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Original Article

Effect of Dexamethasone on Post-Operative Delirium in adults following General Anaesthesia

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ABSTRACT

Objective: To determine the effect of Dexamethasone on post-operative delirium in adults following general anaesthesia among patients operated at Pakistan Navy Hospital Shifa.

Study Design: Prospective comparative study.

Place and Duration of Study: Anaesthesia and Pain Medicine Departments, Pakistan Navy Hospital Shifa, Karachi Pakistan, from Oct 2019 to Jan 2021.

Methodology: Patients operated in the main operation theatre of our hospital during the study period without any complication fulfilling the exclusion/inclusion criteria, were included in the study. They were randomly divided into two groups, with Group-A receiving 4mg Dexamethasone and other routine pre-anaesthetic medications. In contrast, Group-B just received the routine pre-anaesthetic medications but no Dexamethasone. An independent assessor assessed post-operative delirium using the Confusion assessment method (CAM).

Results: A total of 250 patients were included in the study, which met the inclusion criteria**.** The mean age of the study participants was 34.419±4.329 years. 27(10.8%) patients showed post-operative delirium, while 223(89.2%) did not show post-operative delirium on the Confusion assessment method. The chi-square test revealed that none of the factors studied, including the administration of pre-operative Dexamethasone, had any statistically significant relationship with the presence or absence of delirium among the target population (p-value >0.05).

Conclusion: Delirium was a fairly common finding in adult patients 24 hours after routine surgical procedures. None of the factors studied, including Dexamethasone, was related to the presence or absence of delirium in our study.

Keywords: Delirium**,** Dexamethasone, General anaesthesia, Post-operative.

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INTRODUCTION

Delirium is a fairly common complication encountered even in surgeries not involving the head and neck or brain region.[1] Young patients undergoing routine elective surgeries can develop post-operative delirium or cognitive deficits.[2,3] Clinicians should work on other strategies to avoid this complication among patients having surgeries under general anaesthesia.[4,5] One study found that patients who were administered Dexamethasone before oral surgeries were more at risk of developing psychosis after the surgery than those who were not administered Dexamethasone.[6]

Preventing and managing post-operative complications is a joint task of the treating team, including surgeons, anaesthetists and ICU physicians.[7-9] A local study published evaluated the role of injection of Dexamethasone in preventing post-operative nausea and vomiting. It came up with the findings that there is a significant decrease in nausea and vomiting after surgery in the group which was given injections of Dexamethasone.[10] Limited local data has been available regarding the use of Dexamethasone to prevent post-operative cognitive deficits or confusion state. Therefore, we planned this study to determine the effect of Dexamethasone on post-operative delirium in adults following general anaesthesia among patients operated at Pakistan Navy Hospital Shifa.

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METHODOLOGY

The prospective comparative study was conducted at Pakistan Navy Hospital Shifa, Karachi Pakistan, between October 2019 and January 2021. The sample size was calculated using the WHO sample size calculator, keeping the population proportion of post-operative delirium at 15%.[11] Permission from the Hospital Ethics Committee (ltr num: ERC/2021/SURG/38) was sought.

Inclusion Criteria: Patients of either gender, aged 18-65 years who underwent any surgical procedure under general anaesthesia lasting less than 90 minutes were included.

Exclusion Criteria: Patients who underwent surgeries under local or regional anaesthesia or cardiothoracic, head and neck or brain surgeries were excluded from

the study. Patients whose surgery lasted >90 minutes, those who required blood transfusion during or soon after the surgery, or those with solid or haematological tumours were excluded. Gynaecological patients with placental abnormalities or a history of ante or post-partum haemorrhage were also excluded from the study. Patients with a history of delirium, dementia, neuro-psychiatric disorder, recent head injury or substance use prior to the surgery were also excluded from the study.

Informed consent was taken before surgery after giving them a detailed study description. Patients were divided into two groups randomly via a lottery method. Group-A received Dexamethasone and other routine pre-anaesthetic medications, while Group-B just received the routine pre-anaesthetic medications but no Dexamethasone. Non-probability consecutive sampling technique was used to gather the required sample size for this study.

Dexamethasone was given in standard dose (Single dose: 4mg intravenously),[12] preoperatively just before the induction of anaesthesia by a consultant anaesthetist. Comorbidities were well-controlled type-II diabetes mellitus, hypertension, rheumatoid arthritis, Asthma, Chronic obstructive pulmonary disease, Gastro-esophageal reflux disease and ischemic heart disease.

A consultant anaesthetist assessed postoperative delirium using the Confusion Assessment Method (CAM) 24 hours after the procedure. The assessing consultant was blinded regarding Dexamethasone among the study participants. CAM includes a diagnostic algorithm based on four main features of delirium: acute onset and fluctuating course, presence of inattention, disorganized thinking and altered level of consciousness. The diagnosis of delirium by CAM requires the presence of both the first and second feature and at least one of the other two.[13]

Statistical Package for Social Sciences (SPSS) version 23.0 was used for the data analysis. Quantitative variables were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages. Chi-square test was applied to explore the inferential statistics. The *p*-value of ≤0.05 was considered statistically significant.

