

## Case Report

# Management of a ruptured epidural catheter, an anesthesiologist's dilemma: a case report

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## ABSTRACT

Epidural anesthesia is a widely used anesthetic technique in lower extremity surgeries although it is a relatively safe procedure, it can have complications, such as rupture of the epidural catheter. This is a 69-year-old male patient with a diagnosis of Wagner IV diabetic foot is presented, which was scheduled for left supracondylar amputation in which after epidural block, retention of the catheter tip in the epidural space at level L2-L3 was seen, so hemi laminectomy was performed in a second surgical stage in L2 and removal of the epidural catheter. Ideally a broken needle should be removed as soon as possible.

**Keywords:** Epidural anesthesia, Broken epidural catheter, Broken needle, Neuraxial block, Hemilaminectomy

## INTRODUCTION

Epidural anesthesia is a widely used anesthetic technique in lower extremity surgeries. This consists of the neural block of the lumbar and/or sacral segments, achieving an intraoperative and postoperative anesthetic and analgesic

effect, practiced routinely to provide anesthesia/analgesia in different surgical procedures.<sup>1-3</sup> Although it is a relatively safe procedure, it can have complications, such as abscesses, hematoma or and tears. Currently, there are no objective criteria to establish measures that quantify the appropriate ranges of firmness or flexibility that allow

adequate placement with less risk of rupture.<sup>4</sup> The retained piece of the broken fragment, in most cases can have a benign result if it is not manipulated, however, it can also develop neurological sequelae.<sup>5</sup> Despite knowing about the development of sequelae, expectant management prevails over radical surgery.<sup>6</sup> The case report of a catheter rupture with final surgical removal is presented.

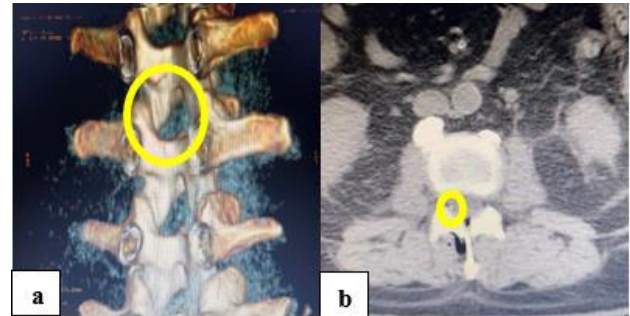
## CASE REPORT

A 69-year-old male patient diagnosed with Wagner IV diabetic foot, was scheduled for left supracondylar amputation. Anesthetic assessment, ASA UIIIA, thromboembolic risk 3, Gupta cardiovascular risk 0.52%, ARISCAT 28 intermediate risk, 800 ml allowable losses, neuraxial blockade is suggested as anesthetic techniques. Vital signs blood pressure (BP) 137/68 mmHg, heart rate (HR) 84 bpm, respiratory rate (RR) 16 per min, oxygen (O<sub>2</sub>) saturation 88% room air, 10 mg nalbuphine sedoanalgesia was administered and the patient placed in the right lateral decubitus position, dorsolumbar asepsis and antisepsis, the intervertebral space was located at L2-L3 and infiltrated with 2% lidocaine (60 mg), Tuohy needle no. 17 inserted up to the yellow ligament identifying epidural space with loss of resistance technique (Pitking), inserted a needle no. 27 with needle technique Tuohy and cerebrospinal fluid with macroscopically normal characteristics was observed, on the second attempt without incident, a subarachnoid dose of isobaric bupivacaine 10 mg is administered, a whitacre needle was then withdrawn and an epidural catheter placed in a cephalic direction. Immediately the patient reported intense paresthesia and pain without allowing the advancement of the catheter, it was decided to withdraw it but resistance was encountered in several attempts, upon removal, a lack of a catheter tip was observed, approximately 2 cm. It was decided to continue with the surgical procedure and the patient was repositioned supine and motor and sensory block was confirmed until T10, the scheduled surgery was performed without eventualities. The patient is released for imaging studies, where a simple tomography is performed to assess retention of the catheter tip. Consultation was requested by the Neurosurgery service and a suggestive image of a catheter in the epidural space at the L2-L3 level was confirmed on the tomography (Figure 1). This clinical case was presented at the hospital committee session and the surgical extraction was decided, so the patient was scheduled for exploration and L2 hemilaminectomy and removal of the epidural catheter.

### Findings

Surgical reoperation of the patient was performed with intravenous sedation and endotracheal intubation, anesthetic maintenance was with sevoflurane adjusted to the requirement. The surgical procedure is started, a L2-L3 mid-posterior incision was made, it was dissected by planes, a dissection of paravertebral muscles was performed, L2 hemilaminectomy was performed and the epidural catheter was located and removed, the surgical

area is washed with solution and antibiotics, we proceeded to close the surgical wound in planes. The patient remained in hospital to complete the antibiotic regimen and monitor glycemic control, discharged on the fourth postoperative day, hemodynamically stable, afebrile, tolerating the oral route, without neurological alterations or motor deficits in the lower extremities.



**Figure 1: Retention of epidural catheter (yellow circle) between L2-L3 (a) three-dimensional reconstruction and (b) cross-sectional computed tomography.**

## DISCUSSION

There are different factors that can lead to the rupture of the epidural catheter; the choice of needles, technique and patient positioning. In the choice of needles, deviation from the axis of the needle and the tip, bending and trauma are more common with the smaller needles.<sup>1</sup> In the puncture technique, the most common reason that spinal needles break is from impact to the bone or resistance due to rigid ligaments/capsules, even without the use of excessive force. The most likely practices that can rupture or cut fragments of the needle mainly include 3 situations: redirect the needle without withdrawing it to the superficial subcutaneous tissues, remove and redirect the needle keeping the introducer in place, and handle the needle after the stylet has been removed.<sup>7,8</sup>

Generally, if the procedure is difficult and requires several attempts, the spinal needle should be replaced regularly with a new one.<sup>7,8</sup> Careful patient positioning is essential for a successful lumbar puncture, although it is unclear what effect the patient's position has on the risk of needle breakage, appropriate anatomical landmarks and the experience of the anesthesiologist should always be considered.<sup>9</sup>

An epidural catheter can become trapped and close to the yellow ligament, posterior longitudinal ligament, intervertebral foramen, pedicles, or facet joints.<sup>10</sup> The sum of factors such as the technique used for insertion and removal, the cooperation of the patient, and the quality of the catheter can influence the rupture when attempting to remove it.<sup>11</sup> An incidence of between 0.003 and 0.005% is estimated.<sup>2</sup> The force applied to withdraw a catheter must be between 130 g and 1,000 g to prevent it from breaking; Some authors have reported that the rupture can occur

from 2.6 kg, other authors report rates of between 0.5 kg and 4.3 kg of force.<sup>12</sup> Some authors have proposed that retained catheters do not have clinical sequelae, since they are considered inert and sterile, so they should not be removed in asymptomatic patients.<sup>13</sup> This is not well documented and there are different reports of neurological complications associated with free fragments, in addition it should be considered that the fragment could migrate causing distant injuries.<sup>2</sup>

## CONCLUSION

Due to possible neurological complications (numbness, paraesthesia or weakness, pain, infection, and CSF leak), after identifying a ruptured epidural catheter, particularly if the needle is located near the spinal canal or is migrating into it, it is suggested timely evaluation by neurosurgery for prompt surgical removal as ideally a broken needle should be removed as soon as possible.

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