Egyptian Journal of Anaesthesia (2015) **31**, 251–253

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Egyptian Society of Anesthesiologists

Egyptian Journal of Anaesthesia

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Case report

Two cases of thoracic spinal anaesthesia in patients with severe diseases

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Received 19 June 2014; accepted 3 April 2015
Available online 8 May 2015

KEYWORDS

Spinal anaesthesia;
Alcoholic neuropathy;
Gastrostomy;
Hypotension;
Neurological complications

Abstract This manuscript describes two cases of thoracic spinal anaesthesia for patients with severe diseases, with satisfying results. Patient 1: female, 57 years old, submitted to a surgical gastrostomy. She had squamous cell carcinoma of the hypopharynx involving the C6 vertebra, carotid and thyroid, with a fistula in the cervical region. After sedation, an epidural puncture was performed in the T7–T8 interspace and an epidural catheter was introduced. Then, a 25G Quinke needle was introduced 5.4 cm in the subarachnoid T8–T9 interspace and 5.0 mg of isobaric bupivacaine was administered. The dermatome level of anaesthesia was established from T3 to T12, preserving the movement of lower limbs. Patient 2: male, 41 years old, with alcohol-related brain atrophy, progressive strength loss in both lower and upper limbs, with spastic tetraparesis and tetrahyperreflexia. After sedation, a 25G Quinke needle was introduced in the subarachnoid T8–T9 interspace, and 5.0 mg of isobaric bupivacaine was introduced. Both patients were transferred to the post-anaesthesia recovery room. The greatest cause for concern in the administration of spinal anaesthesia is the possibility of an accidental medullary puncture. In a recent study, it was found a larger distance between the dura mater and the spinal cord in T6. In another study, the largest distance between the dura mater and the spinal cord was found in T5. Thoracic spinal anaesthesia technique is another anaesthetic technique that may be used in some special situations.

1. Introduction

Thoracic spinal anaesthesia has been used recently as an alternative anaesthetic technique for patients with severe lung disease and for healthy patients, for procedures such as cholecystectomy. This manuscript describes two cases of

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Peer review under responsibility of Egyptian Society of Anesthesiologists.

http://dx.doi.org/10.1016/j.egja.2015.04.002

thoracic spinal anaesthesia for patients with severe diseases, with satisfying results.

2. Case report

Patient 1: female, 57 years old, submitted to a surgical gastrostomy. She had squamous cell carcinoma of the hypopharynx involving the C6 vertebra, carotid and thyroid, with a fistula in the cervical region. She also had lung metastasis and diabetes mellitus. Her blood tests were normal. She was undergoing radiotherapy and chemotherapy treatments and used metformin, insulin, fluconazole, dexamethasone, ondansetron, omeprazole. After obtaining a venous access, she was sedated with midazolam (3.0 mg) and while seated, an epidural puncture was performed in the T7–T8 interspace (inferior scapular line) and an epidural catheter was introduced. Then, a 25G Quinke needle was introduced in the subarachnoid T8–T9 interspace (below the inferior scapular line) and 5.0 mg of isobaric bupivacaine was administered. The dermatome level of anaesthesia was established from T3 to T12, preserving the movement of lower limbs. Sinus bradycardia (49 bpm) was treated with 0.5 mg of atropine and hypotension (BP 84/49) was treated with 4.0 mg of ethylephrine. Forty-five minutes after starting the procedure, a 10 ml dose of bupivacaine 0.125% was administered. The procedure took 65 min and the patient was taken to the post-anaesthesia recovery room.