RESULTS

The study included two hundred fifty patients, meeting the inclusion/exclusion criteria. The mean age of the study participants was 34.419±4.329 years. 148 (59.2%) patients were female, while 102(40.8%) were male. 27(10.8%) patients showed the presence of post-operative delirium, while 223(89.2%) did not show the presence of post-operative delirium on the Confusion assessment method (Table-I). 131(52.4%) patients did not receive Dexamethasone in addition to routine pre-anaesthetic medication, while 119(47.6%) got Dexamethasone in addition to routine pre-anaesthetic medications. 159(63.6%) patients had no comorbid illness, while 91(36.4%) had the presence of comorbid illness. Pearson chi-square test (Table-II) revealed that age (*p*-value-0.275), gender (*p*-value-0.672), presence of comorbidities (*p*-value-0.433) and use of Dexamethasone (*p*-value-0.381) had no statistically significant relationship with presence or absence of delirium among the target population.

Table-I: Characteristics of patients included in the study (n=250)

Study Parameters	n(%)
Age (years)	
Mean±SD	34.419±4.329 years
Gender	
Female	148(59.2%)
Male	102(40.8%)
Presence of Post-Operative Delirium	
Yes	27(10.8%)
No	223(89.2%)
Use of Dexamethasone	
No	131(52.4%)
Yes	119(47.6%)
Presence of Comorbidities	
No	159(63.6%)
Yes	91(36.4%)

Table-II: Relationship of Sociodemographic factors with presence of Delirium among the Target Population (n=250)

Factors	No Delirium	Delirium	*p*-value
Age			
<50 years	132(59.2%)	13(48.1%)	0.275
>50 years	91 (40.8%)	14(51.9%)	
Gender			
Female	131(58.7%)	17(62.9%)	0.672
Male	92(41.3%)	10(37.1%)	
Presence of Comorbidities			
No	140(62.8%)	19(70.3%)	0.433
Yes	83(37.2%)	08(29.7%)	
Use of Dexamethasone			
No	119(53.3%)	12(44.4%)	0.381
Yes	104 (46.7%)	15(55.6%)	

DISCUSSION

Complications in the post-operative period may sometimes ruin the whole effort of the surgical and anaesthetic team; therefore, adequate monitoring is required to prevent or timely diagnose these complications. Post-operative confusion and cognitive decline could be due to several reasons related to surgical

procedures, systemic response to surgery, or underlying ailments. A recent study done in Pakistan by Ashraf *et al.* revealed that delirium was a fairly common finding among patients after routine surgical procedures. They had data from the surgical intensive care unit of a local tertiary care hospital.[14]

Around 10% of patients had post-operative delirium in our study, and the use of Dexamethasone was unrelated to the presence or absence of delirium in our study population. Most of our patients were relatively younger and had no complications during the surgery. Fang *et al.*[15] covered this subject from another aspect. It came up with the findings showed that the administration of a higher dose of Dexamethasone (0.2mg/kg) increased the incidence of post-operative cognitive dysfunction in the early post-operative period after microvascular decompression under general anaesthesia. Differences in results may be due to different target populations. Egwa *et al.*[16] concluded that type of anaesthetic medication has no relationship with the presence of early post-operative cognitive dysfunction. We did not study the type of anaesthetic medication. However, the use of Dexamethasone and routine anaesthetic medication concluded that Dexamethasone had no statistically significant relationship with the presence of post-operative delirium.

Li *et al.*[17] concluded that using Dexmedetomidine during anaesthesia induction and the early post-operative period did not decrease the incidence of post-operative delirium in elderly patients undergoing elective cardiac surgery. We used Dexamethasone instead of Dexmedetomidine, and cardiac surgery was part of our exclusion criteria. Still, we concluded that steroid use during anaesthesia induction does not reduce the chances of post-operative delirium or cognitive decline. Elsonbaty *et al.*[18] concluded that Dexamethasone and magnesium sulphate were effective in reducing post-operative delirium compared to placebo. Our study did not support their findings, as our data did not reflect any significant results regarding the use of Dexamethasone and the reduction in the incidence of post-operative delirium.

Heterogeneous results in the literature emphasize that delirium is a common presentation after surgery, but at present no conclusive evidence that the use of steroids can prevent this complication.

LIMITATIONS OF STUDY

Delirium could be the result of multiple factors during or after the surgery. Effect modifiers and confounding factors for delirium were not efficiently controlled because of the study design. More studies with large sample sizes and controlling confounding factors may generate better results.

CONCLUSION

Delirium was a fairly common finding in adult patients 24 hours after routine surgical procedures. None of the factors studied, including Dexamethasone, was related to the presence or absence of delirium in our study.

Conflict of Interest: None.

Author's Contribution:

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

KIQ & AA: Data acquisition, data analysis, drafting the manuscript, critical review, approval of the final version to be published.

MAG & RY: Data interpretation, concept, study design approval of the final version to be published.

HS & TM: Critical review, 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.

