CASE REPORT

Epidural Volume Extension: A Rescue Technique

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Anaesthesia management is always challenging in a patient who comes in emergency with multiple comorbidities. When we have to choose type of anaesthesia in such patients we have to keep in mind its adverse effects on various organs and cardiovascular system particularly in hemodynamically unstable patients. Epidural and spinal anaesthesia in these cases have their own complications on hemodynamics of the patient. Epidural Volume Expansion (EVE) technique is a known technique that allows to achieve surgical anaesthesia level with smaller dose than the conventional procedure. We report successful management of an emergency case with EVE technique.

Keywords: Epidural volume expansion; Severe anaemia; Haemodialysis

Anaesthesia management is always challenging in a patient who comes in emergency with multiple comorbidities. When we have to choose type of anaesthesia in such patients we have to keep in mind its adverse effects on various organs and cardiovascular system particularly in hemodynamically unstable patients. In these scenarios where patient is hemodynamically unstable general anaesthesia is supposed to be avoided due to risk of myocardial depression, hemodynamic instability with use of multiple drugs in general anaesthesia.

The use of epidural or spinal anaesthesia with titration in such patients can avoid drug related myocardial depression, maintain preload and afterload, maintaining renal perfusion and avoiding nephrotoxic drugs. Epidural and spinal anaesthesia in these cases have their own complications on hemodynamics of the patient. Epidural Volume Expansion technique is a known technique that allows to achieve surgical anaesthesia level with smaller dose than the conventional procedure. In this case report we would like to share our experience in using this rescue technique in successful management of the patient with multiple comorbidities.

Case Description

A 38 year old male patient presented in emergency department with pain in abdomen and left side of chest. Patient had history of fall from height eight days back. He was treated conservatively in local hospital. On arrival to our hospital patient was having severe anaemia with grade III liver injury, bowel perforation and had undergone two cycles of dialysis in view of acute kidney injury.

Chest X-ray revealed left sided effusion and chest drain was inserted for same revealing hemothorax. CECT abdomen showed mid-jejunal perforation with biliary peritonitis. On examination patient was fully conscious with BP 88/50 mm Hg, HR 138/min, SPO2 – 92% on room air and coarse crepitation on both sides.

In laboratory investigations TLC was 16000cells/mm3, Hb- 6.5gm/L, PT/INR 14/1.06, serum albumin -2.2gm/dl, SGOT/SGPT- 156/159, Urea/Cr- 86/2.5. In the preoperative area two wide bore cannula 16 gauge were secured, 500 ml of crystalloids and one unit of PRBC was transfused. Patient vitals improved to BP 96/50 mm Hg and HR 104/min. Patient was posted for laparotomy and high risk consent with requirement of postoperative ventilator support explained to patient relatives. Patient was shifted to OR and standard ASA monitors were attached.

We planned EVE technique to achieve desired level in this patient considering various comorbidities and nephrotoxic effects of multiple drugs used in general anaesthesia. Under all aseptic precautions epidural catheter was put in L1-L2 space. 1.5 ml of 0.75% Ropivacaine was given intra-thecally in L3-L4 space using 26G Quincke spinal needle. After continuous monitoring of vitals 8 ml of normal saline was given in the epidural space to achieve sensory level up to T6 level.

The patient was hemodynamically stable throughout the perioperative period. During intraoperative period one litre of crystalloid and one unit PRBC was transfused and operation lasted for 2 hours and 30 mins. Patient was stable in postoperative room after surgery and shifted to general ward after 2 hours.

Figure 1- Yellow colored CSF at the hub of spinal needle

Discussion

Our patient was on haemodialysis with poor chest compliance which made us to choose regional anaesthesia over general anaesthesia. The problem with spinal anaesthesia was its limited duration of action and sudden hypotension due to sympathetic blockade. The advantages of epidural anaesthesia is that we can extend our anaesthesia with supplement doses if surgery lasts longer and patient usually remains hemodynamically stable.

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Similar case was reported in the literature by Srivastava VK et al. [1] where epidural anaesthesia was used successfully in patients of renal failure on maintenance haemodialysis with global hypokinesia presented for live donor transplantation. In another multi-center randomized study done by Yeager MP et al. [2] to evaluate the effect of epidural Anaesthesia on postoperative morbidity in high risk surgical patients found reduction in overall postoperative complication rate and better postoperative outcome in patients who received epidural anaesthesia .In another case report by Mikako kusakai et al. [3], epidural was given combined with dexmedetomidine for appendicectomy in a patient with amyotrophic lateral sclerosis without any complication.

Various reports in the literature have shown the benefit of epidural volume extension (EVE) to achieve the desired effect, without significant hemodynamic effect and faster recovery of motor function [4-5]. A study at Blumgart et al. [6] suggested a higher level of analgesia with EVE compared with spinal alone. This was due to the secondary to the volume effect in epidural space which compresses the subarachnoid space and increase the intra-thecal spread of the drug.

Thus EVE technique has benefits of hemodynamic stability, faster recovery after surgery and higher level of analgesia compared to conventional methods. Although there is much literature published about this technique there should be working knowledge regarding this procedure for the better management of cases mainly in emergencies.

Conclusion

Anaesthesiologists should be aware of these rescue techniques when dealing with patients with multiple comorbidities particularly in emergencies.

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