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CASO CLÍNICO

Accidental Subarachnoid Position of an Epidural Catheter

Colocação Subaracnoideia Acidental de um Catéter Epidural

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Afiliação
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ABSTRACT

Epidural analgesia remains a frequently used technique in all perioperative settings and chronic pain management, though still associated with a variety of complications, including technique failure, spinal hematoma or abscess and inadvertent location/migration of the catheter to the intravascular/subdural/subarachnoid space, with potential letal consequences.

In this clinical case we report a migration of an epidural catheter intended for chronic pain management, which was placed intrathecally with position confirmed by radiocontrast dye. The authors pretend to highlight with this case that a high suspicion level is crucial for the correct diagnosis of catheter malposition and appropriate management. In our current knowledge, there are no previous published images on the literature showing simultaneous radiocontrast in both the epidural and intratechal space, giving our images its singularity.

RESUMO

A analgesia epidural permanece uma técnica frequentemente utilizada em todo o perioperatório e abordagem de estados de dor crónica, embora se mantenha associada com diversas complicações, incluindo a falha da técnica analgésica, hematoma ou abcesso espinhal e inadvertente localização/migração do catéter para o espaço intravascular/subdural/subaracnoideu, com consequências potencialmente letais.

Neste caso clínico, descrevemos a migração de um catéter epidural colocado para abordagem de dor crónica, que foi visualizado no espaço intratecal com a administração de radiocontraste. Com este caso, os autores pretendem ressalvar a necessidade de um elevado nível de suspeição para o correto diagnóstico de mau posicionamento do catéter e apropriada abordagem do mesmo. No atual conhecimento dos autores não há imagens previamente publicadas na literatura em que seja visível radiocontraste simultâneo no espaço epidural e subaracnoideu, tornando as imagens enviadas únicas.

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INTRODUCTION

The epidural space is located between the flavum ligament and externally to the dura mater as opposed to the subarachnoid space existing between the arachnoid and the pia mater, containing the cerebrospinal fluid. The subdural space constitutes a potential space between the arachnoid and the dura mater with limited quantity of serous fluid.

Although epidural analgesia is frequently used, both in pre, intra and postoperative settings, as well as acute and chronic pain, it remains associated with a variety of complications: analgesic failure, unilateral analgesia, accidental dural puncture, post-dural puncture headache, hemorrhage/hematoma or inadvertent location/migration of the catheter to the intravascular/subdural/subarachnoid space.[1]

Unlike the epidural space, the subarachnoid space is continuous with the subarachnoid intracranial space. Subarachnoid injection of large amount of the local anesthetic intended for epidural space leads to an extensive block in 15-20 min, including the cranial nerves and the respiratory muscles, with potential for respiratory arrest.

In this case report, we present a case of subarachnoid catheter placement confirmed by radiography through administration of unionized contrast.

CASE REPORT

The present case report has been approved by the ethical committee of the clinical institution. A 74-year-old male patient, diagnosed with rectum adenocarcinoma, was submitted to abdominoperineal resection. The procedure

presented with a perineal fistula as a complication.

Two years after the surgical intervention, the patient displayed pelvic cancer recurrence with bladder invasion and multiple metastasis in the liver, lungs and bones. Along with this diagnosis, the patient presented intense algic complaints, located at the perineum. The pain was exacerbated in the sitting position and relieved at the decubitus position.

Regarding this, the patient was hospitalized and medicated with iv morphine perfusion (between 2-4 mL/h), diclofenac 50 mg twice daily, amitriptyline 12.5 mg once daily, gabapentine 300 mg twice daily and paracetamol 1 g. It was given the patient the possibility to initiate epidural analgesia, which he refused due to symptomatic improvement. The patient was then discharged home with oral medication and maintained regular follow-up at the hospital pain clinic.

