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Case Report Open Access

Inadvert Intravenous Administration of Local Anaesthetic During Labour: A Case Report

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Abstract

Introduction: Local anaesthetics are widely used in the daily practice of the anaesthesiologists. Although in most part of the times no adverse effect are observed secondary to its use, accidental intravascular injection can be related to serious consequences. The objective of this case report is to describe an accidental intravascular administration of a local anesthetic during labour epidural analgesia.

Methods: Clinical records of a complete epidural labour analgesia case were collected.

Results: During an epidural blockade for labour analgesia, local anesthetic toxicity was acutely diagnosed after a bolus dose. This epidural catheter was promptly removed. Following the parturient informed consent and will, a second epidural catheter was introduced at a different lumbar level, with a subsequent successful analgesia, with no complications registered, with a normal delivery in the due time, with no morbidities either to the mother and the newborn.

Discussion: After an incomplete success of the first bolus when the first epidural catheter has been used, a diagnostic bolus of Lidocaine showed that this catheter was actually in an intravascular space. The diagnostic was purely clinical, given the highly typical clinical signs that were observed. These signs were so clear that no other diagnostic procedure was necessary. The fact that labour analgesia was resumed after a second catheter was introduced (this time with complete success) showed a good confidence relationship between doctor and patient, which is of paramount importance during Anesthesiology practice.

Conclusions: Intravascular injection of local anaesthetics could be prevented following some safe steps. In cases when it is not primarily identified, a transparent dressing could allow observation of blood inside catheter and help to make the diagnosis.

Keywords: Local anesthetic; Intravascular administration local anesthetic

Introduction

Local anaesthetics are widely used in the daily practice of the anaesthesiologists. Although in most part of the times no adverse effect is observed secondary to its use, accidental intravascular injection can be related to serious consequences [1] and is, probably, the most significant hazard in epidural blockade [2].

In most of the cases, accidental intravascular injection can be avoided with the adoption of some "safe steps" as intravenous test doses, incremental injection and aspiration of needles and catheter, but even this last method may fail to identify intravascular placement of the catheter in about 0.6% to 2,3% of patients [1,3,4].

The incidence of vascular puncture during epidural technique can be even higher in obstetrical patients, since there is an increase in venous pressure under the gravid uterus, which leads epidural plexus to be engorged [5].

However, the reduced sensitivity to chronotropes and vasopressors associated with pregnancy and the large variability in the maternal heart rate during labor, related to pain stimulus in each uterine contraction, make the intravascular catheter detection after a test dose much more difficult in this scenario than in the normal population [6].

Case Report

A 36 year-old multiparous woman (78 kg, 1.55 m), ASA 2 status (pregnancy and asthma controlled with regular medication), presented to delivery unit at 38 weeks' gestation.

The patient had a history of caesarean 14 years ago due to a breech presentation without complications.

Admitted at the hospital in labour, she was proposed for epidural analgesia with 3 cm of dilatation and pain due to contractions. No allergic medicine history was identified. There was not any contraindication to the implementation of this analgesic technique.

Epidural technique was applied in a seated position, in the L3-L4 interspace, using a saline loss of resistance technique with an 18G Tuohy needle. No difficulty was felt to achieve the epidural space 5 cm from the skin, at this level. The catheter was introduced 4 cm in the epidural space and patient referred no complains. The external tip of the catheter was positioned under the level of patient's skin entrance and it was aspirated. No blood was observed inside it.

After the patient was monitored with pulse oximetry and non-invasive arterial pressure, 5 ml of a syringe containing 10 mg of sufentanil and 20 mg of ropivacaine 0,2% (12 ml total volume mixture) was administered in the epidural space. After no complain, passed 2 min, the remaining 7 ml of this mixture was administered. About two min after, the patient referred a pressure sensation in the occipital region that lasted less than 5 min. As it seemed to be a non-specific symptom, the patient attributed it to the positioning during the execution of the epidural technique and it was interpreted like a myofascial pain.

No changes in the cardiac frequency or arterial pressure were observed. According to the protocol of our institution, an epidural perfusion of ropivacaine 0%, 1% and sufentanil 0 μ/ml, 25 μ/ml at a rate of infusion of 8 ml/h was started following the initial previously mentioned bolus.

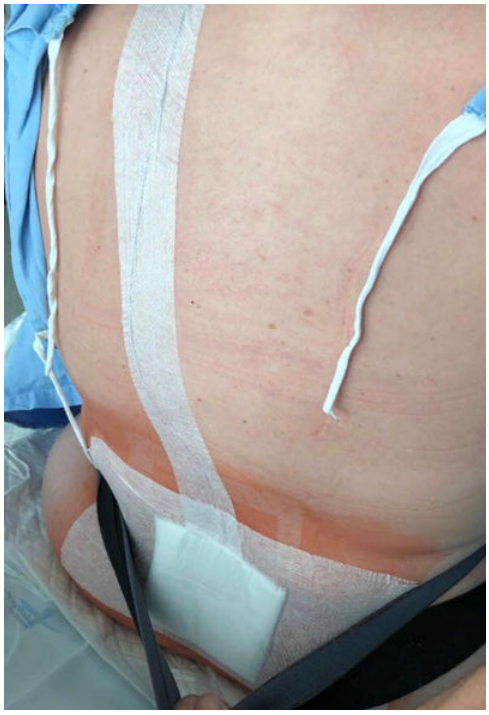

Figure 1: No blood or liquid under epidural catheter dressing.