REFERENCES

1. Rose J, Weiser TG, Hider P, Wilson L, Gruen RL, Bickler SW, et al. Estimated need for surgery worldwide based on prevalence of diseases: a modelling strategy for the WHO Global Health Estimate. Lancet Glob Health 2015; 3 Suppl-2(Suppl-2): S13-S20. https://doi:10.1016/S2214-109X(15)70087-2
2. Fehlberg T, Rose J, Guest GD, Watters D. The surgical burden of disease and perioperative mortality in patients admitted to hospitals in Victoria, Australia: a population-level observational study. BMJ Open 2019; 9(5): e028671. http://dx.doi.org/10.1136/bmjopen-2018-028671
3. Batista J, Cruz EDA, Alpendre FT, Rocha DJMD, Brandão MB, Maziero ECS. Prevalence and avoidability of surgical adverse events in a teaching hospital in Brazil. Rev Lat Am Enfermagem 2019; 27(1): e2939. https://doi.org/10.1590/1518-8345.2939.3171
4. Halfon P, Staines A, Burnand B. Adverse events related to hospital care: a retrospective medical records review in a Swiss hospital. Int J Qual Health Care 2017; 29(4): 527-533. https://doi.org/10.1093/intqhc/mzx061
5. Oh ST, Park JY. Postoperative delirium. Korean J Anesthesiol 2019; 72(1): 4-12. https://doi:10.4097/kja.d.18.00073.1
6. Janjua MS, Spurling BC, Arthur ME. Postoperative Delirium. Treasure Island (FL): StatPearls Publishing; 2020, [Internet] avaialble at: https://www.ncbi.nlm.nih.gov/books/NBK531/
7. Li LQ, Wang C, Fang MD, Xu HY, Lu HL, Zhang HZ, et al. Effects of dexamethasone on post-operative cognitive dysfunction and delirium in adults following general anaesthesia: a meta-analysis of randomised controlled trials. BMC Anesthesiol 2019; 19(1): 113. https://doi:10.1186/s12871-019-0783-x
8. Mardani D, Bigdelian H. Prophylaxis of dexamethasone protects patients from further post-operative delirium after cardiac surgery: a randomized trial. J Res Med Sci 2013; 18(2): 137–143.
9. Koteswara CM, Patnaik P. Peri-operative dexamethasone therapy and post-operative psychosis in patients undergoing major oral and maxillofacial surgery. J Anaesthesiol Clin Pharmacol 2014; 30(1): 94-96. https://doi:10. /0970-9185.125713

10. Kashmiri Zu, Sheikh Z, Haider S. Injection dexamethasone in preventing postoperative nausea and vomiting: a comparison with placebo in the patients undergoing laparoscopic cholecystectomy. J Coll Physicians Surg Pak 2006; 16(11): 689-692.
11. Evered L, Silbert B, Knopman DS, Scott DA, DeKosky ST, Rasmussen LS, et al. Recommendations for the Nomenclature of Cognitive Change Associated with Anaesthesia and Surgery-20181. J Alzheimers Dis 2018; 66(1): 1-10. https://doi.org/10.1097/aln.0000000000002334
12. Glumac S, Kardum G, Sodic L, Supe-Domic D, Karanovic N. Effects of dexamethasone on early cognitive decline after cardiac surgery: A randomised controlled trial. Eur J Anaesthesiol 2017; 34(11): 776-784. https://doi: 10.1097/EJA.0000000000000647.
13. Khor HM, Ong HC, Tan BK, Low CM, Saedon N, Tan KM, et al. Assessment of Delirium Using the Confusion Assessment Method in Older Adult Inpatients in Malaysia. Geriatrics (Basel) 2019; 4(3): 52. https://doi:10.3390/geriatrics4030052
14. Ashraf A, Hashmi M, Raza A, Salim B, Khan MF. Incidence, risk factors and outcome of delirium in a surgical intensive care unit of a tertiary care hospital. Qatar Med J 2020; 2019(2): 62-64. https://doi:10.5339/qmj.2019.qccc.62
15. Fang Q, Qian X, An J, Wen H, Cope DK, Williams JP, et al. Higher dose dexamethasone increases early postoperative cognitive dysfunction. J Neurosurg Anesthesiol 2014; 26(3): 220-225. https://doi: 10.1097/ANA.0000000000000024.
16. Egawa J, Inoue S, Nishiwada T, Tojo T, Kimura M, Kawaguchi T, et al. Effects of anesthetics on early postoperative cognitive outcome and intraoperative cerebral oxygen balance in patients undergoing lung surgery: a randomized clinical trial. Can J Anaesth 2016; 63(10): 1161-1169. https://doi.org/10.1007/s12630-016-0700-4
17. Li X, Yang J, Nie XL, Zhang Y, Li XY, Li LH, et al. Impact of dexmedetomidine on the incidence of delirium in elderly patients after cardiac surgery: A randomized controlled trial. PLoS One 2017; 12(2): e0170757. https;//doi: 10.1371/journal.pone.0170757.
18. Elsonbaty M, E Lsonbaty A. effect of intravenous magnesium sulphate or dexamethasone as adjuvants to sevoflurane anesthesia to prevent delirium during primary cleft palate repair, controlled randomized blind study. Egypt J Anaesth 2017; 33(1): 91–95. https://doi:10.1016/j.egja.2016.11.003.