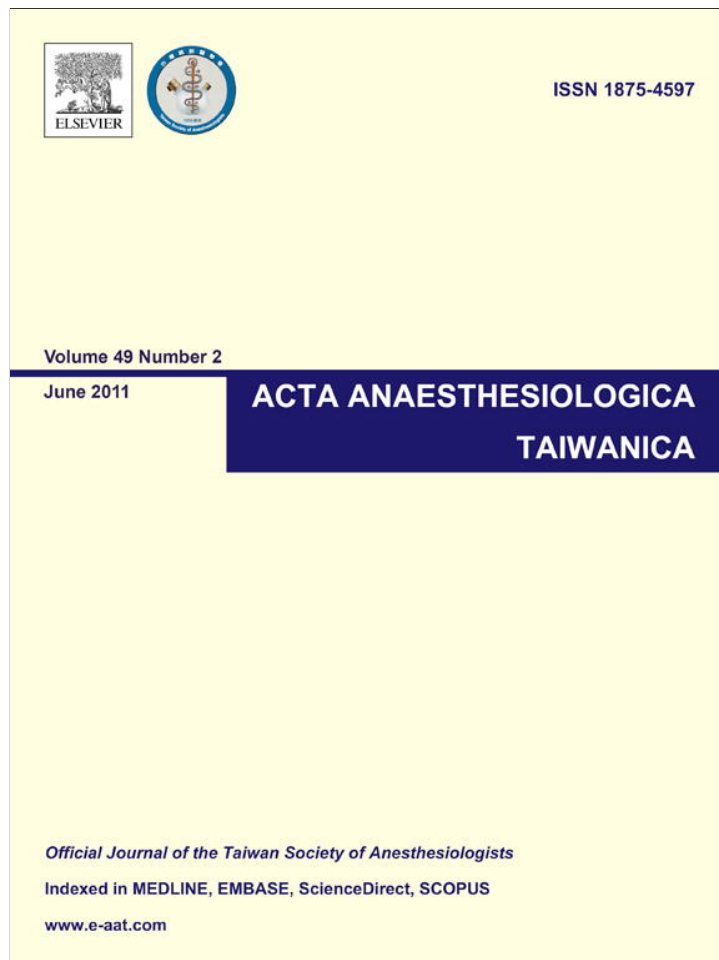


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Contents lists available at ScienceDirect

Acta Anaesthesiologica Taiwanica

journal homepage: www.e-aat.com

Case Report

Bacterial infection in deep paraspinal muscles in a parturient following epidural analgesia[†]Ying-Wei Yang^{1,2}, Wei-Ting Chen¹, Jui-Yuan Chen¹, She-Chin Lee¹, Yi Chang¹, Yeong-Ray Wen^{1,3*}¹ Department of Anesthesiology, Shin-Kong Wu Ho-Su Memorial Hospital, Taipei, Taiwan, R.O.C.² Department of Surgery, National Yang-Ming University Hospital, I-Lan, Taiwan, R.O.C.³ Department of Anesthesiology, China Medical University Hospital, Taichung, Taiwan, R.O.C.

ARTICLE INFO

Article history:

Received 31 August 2010

Received in revised form

6 May 2011

Accepted 11 May 2011

Key words:

analgesia, epidural;

infection;

labor pain;

postpartum period

ABSTRACT

We report a case of paraspinal muscle infection shortly after epidural analgesia for labor pain in a nulliparous parturient who was subjected to emergent Cesarean section because of fetal distress. Epidural morphine was administered for 3 days for postoperative pain control. She began to have constant lower back pain on postpartum Day 4. Magnetic resonance image study revealed a broad area of subcutaneous edema with a continuum along the catheter trajectory deep to the paraspinal muscles. An injection-related bacterial infection was suspected; the patient was treated with intravenous antibiotics and was soon cured uncomplicatedly. Epidural analgesia is effective to control labor pain and, in general, it is safe. However, the sequelae of complicated infection may be underestimated. We herein report a case complicated by iatrogenic infection, discuss the causes, and give suggestions for prevention.

