preceding research.<sup>12</sup>

We additionally observed that GA had the best impact on the repetition of cultivars (forty five.five precent) and the least on personal and public facts of patients (16.2%), that's constant with the results of preceding research. So, the operating memory section is extra tormented by GA than reference memory.

**Conclusion**

GA affects the short-time period memory, and its most impact is on range repeat, whilst its least impact is on non-public information. There has been general anaesthesia for non-obligatory surgical procedure in younger youngsters does no longer look like related to declines in working memory, processing velocity, and quality motor skills within the first 3 months postoperatively, even in kids who have prior exposure to general anaesthesia. These result, constant with previous work in older children, can provide scientific reassurance

to anaesthesiologists and households. If exposure is related with deficits in a few cognitive domain names, such

deficits might also only end up apparent later in neurodevelopment.

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