



POSTOPERATIVE ANALGESIA FOLLOWING ABDOMINAL AORTIC SURGERY

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European Federation of IASP® Chapters (EFIC) declares pain as a serious health problem in Europe. The International Association for the Study of Pain (**IASP**) defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (1).

In order to improve results from surgical treatment we should be aware of the consequences of uncontrolled postoperative pain and have a greater appreciation of the importance of acute postoperative pain control (2, 3, 4, 5). Inadequate control of postoperative pain may result in a higher incidence of chronic postsurgical pain, increased postoperative morbidities and worsened patient-oriented outcomes such as quality of life.

Effective postoperative analgesia improves patients' comfort and satisfaction, provides faster recovery of functional status of postoperative patients, reduces morbidity and contributes for a faster hospital discharge. (6)

Context: Whether epidural analgesia is a better method for postoperative pain control compared with parenteral opioids.

Methods: For easier pain assessment we used some of the most popular scales: Numerical Rating Pain Scale - from 1 to 10, where the patient is asked to point out a number equal to the level of pain he feels, and the Visual Analog Pain Scale – the patient is given a ruler graduated from 1 to 10 and he himself determines the severity of pain from 1 to 10 (1).

0	1	2	3	4	5	6	7	8	9	10
NO PAIN	MILD PAIN			MODERATE PAIN			SEVERE PAIN			
none		disturbing		Uncomfortable		unbearable		worst imaginable		

We used the Numbering Pain Rating Scale (NRS) and Ramsey Sedation Scale to measure the intensity of the pain both under static (NRSs) and dynamic (NRSd) conditions. In addition to

patient's satisfaction, we took into consideration the medical condition and postoperative complications, treatment side effects and length of hospital stay.

Ramsey Sedation Scale	
Score	Response:
1	Anxious, agitated or restless or both
2	Cooperative, oriented, tranquil
3	Responding to commands only
4	Brisk response to light glabellar tap or loud auditory stimulus
5	Sluggish response to light glabellar tap or loud auditory stimulus
6	No response

RESULTS

For abdominal aortic surgery with different surgical approaches and pain assessment epidural analgesia provides better analgesia

when compared to the use of intravenous opiates, especially during movement, for the first couple of postoperative days.

Our patients found the epidural catheter technique with l-bupivacaine more satisfactory. In this study group the NRS scores median were NRSs < 3 and NRSd < 4. The complication rates

were lower than expected for nausea or vomiting and pruritus but comparable with existing data for lower extremity motor block.

	Group A (n=25)	Group B (n=25)
Age (years)	68,7 (±11,33)	65 (±9,12)
Gender, male (%)	13 (52%)	17 (68%)
BMI (kg/m ²)	22,34 (±2,5)	23,44 (±1,4)

Demographic characteristics of the patient study group (n=50).

Group A – epidural analgesia

Group B – opioid and non-opioid analgetics.

This study was undertaken to compare the effectiveness of postoperative epidural analgesia (PEA) with parenteral slow-release opioids and non-opioid analgetics for the control of moderate or severe pain. We did an observational and retrospective analysis considering a period of 5 years (from 2009 to 2013) in which we reviewed 50 patients that underwent elective abdominal aortic surgery with retro- and transperitoneal approach, performed by the vascular surgeons from our clinic. We divided two nonrandomized groups one of which received epidural analgesia with l-bupivacaine, and the other was managed by a combination of parenteral opioid and non-opioid analgetics. The demographic data was similar in both groups, concerning: age, sex, hypertension, coronary artery disease, diabetes mellitus, smoking, chronic obstructive pulmonary disease, renal insufficiency. The rate of surgical complications did not differ between the groups. Likewise, surgical intensive care unit stay and complications were similar in both groups. The average length of stay in patients receiving PEA was 8 days, compared with 6 days for the parenteral opioid group. Following discharge from the hospital, no additional complications were encountered and no readmissions required during a 4-week-follow-up (7).

Patient Selection

Procedures included elective abdominal aortic surgery for aneurysm or aortoiliac occlusive disease, as well as visceral and renal arterial reconstruction requiring abdominal aortic cross-clamping without the need of extra corporal membrane oxygenation (ECMO) (8). Other exclusions included contraindication to any feature of the proposed clinical management, including epidural anesthesia, previous surgery

or severe deformity of the thoraco-lumbar spine, previous or current neurologic disease affecting the lower hemithorax or below, opioid dependence, major surgery in the previous 14 days, and patient refusal, as well as any contraindication for the use of NSAIDs.

Preoperative management

If no contraindications (e.g. coagulopathy) are present patients are randomly supplemented with epidural analgesia, which is inserted preoperatively in the intervertebral spaces at the level between T8-11 with the loss-of-resistance technique. During insertion of epidural catheters, patients were given intravenous midazolam in 0.5-mg increments (maximal dose of 5 mg) and fentanyl in 25-µg increments (maximum dose of 100 µg) for sedation. With the epidural needle level oriented in the cephalad direction, a multiport catheter was inserted 4 cm into the epidural space. All epidural catheters were tested for appropriate placement with the administration of a test dose consisting of 3 ml of 2% lidocaine with 15 mg of epinephrine. Formal entry into the study occurred after successful placement and testing of the epidural catheter (8).

