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Peculiarities of anesthesiology of minimal invasive spine surgery

Abstract: the 204 percutant RX-controled lumbal disc extractions have been done in our department. The transforaminal approach was preformed, the disc herniation was extracted under endoscopic control. In all cases the epidural anesthesia was performed. We would like to introduce the peculiarities, complications of epidural anesthesia.

Keywords: epidural anesthesia, peculiarities, complications, endoscopic lumbal discectomy.

Introduction

The advantages of minimal invasive spine operations which are called other way key hall or endoscopic operations are less tissue trauma, and the endotracheal intubation is absent. This two factors let surgeon activate patients after 3–4 hours after surgery and minimize the duration of hospitalization up to one day. This kind of operations were performed under local anesthesia which is the most popular method for this type of surgery. For relaxation and comfort of the patient, sedation with intravenous Midazolam or Fentanyl was administered by the anesthetist. Some patients were uneasy about having the operation performed under local anesthesia and so the operation was done under general anesthesia [1].

The local anesthesia with intravenous sedation is not enough in some cases, as because of pain patients feel discomfort and their motions are difficult to control, but usage of local anesthesia helps to prevent nerve root injury. The general anesthesia is perfect for patient and surgeon too, but there is possibility of nerve root damaging because there is no possibility to have verbal contact with patient.

The epidural anesthesia with only sensor block is perfect for such operations because it lets patient be in comfortable position during surgery until surgical instruments touch the nerve root, in this cases patients feel pain and the surgeon stops the movies and checks the position of instrument. So epidural anesthesia and analgesia are used widely during surgical procedures and for pain control. This is generally regarded as safe and effective method of anesthesia [2]. There are different complications after epidural anesthesia. For example authors report four cases of neurological complication after epidural anesthesia. After summering the possible reasons authors did the following conclusion. The conclusions to be drawn from these experiences are as follows: [1] ischemic injuries to the spinal cord may occur in children during epidural anesthesia, but spontaneous infarction of the spinal cord also may occur in patients who experience hypotension absent epidural anesthesia; [2] collection of outcome data for a large number of children undergoing epidural anesthesia is necessary and desirable to define the magnitude of risk, thought at this time to be quite small; toward that end, the PRAN continues to accumulate data in North America and to enroll new participating sites,

with case numbers of approximately 35,000 in their database; and [3] further laboratory and clinical investigations are desirable to define the pressure–volume relationship of the epidural space, and the effect of transient epidural hypertension on spinal cord bloodflow and perfusion, to guide clinicians in choosing an appropriate local anesthetic volume and rate of injection, as well as the safety of adjuvant-containing local anesthetic solutions in the developing central nervous system [3]. Although the exact pathophysiologic mechanism remains a matter of speculation, it is theorized that excessive epidural fat might impinge upon the spinal cord, nerve roots, vessels, or even facet joints, which normally allow egress of fluid placed in the epidural space. Using data from the full NAP3 report the risk of a severe neurological complication after preoperative epidural anesthesia is calculated to be 1 : 3 703 (n = 100 000) when the patients who recovered are included [4]. Preexisting spinal canal pathology is a recognized risk factor for adult patients undergoing epidural analgesia [5; 6].

Patients with compressive myelopathy due to lower thoracic lesions, especially epiconus lesions (ranging from the lower level of the T10 vertebra to T12-L1 intervertebral disc level present with pain or motor disturbance of the lower limbs, which is similar to the symptoms of lumbar radiculopathy. There are asymptomatic thoracic lesions in approximately 30 % of patients undergoing lumbar decompressive surgery. The decompressive surgery could cause a change of pressure at the level of the pre-existing missed compressive lesions, causing pressure on the neural elements [7]. The authors report two cases of postoperative cauda equina syndrome in patients undergoing single-level lumbar microdiscectomy in which intraoperative electrophysiological monitoring was used. In both patients, the amplitudes of cortical and subcortical intraoperative somatosensory evoked potentials (SSEPs) abruptly decreased during discectomy and foraminotomy. In the first patient, a slow, partial improvement of SSEPs was observed before the end of the operation, whereas no improvement was observed in the second patient. The authors' findings support the proposition that intraoperative SSEP monitoring may be useful in predicting the development of cauda equina syndrome in patients undergoing lumbar microdiscectomy [8]. The clinical features of 12 patients with neurologic complications following lumbar epidural anesthesia or analgesia were introduced. Authors think that neurologic complications may be more severe in the presence of spinal stenosis or after inadvertent subarachnoid injection of anesthetic or analgesic agent [9]. The complications may occur during placement of the epidural catheter or from the effects of the drugs given during the procedure [10]. Despite the potential risks, the frequency of severe, permanent neurological complications related to epidural catheterization based on prospective and retrospective studies, seem to be extremely low at roughly 0.1–1/10 000 procedures [11]. Radiculopathy, cauda equina syndrome, and myelopathy are all recognized causes of permanent neurological disability after epidural anesthesia and. The authors describe the clinical and radiological findings of three cases of intrinsic spinal cord damage occurring as a result of cervical, thoracic, and lumbar epidurals. They therefore propose that the mechanism responsible for the early onset of neurological symptoms was direct penetration of the spinal cord during attempted epidural catheterisation and subsequent injection of fluid into the substance of the cord, producing localized hydromyelia [12; 13].

