

Incidence of and Risk Factors for Post-Operative Cognitive Dysfunction (POCD) in Neurosurgical Patients: A Prospective Cohort Study

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Abstract : Introduction: Post-operative cognitive dysfunction (POCD) is a spectrum of clinical syndrome presenting as emergence delirium (ED) and/or post-operative delirium (POD). ED is a transient state (minutes to hours) of marked agitation after the discontinuation of general anesthesia, which does not respond to consoling measures. On the other hand, POD without identifiable etiology is not temporally related to emergence from anesthesia. These patients often emerge smoothly and may be lucid in the post-anesthesia care unit (PACU), but may develop fluctuating mental status, most commonly between postoperative days one and three. General anesthesia (GA) has been identified as a risk factor for POCD. Cranial surgeries involve brain handling in addition to exposure to GA. We hypothesize that the incidence of postoperative delirium after cranial surgery is twice that of spinal surgery. The primary objective of this study was to evaluate the incidence of emergence delirium and postoperative delirium in patients undergoing cranial and spinal neurosurgeries. The secondary objective was to identify the perioperative risk factors of ED and POD. Methods: This was a prospective cohort observation study conducted from March 2020 to September 2023 conducted at a tertiary neurocentre. After obtaining institutional ethics committee approval, adult patients undergoing cranial or spinal surgery with a Glasgow coma scale of 15 were included in the study. Patients undergoing cranial surgery are considered exposed to risk factors, while patients undergoing spinal surgery are considered unexposed. All study subjects received standard general anesthesia. About twenty perioperative parameters were identified as risk factors for POCD. ED was assessed using the Riker sedation agitation scale, and POD was assessed using the confusion assessment method. A sample size of 2000 patients was planned with 1000 each cranial and spinal cases. However, around 700 spinal patients could be recruited for this study. Results: In this study, about two thousand patients were screened for inclusion. However, 1185 cranial cases and 742 spinal cases were considered for final analysis. Both the groups were similar in terms of demographics. Incidence of ED was 25.8% after cranial surgery vs 10.24% after spinal surgery (relative risk 2.5). The incidence of POD after cranial surgery is 20.25% vs 2.15% after cranial surgery (relative risk 9.3). All the proposed risk factors were assessed using binomial logistic regression. Conclusion: Cranial cases expose patients to a nine times higher risk for the development of postoperative delirium. The presence of ED predisposes to POD representing a spectrum.

Keywords : post operative cognitive dysfunction, Neurosurgical patients cohort study, cohort study, emergence delirium

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