All patients are extubated immediately after surgery if they fulfill the following criteria: core temperature – 36,8 °C, hemodynamic stability without need for catecholamine therapy and exclusion of residual paralysis. In our department patients after elective open abdominal aortic surgery are routinely transferred to the ICU, where they are observed overnight and transferred to the vascular surgical ward on the first postoperative day if they fulfill the following criteria: stable hemodynamic parameters, no clinical signs of organ failure and stable laboratory tests (e.g. hemoglobin). The

epidural catheter was usually removed after pain control was achieved by i.v. medication alone, usually after 2–3 days. Complications of epidural anesthesia such as bleeding resulting in paralysis fortunately did not occur in our series. (9)

In the first group of patients (Group A), that were managed by epidural analgesia, 4 ml of chirocaine 0,25% (l-bupivacaine) were administered every 6 h. The second group (Group B) was controlled by parenteral opiates – Lydol, Tramadol and Morphine, combined with non-opioid analgetics such as Perfalgan and Dexofen. The initial dose opiates was presented 15 min before ending the anesthesia. The doses of parenteral analgetics were as follows: Lydol 50 mg i.m. 4 times daily, Tramadol 50 mg i.m. 4 times daily, Morphine 4-5 mg s.c., Perfalgan 1 g every 6 hours and Dexofen 50 mg bolus every 8 hour. In case of poor pain control, the prescribed rescue doses were an epidural bolus of 4 ml l-bupivacaine 0,25% up to 3 times in 24 hours (Group A) or a parenteral administration of an additional dose of Lydol or Morphine up to five times in 24 hours (Group B).

After being transferred to the vascular surgery ward patients remained for an average of 7 days. The intensity of pain was evaluated four times

daily for 2 days using the NRS (NRS 0 – no pain, to 10 – the most intense pain I can imagine) and Ramsey Sedation Scale (according to how rousable the patient is – at least level 4). Both were considered under static (NRSs – patient lies still on the bed) and dynamic conditions (NRSd – during limb movement). On the first day of monitoring, pain intensity was evaluated 5 times – 1 hour after the operation, and another 4 times afterwards with 6 hour intervals. During the second postoperative day the same time intervals were kept with an overall of 6 evaluations. Pain management objectives were to maintain pain intensity within $NRSs \leq 3$ and $NRSd \leq 4$. At the same time, we also recorded non-invasive arterial blood pressure (AP), heart rate (HR), respiratory rate (RR), the presence of treatment side effects, and the degree of patient satisfaction of the pain management treatment. In particular, expected side effects were motor block, hyposthenia or hypoesthesia, signs of neurological or cardiac local anesthetic toxicity; or opiates side effects, such as sedation (using the Ramsey 5-item scale), respiratory depression, nausea, vomiting, itching or constipation. Finally patient satisfaction was estimated before hospital discharge using a 4-item category scale: insufficient, sufficient, good or excellent (12).

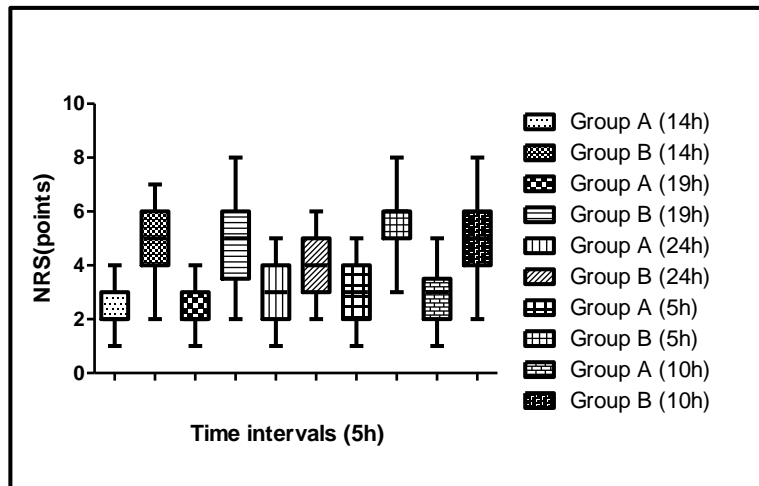


Figure 1. Postoperative pain according to NRS within Groups A and B during the first 24 hours.

Postoperative care of patients undergoing abdominal aortic surgery has continuously improved over the past decade. A cornerstone in this concept is the use of regional anesthetic techniques, i.e. epidural anesthesia, in order to reduce surgical stress and optimize postoperative pain management (10). Patients, that underwent

surgery for abdominal aneurisms or occlusive arterial disease, experience most frequently postoperative moderate to severe pain. The effective management of pain is essential for a faster recovery with reduced complications. The sequel of severe untreated pain can be long lasting psychological effects on the patient, together with adverse hemodynamic changes. Tachycardia and hypertension, together with an

increase in systemic vascular resistance, will cause an increase in myocardial oxygen consumption and demand that may result in myocardial ischemia (11, 12). There may also be a deleterious effect on the immune system in an already compromised patient who is trying to combat a serious illness, but foremost it is inhumane not to adequately treat pain (13).

CONCLUSION

The epidural infusion of local anesthetics (l-bupivacaine) provides better postoperative analgesia compared with parenteral opioids after abdominal aortic surgery. For patients with contraindications for this technique pain control may be obtained by a parenteral combination of opioid and non-opioid analgetics which also shows satisfactory results but remains an alternative.

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