Two months after the hospitalization, a worsening of the pain ensued. Thereafter, a tunnelized epidural catheter was placed with a perfusion of ropivacaine 0.2% and morphine 0.1% at 4 mL/h. Two months after placement of this epidural catheter, the patient experienced an abrupt exacerbated pain, turning on to the emergency service due to aggravated symptoms located on the perineum. At the emergency services, it was verified a partial withdrawn of the epidural catheter. Regarding the pain control previous accomplished, it was considered a new placement of an epidural tunnelized catheter, under radiological control. The epidural space was searched by loss of resistance technique using saline, at the L4-L5 interspace. When the space was reached, 0.5 mL of non-ionized contrast was administered, confirming the location at the epidural space (Fig. 1).

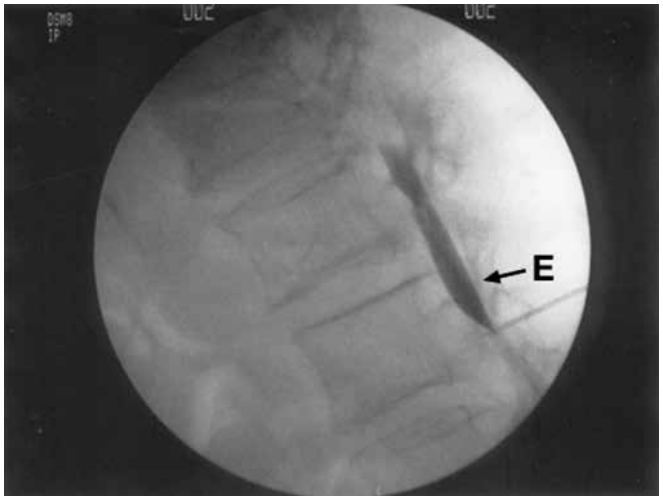

Figure 1. Epidural space with constrast dye administered by the epidural needle (E)

The epidural catheter was then introduced through the Tuohy needle and its position was again confirmed with contrast-enhanced radiography. This time the radiocontrat dye was seen spreading at the subarachnoid space and catheter migration was identified. (Fig.s 2 and 3)

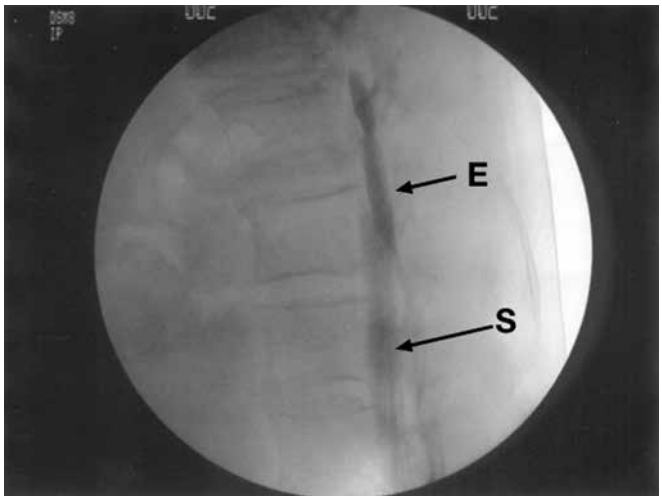

Figure 2. Administration of radiocontrast dye by the catheter identified subarachnoid catheter migration (S). Contrast in the epidural space is identified by the letter E