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1. Introduction

Epidural analgesia is effective in treating the pain experienced by parturients in labor. In general, the method is safe; however, severe complications of epidural analgesia, such as nerve injury, epidural hematoma, or epidural infection still have been reported.^{1–4} Infection related to epidural catheterizations could occur superficially, deep, or in the epidural spaces.^{5,6} In general, the incidence of postoperative infection at the insertion site is as low as 0.8% and that of major neuraxial infections, such as epidural abscess, is approximately 1:1368.³ In comparison, infection in parturient women after epidural treatment is much lower at 1:110,000. The rates of deep muscle and epidural infections were reported to be less than 0.001%, but very few data are available for superficial infection. Because superficial infections in the postpartum women may have chance to progress to deep tissues and may result in permanent sequelae, early diagnosis of all technique-related epidural infections is of great importance.^{1,6,7}

We herein report a pregnant woman who received epidural analgesia for labor pain. After undergoing emergent Cesarean

section because of fetal distress, she received epidural morphine for postoperative pain management. A broad area of subcutaneous infection found concentrically to the epidural injection site associated with paraspinal muscle fasciitis was diagnosed on postpartum Day 5. A disastrous complication of dissemination from deep muscles to serious neuraxial infection is possibly avoided.

2. Case report

A 31-year-old nulliparous woman at 39 weeks' gestation was admitted for spontaneous delivery. She was free from systemic diseases, such as hypertension, diabetes, or immunological problems, and had no history of spinal abnormality or chronic back pain. Because of premature rupture of membrane and her blood examination on admission, which showed leukocytosis with white cell count of 9100/ μ L, 2 g of intravenous ampicillin was prophylactically given once. After admission, she was requested painless labor with which we complied.

After detailed explanation, epidural catheterization was performed by an anesthesiologist. Following disinfection and draping an 18-gauge Tuohy needle (Epidural minipack; Portex Smiths Medical International, Kent, UK) was inserted through L4–L5 interspinous space under local anesthesia with 1% lidocaine. After confirmation of right epidural entry, an epidural catheter was introduced until an 8-cm segment of the catheter was in the epidural space. A bacterial filter was placed at the distal end of the

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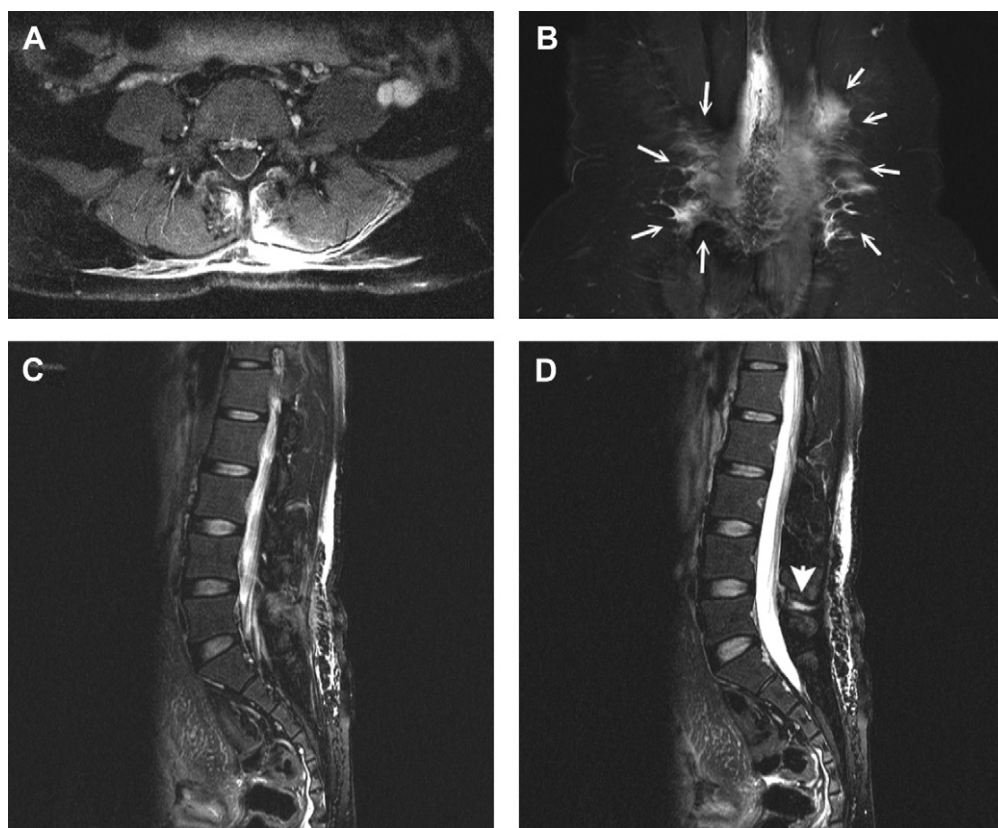