Method

The catheterization of epidural space of lumbal spine was performed prior 1–2 hours before surgery. A little dosage of anesthetic was injected before patients are sent to OP room. This let confirm the right position of epidural catheter if the analgesia occurs. The general principals of epidural space catheterization was the same as it is introduced in literature. The point of catheterization is L1-L2 level, after getting to epidural space the tip of epidural catheter was moved to upper level or to the down. The Solution of 0,25 % 20,0 ml. Bupivacaini or Kirocaini was used just before skin incision, after it depend on surgery duration 0,125 % 10,0 ml. of anesthetics were injected every 30–45 minutes. The most important is that analgesia and anesthesia was done in a quantity that only sensor anesthesia occur, we try to avoid of motor block, this mentions that all the steps of operation like soft tissue incision, bone drilling, ligamentum cutting can be performed without pain, but if surgical instruments touch nerve root the patient fell it and let surgeon know about it. We think that it is the best way to prevent nerve root damaging in cases when endoscopic view of nerve root is difficult and don't let recognize nerve root exactly. Intravenous Diazepami injecton was done to patients who have feeling of fear. In cases of not enough analgesia solution Fentanili in a dosage of 50–150 mkg. was also done intravenous.

Results

In 167 cases (82 %) the anesthesia was good enough that let finish surgery without any problem. In 15 cases (7,3 %) there was a need for intravenous Diazepami injection because that patients feel fear and discomfort which progressively grew up during the surgery. It was interesting that 2 of that 15 patients after Diazepami injection became more irritated which is reason of idiopathic reaction. In 22 cases (10,7 %) the epidural anesthesia wasn't enough effective and intravenous injection of solution of Fentanili was preformed.

In 42 cases (20,5 %) a sudden headache occurs during surgery when saline solution under high pressure was injected through irrigation tubes of endoscope. This is a procedure which is preformed in cases of hemorrhage during endoscopic step of surgery for making better endoscopic visualization. As a consequence big volume of solution under a high pressure goes into the epidural space which is a reason of headache. Only aspiration through the endoscopic working channel helps to pass this headache, intravenous drugs infusion was ineffective. We had 5 (2.4 %) patients with neurological complications after epidural anesthesia. Two of them had paresthesia only which were treated by steroid drugs and gabapentin during two three weeks. In three cases paresthesia with dysfunction of bladder and bowel were present. It was classic clinical manifestation of cauda equina syndrome. In two cases clinical syndromes

appeared after 48–72 hours of surgery, one patient felt the paresthesia and dysfunction of bladder and bowel after 5–6 hours from surgery and epidural anesthesia. In all cases MRI were prepared, no any mechanical damaging of nerve roots or spinal cord on surgery level were founded. This all patients fell pain during operation on level Th 5 – Th 8 and had episodic loss of consciousness. There was no episode of arterial pressure hypo or hypertension during surgery.

The follow up of this patients during two – three months shows poor recovery of neurological symptoms.

Conclusion

The epidural anesthesia with only sensor block during endoscopic lumbal disc surgery is safe and effective which allows patient and surgeon to complete the surgery with high comfort. There is a little rate of complications but unfortunately this complications are very dangerous and treatment of neurological complications like cauda equine syndrome is not effective. For prevention of this complications we suggest to do epidural catheterization especially moving the tip epidural catheter as low as possible at the level of L4-L5-S1. The anesthetic drug concentration must be minimized as possible. Before operation intravenous infusion of 1,0–1,5 l solution and 16mg of Dexamethasone must be done. In cases of feeling pain during operation on upper thoracic spine and having episodic loss of consciousness the risk of cauda equna syndrome is high.

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Specific features of the childbirth process and postpartum period in Women with epilepsy

Abstract: This paper assessed impact of epilepsy on the labor course and postpartum period; it was discovered that complicated labor course and postpartum period exceeds several times than those in the population. However,