

Title: THORACIC EPIDURAL ANALGESIA IN MORBID OBESITY.

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Introduction. Recommendations concerning the anesthetic management of patients with morbid obesity vary from general anesthesia with narcotics or inhalation agents and muscle relaxants to light general anesthesia combined with lumbar epidural analgesia and small doses of a short acting narcotic. In this study thoracic epidural analgesia was evaluated because of its potential advantages.

Methods. Twenty patients weighing 138.5 ± 18.3 kg undergoing gastric bypass were studied. Informed consent and approval by the Research Committee, University of Alabama in Birmingham, was obtained. Premedication consisted of 10mg of diazepam and 30ml of mylanta orally. Prior to surgery the radial artery was cannulated and a Swan-Ganz catheter introduced into the pulmonary artery. All 20 patients received 3mg of d-tubocurarine, 3mg/kg of thiopental, and 0.8-1.0 mg/kg succinylcholine. Following oral endotracheal intubation, pancuronium (6-8 mg) was injected and controlled respiration with nitrous oxide-oxygen mixture was provided. In 12 patients (Group E) an epidural catheter was introduced at T₅ level prior to anesthesia induction. Intraoperative analgesia was provided with 12-15 ml of 0.5% bupivacaine, and postoperative analgesia in these patients was achieved with the same solution - 4-6 ml injected epidurally every several hours as needed. Half of the patients (subgroup Ee) received bupivacaine with epinephrine 1:200,000, while another half (subgroup Eo) received bupivacaine alone. In 8 patients (Group B) - balanced anesthesia using fentanyl (0.3-0.6 mg) and enflurane (0.5-0.8 volume percent) replaced intraoperative epidural analgesia, and postoperative analgesia was provided by intravenous morphine (2-5mg). At the end of the surgery, all patients were given glycopyrrolate 0.4mg and pyridostigmine 10mg to reverse neuromuscular block. Circulatory and respiratory variables were measured and calculated one day before surgery, during surgery and immediately after extubation. Multiple measurements were also made before and after administration of analgesics for pain relief.

Results. During surgery - cardiac output (CO) decreased by 12% and 18% in subgroups Ee and Eo respectively, while it was unchanged in Group B. A decrease in mean systemic arterial pressure (SAP) was observed in all groups, while heart rate (HR) decreased significantly in Group Eo only. This resulted in a significant ($P < 0.05$) decrease in rate pressure product (RPP) by 25%, 35% and 20% in Groups Ee, Eo and B respectively. Similar changes were observed in left ventricle stroke work (LVSW). All patients who received combined general and epidural anesthesia (Group E) had adequate respiration, were awake, and extubated immediately after the operation. Five patients in Group B needed prolonged controlled respiration and were extubated within 2 to 6 hours after surgery. Postoperative epidural analgesia led to full pain relief. CO was increased by 15% before epidural injection (when patients experienced pain) and returned to preoperative level during epidural analgesia. After epidural injection, SAP, systemic and pulmonary vascular resistance decreased in subgroup Eo only by 20%, 19% and 27% respectively. RPP decreased by 15%

and 20% and LVSW by 22% and 28% in subgroups Ee and Eo respectively. Arterial and mixed venous blood gases and pH were within normal limits before and after epidural injection, but insignificant increase in PaO₂, PvO₂ and decrease in oxygen consumption during epidural analgesia were observed. PaO₂ values observed postoperatively were 10-15 torr higher than before surgery (78.9 ± 6.08 torr a day before surgery, 87.9 ± 5.44 torr after surgery in conditions of pain, and 102.3 ± 11.17 torr during epidural analgesia). Tidal volume and forced vital capacity increased, and respiratory rate decreased during epidural analgesia in both subgroups by 12%-20% when compared with pre-analgesic values. Epidural injection decreased alveolar-arterial pO₂ difference - (A-a) DO₂ - from 123.1 ± 25.5 to 62.1 ± 31.0 torr and from 120.8 ± 25.5 to 46.0 ± 26.0 torr in subgroups Ee and Ee respectively. Postoperative morphine analgesia resulted in quite satisfactory pain relief and was accompanied with no significant changes in main cardiovascular and respiratory variables when compared with pre-analgesia (while patient experienced pain). (A-a) DO₂ did not change (146.5 ± 4.5 torr before and 137.1 ± 21.2 torr after morphine injection). However, CO, HR and LVSW postoperatively were higher (18%, 12% and 10% respectively) than before surgery.

Discussion. Epidural analgesia as a component of general anesthesia in patients with morbid obesity permitted light anesthesia, allowed immediate extubation and facilitated patient activity in the immediate postoperative period. The advantages of postoperative continuous epidural over morphine analgesia include an increase in tidal volume and vital capacity and decrease in (A-a) DO₂. A decrease in CO, LVSW and RPP together with unchanged arterial and mixed venous blood gases and pH suggest that continuous epidural analgesia decreases metabolism and oxygen requirement, advantaging cardiovascular function.

References.

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