About 1 h after the initial bolus, patient was observed and complained of drowsiness and partial relief of the pain initially. However, as it was inconsistent, most part of the contractions was still painful. The dressing in the back of the patient (local of epidural insertion) was observed and was find clean and dry. As the dressings used for this propose in our hospital are not transparent, the catheter was only seen in the superior part fixed to the shoulder of the patient (Figure 1) and in this location, it was clean.

Due to the permanence of pain, it was decided to administer a bolus of 5 ml (100 mg) 2% Lidocaine through epidural catheter and observe the consequent analgesia. Immediately after the administration, the patient referred a perioral numbness that lasted 2 min and the heart frequency that was about 80-90 bpm, increased to 110-115 bpm. No more signs or symptoms were observed.

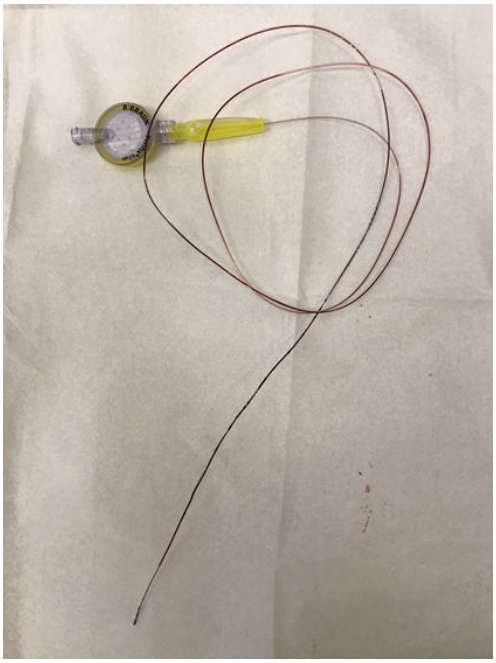

Figure 2: Blood present inside epidural catheter.

Following this complain, intravascular injection of the local anaesthetic was suspected and the dressing was withdrawn to analyse the catheter. It was observed blood inside the catheter (Figure 2) in the part that was covered by the dressing. The catheter was immediately withdrawn and the patient was informed about what happened. Observation of the patient was maintained with heart rate, ECG, pulse oximetry and non-invasive arterial pressure. Neurological status was also observed and no other alterations were seen. Foetal monitoring maintained without alterations.

Patient agreed to be submitted to another epidural catheter placement in order to achieve labour analgesia. The epidural technique was again applied in the seated position, this time in the L2-L3 intervertebral space and without complications. Epidural space was distant 4 cm from skin at this location and 3 cm, 5 cm of catheter were introduced in the space. One more time, the catheter was aspirated and no blood was observed inside it.

At this time, it was decided to administer an initial epidural test dose with 3 ml of Lidocaine 2% containing 15 μ/ml epinephrine (1:200.000) but it was not immediately conclusive due to a uterus contraction right after injection followed by patient's complaint of pain and raise of heart frequency. Two min after epidural test dose, patient referred pain relief. Movement of both inferior members was sustained and intrathecal administration was excluded. Labour analgesia was maintained with a perfusion containing ropivacaine 0,1% and sufentanil 0 μ/ml, 25 μ/ml at a rate of 8 ml/min. No complications were observed until delivery.

Discussion

Accidental intravascular injection of local anaesthetics during performance of regional anaesthesia is the main mechanism of systemic toxicity related to these drugs [7].

During the execution of the epidural technique, some methods to prevent intravascular placement of the catheter were used. After introduction of the catheter in the epidural space, it was left in a position inferior to its insertion, so blood could drainage due to gravity. The catheter was also aspirated and no blood was observed. Administration of a solution containing opioid and a local anaesthetic occurred in two phases (two boluses) and between them, no adverse effect was observed.

The authors believe that even though we have not seen blood inside the catheter initially, its location might be intravascular from the beginning.

Patient complaining occurred only after the end of the two steps administration probably because the local anaesthetic used was ropivacaine. The safe profile of this drug, regarding central nervous system and cardiac effects [8] and the initial small dosage (approximately 4 mg of sufentanil and 8 mg of ropivacaine), allowed the patient not to complain about any symptom after the first part of the administration. After the end of the first bolus containing 10 mg of sufentanil and 20 mg of ropivacaine, patient complained of an occipital pressure, a symptom not described in the literature in the context of local anaesthetic toxicity. As it was brief and a non-specificity symptom, intravascular placement of the catheter was not suspected immediately after the first analgesic administration.

After administration of Lidocaine 100 mg, neurological symptoms could be observed and intravascular placement was identified.

According to Owen et al. [9] intravascular injection of ropivacaine 25 mg produced symptoms in only 52% of patients compared to 100 mg of Lidocaine (87%). Occipital pressure sensation was not described. These authors concluded that ropivacaine should not be used as a reliable test dose drug.

We believe that even though the initial symptoms were non-specific, intravascular placement of the catheter could be identified earlier if the dressing was transparent. Regarding this matter, prior aspiration of the catheter before each drug administration should be compulsory, in order to allow the observation of blood inside it.

Key learning points

Clinical assessment of pain relief and other *de novo* clinical signs should be done after every epidural bolus.

Any new finding during an epidural analgesic labour protocol should be accordingly interpreted throughout all the procedure.

The patient should be promptly informed about the new findings and invited to decide on alternative options for his or her treatment.

A complication should be evaluated and if considered of minor magnitude, may not preclude further attempts, obviously with the patient informed consent.

Conclusion

Intravascular injection of local anaesthetics could be prevented following some safe steps.

In cases when it was not identified previously, a transparent dressing could allow observation of blood inside catheter.

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