Patient 2: male, 41 years old, with alcohol-related brain atrophy, progressive strength loss in both lower and upper limbs, with spastic tetraparesis and tetrahyperreflexia. He had recurrent cases of pneumonia caused by gastroesophageal reflux, and was submitted to a surgical gastrostomy. Bilateral rhonchi were present on chest auscultation. Cranial computed tomography: significant cortical sulci and sylvian fissures with preserved cerebellar parenchyma and brainstem. After venoclysis and sedation with midazolam (2.0 mg), the patient was placed in lateral position and a 25G Quinke needle was introduced in the subarachnoid T8–T9 interspace, and 5.0 mg of isobaric bupivacaine was introduced. Hypotension (BP 81/41) was treated with 10 mg of ephedrine and sinus bradycardia (44 bpm) was treated with 0.5 mg of atropine. The procedure took 45 min and the patient was taken to the post-anaesthesia recovery room.

3. Discussion

In the past two decades, anaesthetists from several regions in the world have shown interest in evaluating the effectiveness and the limitations of thoracic spinal anaesthesia. Most studies have focused on patients ASA physical state 1 or 2, in case of laparoscopic cholecystectomy and in patients with severe lung disease [1–5].

The greatest cause for concern in the administration of spinal anaesthesia is the possibility of an accidental medullary puncture with transient or definitive neurological sequelae. The spinal cord is known to end around the L2–L3 interspace. Thus it is safer to administer spinal anaesthesia below that level. Studies using magnetic resonance imaging have estimated the mean distance between the dura mater and the spinal cord in several thoracic interspaces. In a study, Lee et al., have found a larger distance between the dura mater and the spinal cord in T6 (9.5 ± 1.8 mm) [6]. In the study conducted by Imbelloni et al., the largest distance between the dura mater and the spinal cord was found in T5 (5.8 ± 0.8 mm), with the shortest distance in T2 and T10 [7]. This may be explained with the fact that in the mid thoracic region, the spinal cord is ventrally located, more distant from the dura mater, mainly when the patient is in a forced thoracic flexion [8]. This also explains why, in a study with 113 thoracic epidural punctures and incidence of 4.4% of dural perforations in this region there were no neurological sequelae [9]. The incidence of paraesthesia in lower thoracic spinal anaesthesia using a cutting needle or a pencil-point needle has been recently compared and no significant difference has been found between both groups. The mean incidence of paraesthesia of both groups together was 6.6%, with no case of neurological sequelae [10]. In another study with thoracic spinal anaesthesia, patients who had paraesthesia during puncture did not have any neurological sequelae [10]. Regarding hemodynamic effects, there has been a sympathetic block, even with low doses of bupivacaine, which caused bradycardia and hypotension in the cases mentioned in this manuscript. Hypotension and bradycardia are probably induced by a reduced sympathetic nervous system tone, which may be secondary to the block of cardiac accelerator fibres (T1–T4) and to the thoracolumbar distribution of the block. Other authors have found the same hemodynamic changes. In a recent study comparing anaesthetic techniques for laparoscopic cholecystectomy, thoracic spinal anaesthesia was shown to be better than lumbar spinal anaesthesia, regarding the hemodynamic stability (lower dose of ephedrine) [11].

In the patients presented in this paper, thoracic spinal anaesthesia was shown to be a safe and reliable technique, allowing a surgical anaesthesia, with tolerable hemodynamic changes and with no manipulation of airways. In the first case, tracheal intubation might be impossible due to the anatomical changes and in the second case, the patient would probably need postoperative recovery in an intensive care unit for tracheal extubation. In patient 1 we opt to insert an epidural catheter in case of fail of the spinal anaesthesia. Since we use double puncture technique, and we inserted the epidural catheter first, we performed the spinal anaesthesia a level below. Probably, if the combined spinal-epidural set was available, it would add a benefit in guiding the spinal needle through the epidural needle. Beyond allowing spinal needle insertion easier, the set would permit accurate measures of the depth of the epidural space.

Thus, as shown in other studies, thoracic spinal anaesthesia technique is another anaesthetic technique that may be used in some special situations. One benefit of the spinal thoracic anaesthesia over the thoracic epidural is the local anaesthetic mass reduction. The patient's medical conditions, the surgery to be performed, the experience and the familiarity of the anaesthetist with the technique should all be considered.

Conflicts of interest

None.

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