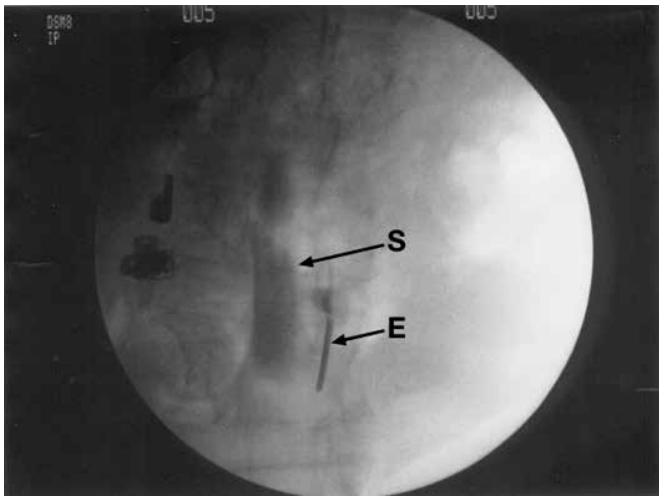

Figure 3. Postero-anterior view of radiocontrast dye in the epidural space (E) and subarachnoid space (S)

DISCUSSION

Insertion of epidural catheters poses the risk of malposition of the catheter: either intravascular, subdural or intrathecal, with an incidence between 21% to 43%.[2] This poses potentially lethal complications, with a clinical diagnosis often difficult due to varied symptomatic presentation.

Malposition can occur due to a variety of factors, such as tear of the arachnoid membrane by the catheter or catheter tip eroding through the arachnoid membrane. Some authors postulate that the sub-atmospheric pressure in the epidural space and gripping action by ligamentum flavum propelling the catheter inwards as patients straighten their backs from the flexed position can also explain catheter migration.[3] The majority of epidural catheter's malposition occur at the time of insertion, as was the case in this case report, although cases of catheter migration thereafter have been reported.[4-6]

In the described clinical case, migration occurred into the intrathecal space. To exclude malposition, administration

of local anesthetic (typically 60 mg lignocaine with 15 µg of epinephrine) is commonly used to exclude subarachnoid or intravascular placement, although it does not always ensure correct placement. Other method to confirm epidural position consists of aspiration: absence of cerebrospinal fluid or blood in the aspirate favours correct position. Notwithstanding, this test also lacks optimal sensibility: aspiration and negative pressure applied to blood vessels frequently leads to intravascular collapse and false negative results[7]; also dural puncture by the epidural needle is usually obvious but puncture by the catheter is difficult to identify, since flow of cerebrospinal fluid down the catheter is comparatively slow and may be mistaken for saline.[8] This distinction can however be made by testing the fluid for glucose.[9] Despite this and regarding the frequent false negative results, some authors recommend the preferential use of a test dose to exclude the intrathecal or intravascular migration of an epidural catheter.[5] Aditionally, these authors suggest administration of all doses in small aliquots as test doses after careful aspiration of the catheter and the use of commercially available clamps to prevent migration.

However, in the presented case, malposition was confirmed radiographically with contrast dye administration, which demonstrates typical epidural spread under fluoroscopy (Fig. 1) and subarachnoid spread of contrast by the catheter in Fig.s 2 and 3, making it a highly sensitive test. This technique, however, remains an exclusion test due to lack of equipment and concerns about radiation hazards and contrast risks, such as contrast hypersensitivity, contrast induced nephropathy, making it infrequently used.[9] Other authors have suggested diagnostic imaging with a spiral computed tomography scan or magnetic resonance imaging, allowing not only the diagnosis of the catheter position but also of a potential epidural/spinal hematoma.[9,10]

In our clinical case, the presence of a permanent previous epidural catheter favoured posterior migration of a newly inserted catheter, as the initial catheter tip probably had caused an erosion in the arachnoid membrane.[11] Anatomical studies suggest that arachnoid puncture by an epidural catheter is possible, though dural puncture is unlikely.[12] This knowledge along with the fact that the catheter was going to be tunneled for long duration use, impelled the authors to use contrast dye administration for epidural catheter placement confirmation, giving an increasing security in the technique execution and correct catheter location.

The authors pretend to highlight with this case that a high suspicion level is crucial for the correct diagnosis of catheter malposition and appropriate management. Close surveillance, avoidance of further injections of local anesthetic and institution of support therapy are mandatory to avoid potential critical complications, such as cardiopulmonary arrest and death that may ensue after intrathecal malposition.

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