Fig. 1. T2-weighted magnetic resonance image scanning without contrast medium on the postpartum Day 5 showed deep muscles infection related to epidural injection. (A) An axial-view T2 image: a large inflammation extending from the superficial subcutaneous tissues to bilateral sides of deep paraspinal muscles (more at the left side) along the epidural injection tract; (B) A superficial coronal view: a large edematous inflammation/(signal) spreading over bilateral subcutaneous tissues (encircled by white arrows) in the back; (C) Median sagittal view: the high-intense signal spreads from the subcutaneous tissues to the deep tissues between L4–L5 interspinal process, indicating a wide and deep muscle involvement. No signal was shown at the epidural space; (D) A median-sagittal view: a particular slice shows a strong signal (marked by a white arrowhead) penetrating along the injection trajectory at L4–L5 intervertebral space.

catheter before connection to the infusion pump. No blood or cerebrospinal fluid was aspirated from the catheter and no oozing of fluid was noted at the puncture site. Continuous epidural infusion with a solution of fentanyl 2 µg/mL and ropivacaine 1% (AstraZeneca, Södertälje, Sweden) in normal saline was started immediately after epidural catheterization. Her pain score decreased from 7–8 before injection to 2–3 30 minutes after injection, as evaluated by 0–10 verbal rating scale.

Forty-five minutes later, the fetal heartbeat repeatedly fell. Emergent Cesarean section was decided because of fetal distress. Spinal anesthesia was performed with a 27-gauge Quincke spinal needle at the L3–L4 interspinal space through paramedian approach and 11 mg of 0.5% bupivacaine (AstraZeneca, Södertälje, Sweden) was injected. The epidural catheter for labor pain was not removed; it was sterilized before and after spinal injection and was secured again on the back in similar manner with transparent dressing (Tagaderm 3M; Neuss, Germany) tape.

The surgery was smooth. A health baby weighing 3050 g was delivered uneventfully. Postoperative pain control was started immediately after surgery with a bolus of 2 mg morphine in 10 mL normal saline injected in the epidural space followed by 2 mg of epidural morphine given every 12 hours for 3 days by our pain service staff. All injections were running through the bacterial filter. The patient was visited twice daily and she complained of only low-grade pain (verbal rating scale = 2–3). On postpartum Day 3 (about 72 hours after epidural insertion), the epidural catheter was removed. The punctured wound was clear and normal and was covered with gauze after disinfection.

On postpartum Day 4, the patient complained of mild low-back pain without molestation of normal activities. In the evening of postpartum Day 5, a 1.5 cm × 1.5 cm erythematous, swollen papule with little purulent discharge was noted at the epidural injection site. Besides, she complained of low-back pain with radiation to left thigh but the leg sensation and muscle power were unmolesated.

Under suspicion of neuraxial infection, a magnetic resonance imaging (MRI) was immediately arranged and empiric antibiotic with 2 g of intravenous oxacillin every 6 hours was started. The images suggested a deep lumbar infection with evident findings over a broad area from subcutaneous tissues beneath the epidural injection site, extrapolating to bilateral deep paraspinal muscles (Fig. 1). Blood test indicated that white cell count was $10.65 \times 1000/uL$ and C-reactive protein was 6.05 mg/dL. Leg pain improved on postpartum Day 6 but low-back pain persisted. The erythematous papule decreased in size and was fading. Wound culture revealed a growth of *Staphylococcus aureus* with sensitivity to oxacillin, so oxacillin was continued for 7 days. The papule and clinical symptoms were resolved on postpartum Day 9 and laboratory data turned for normal on postpartum Day 10. Patient was discharged on postpartum Day 12. No fever was noted throughout the course.

One and half month later, the patient came back to our clinic with complaint of pain over left calf and lateral aspect of thigh. Nonsteroidal anti-inflammatory drug and muscle relaxant were prescribed for a short term. Some 6 months later, she turned up once for low back pain and was effectively treated with anti-inflammatory drugs and muscle relaxants.

