

Effects on Inflammatory Biomarkers and Respiratory Mechanics in Laparoscopic Bariatric Surgery: Desflurane vs. Total Intravenous Anaesthesia with Propofol

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Abstract : Obesity is associated with a chronic inflammatory state. During surgery, there is an interplay between anaesthetic and surgical stress vis-a-vis the already present complex immune state. Moreover, the postoperative period is dictated by inflammation, which is crucial for wound healing and regeneration. An excess of inflammatory response might hamper recovery besides increasing the risk for infection and complications. There is definite evidence of the immunosuppressive role of inhaled anaesthetic agents. This immune modulation may be brought into effect directly by influencing the innate and adaptive immunity cells. The effects of propofol on immune mechanisms in has been widely elucidated because of its popularity. It reduces superoxide generation, elastase release, and chemotaxis. However, there is no unequivocal proof of one's superiority over the other. Hence, an anaesthetic regimen with lesser inflammatory potential and specific to the obese patient is needed. OBESITA trial protocol (2019) by Sousa and co-workers in progress aims to test the hypothesis that anaesthesia with sevoflurane results in a weaker proinflammatory response compared to propofol, as evidenced by lower IL-6 and other biomarkers and an increased macrophage differentiation into M2 phenotype in adipose tissue. IL-6 was used as the objective parameter to evaluate inflammation as it is regulated by both surgery and anesthesia. It is the most sensitive marker of the inflammatory response to tissue damage since it is released within minutes by blood leukocytes. We hypothesized that maintenance of anaesthesia with propofol would lead to less inflammation than that with desflurane. Aims: The effect of two anaesthetic techniques, total intravenous anaesthesia (TIVA) with propofol and desflurane, on surgical stress response was evaluated. The primary objective was to compare serum interleukin-6 (IL-6) levels before and after surgery. Methods: In this prospective single-blinded randomized controlled trial undertaken, 30 obese patients (BMI>30 kg/m²) undergoing laparoscopic bariatric surgery under general anaesthesia were recruited. Patients were randomized to receive desflurane or TIVA using a target-controlled infusion for maintenance of anaesthesia. As a marker of inflammation, pre-and post-surgery IL-6 levels were compared. Results: After surgery, IL-6 levels increased significantly in both groups. The rise in IL-6 was less with TIVA than with desflurane; however, it did not reach significance. IL-6 rise post-surgery correlated positively with the complexity of procedure and duration of surgery and anaesthesia, rather than anaesthetic technique. Both groups did not differ in terms of intra-operative hemodynamic and respiratory variables, time to awakening, postoperative pulmonary complications, and duration of hospital stay. The incidence of nausea was significantly higher with desflurane than with TIVA. Conclusion: Inflammatory response did not differ as a function of anaesthetic technique when propofol and desflurane were compared. Also, patient and surgical variables dictated post-operative inflammation more than the anaesthetic factors. Further, larger sample size is needed to confirm or refute these findings.

Keywords : bariatric, biomarkers, inflammation, laparoscopy

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