3. Discussion

We report an epidural analgesia-related paraspinal deep muscle infection in a parturient after undergoing Cesarean section under spinal anesthesia and might thus have prevented a serious neuraxial complication if left undiagnosed. Epidural abscess is one of the most devastating complications associated with spinal/epidural analgesia. Undetected epidural abscess can result in irreversible paralysis of the lower limbs, and emergent surgical decompression is almost essential if neurological deficits appear and persist.^{4,8} Although deep muscle infections after labor were sporadically reported, they may be underestimated. Any types of infections related to epidural techniques are potentially detrimental as there is risk of progression to epidural abscess.^{1,4}

Many preexisting pathologies potentially predispose patients to epidural-related infection, such as diabetes, immunocompromised condition, or existing infection at the injection skin.^{2,9,10} Prolonged time in catheterization increases the risk because pathogens can be introduced through various ways, such as skin contamination at the time of needle insertion, accidental dressing detachment, contaminated local anesthetics/analgesics, and blood-borne bacteria from a remote infection colonizing adjacent to the epidural catheter.¹¹ Peripartum women may be highly liable to be infected because of particular conditions, such as preterm rupture of membrane, episiotomy, or surgery. In this report, the patient might have sustained the epidural injection in the delivery room where the environment is less aseptic than the operation room. Furthermore, performance of spinal anesthesia without removal of the epidural catheter and repeated disconnections of epidural filter nut for postoperative morphine injections could increase the chance of infection. Presumably, skin-born microbe may be the cause of the wide-spreading subcutaneous infection in the light of these vulnerable practices, and reading of MRI images however genuine is impossible to confirm. No matter how infectious complications are unpredictable and unavoidable, they can be substantially reduced by strictly preventive maneuvers, such as absolute skin disinfection, aseptic injection technique, careful implantation care, and standardized health care protocols.

Skin contamination could lead to an inward spread of pathogens through the injection tract to deep tissues. In this case, the MRI images showed an edematous change along the injection trajectory to deep paraspinal muscle groups suggesting an infectious progression, which was consistent with the development of symptoms in the patient, that is, first back pain, then referred pain to the left thigh. A study of postoperative epidural patients indicated that positive culture of bacteria in the subcutaneous catheter was as high as 10%, which suggested that bacterial migration along the epidural catheter tract from skin insertion site to catheter tip in the epidural space was the most common route of epidural colonization.¹¹ When bacteria invade deeply enough to neuraxial tissues close to epidural or intrathecal spaces, complications, such as meningitis, paraplegia, and even death, may occur. In this case, we diagnosed the infection early enough before it had become severe and serious and a catastrophic sequela was prevented.

One of the common pathogens of epidural abscess is *S aureus*,¹² and in our patient, it was confirmed by wound culture. Back pain, the first sign we found in this case, occurred on postpartum Day 4. Other infectious signs, such as skin discharge and fever, were delayingly found or not obvious, probably because of antibiotic use for surgical purpose. More importantly, several available reports indicated that epidural-related deep infections in postpartum women were not diagnosed until 7–19 days after delivery,^{9,13–15} at which time most of the patients had been discharged from hospital. The above facts evidently warn us that early signs of epidural infection may be obscure, mild, and hard to be detected, and the

initial accurate diagnostic rate was low as revealed by a 10-year survey of confirmed cases in hospital.^{14,16,17} Therefore, never be too careful to use all means for early diagnosis and treat any suspicious cases.

Because pregnancy-induced low back pain and injection-induced pain can be combinedly present in postcesarean section women, any newly coming back pain should be distinguished. If a female complained of low-back pain following epidural treatment, meticulous investigations to differentiate neuraxial infection, epidural hematoma, or neurotrauma have to be started immediately. In addition to diagnosing from clinical symptoms, physical examinations, and laboratory studies, MRI can efficiently help to reach a fast and reliable diagnosis and to make a decision for a conservative or surgical treatment. It would be too late to start MRI when the pathology had been progressing to show neurologic signs.^{12,13,17,18} In some reports, computed tomography scan without myelography provided little diagnostic information and not considered to be the method of choice.¹⁹ We arranged MRI as soon as the patient complained of back pain and timely prevented an insidious development of neuraxial abscess formation.

Epidural analgesia for the parturient is a common routine practice.²⁰ All anesthesiologists know the means to prevent possible procedure-induced infection, especially deep infection and epidural abscess.^{20,21} However, early detection and differentiation of infectious signs at postanesthetic visit are equally important. To reduce catastrophic consequence, all fail-safe steps at preinjection evaluation, standardized interventional procedures, and post-injection care should be always considered significant.^{13,22}

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