

# Absence of bacterial growth in the culture from the epidural catheter of a patient with endometrial carcinoma and febrile neutropenia: a case report and review of the literature

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## Summary

Infection is a potentially serious complication of long-term epidural (EP) catheterization in cancer patients. Although the use of epidural opioid analgesia is an effective and safe means for pain relief in terminally ill patients, these patients are in need of monitoring for possible infection. This is the first report in which EP catheter cultivation has been assessed in an immunocompromised and febrile neutropenic endometrial cancer patient.

**Key words:** Epidural analgesia; Epidural infection; Cancer; Febrile neutropenia.

## Introduction

Despite the development of an impressive pharmacological armamentarium, the frequency of chronic severe cancer pain remains high. About one-third of cancer patients in active therapy and two-thirds of patients with advanced disease suffer from chronic severe pain [1]. Analgesics can be administered to the epidural space by means of an epidural catheter [2]. The techniques for intraspinal opioid and anaesthetic administration allow safe and selective analgesia at doses that are lower than those required to provide equivalent analgesia systemically [3].

Infection continues to be the major fatal complication in cancer patients. A potentially serious complication of long-term epidural (EP) catheterization in cancer patients is infection around the catheter which may result in bacterial EP abscess or meningitis [4, 5]. Since neutropenia is common during cancer treatment, there is a continual risk of infection thus it is important to become aware of these complications and their management [6].

The symptoms and signs of infection in such patients should be identified, and pertinent clinical, radiological (magnetic resonance imaging), and bacteriological data should be analysed [7].

In this report we present and discuss a patient with endometrial carcinoma who had febrile neutropenia after chemotherapy. Interestingly, the patient did not have EP infection despite the long-term EP catheterization for pain control.

## Case Report

A 54-year-old, 82 kg woman who had endometrial carcinoma was treated in our pain-clinic for pain relief for 12 months. She

Revised manuscript accepted for publication February 20, 2002

had undergone total abdominal hysterectomy and bilateral salpingo-oophorectomy two years before. She was also treated with chemotherapy and radiotherapy. She had bone metastasis and psoas muscle invasion. She also had a rectovaginal fistula.

For her pain relief, we applied the WHO analgesic ladder approach for ten months [8], and then we performed epidural analgesia. The EP catheter was inserted in the operating room under aseptic conditions. The polyamide catheter (Perifix®18G, Braun) was inserted through the L<sub>3</sub>-L<sub>4</sub> interspace with an 18-gauge Tuohy needle using the loss of resistance technique. The catheter was fixed using adhesive dressings after attachment to a 0.2-µm EP bacterial filter. Pump cassettes and filter were initially changed by hospital-based clinical nurse specialists, and then by visiting specialised district nurses, and finally by the patient's family, if appropriate. Syringes (5ml) containing 0.125% bupivacaine + morphine were prepared in sterile conditions and given to the patient. The dose of morphine was adjusted according to the visual analogue scales score. The patient was examined once a week. In the 87<sup>th</sup> day of catheter insertion or after the 3<sup>rd</sup> cure of her chemotherapy, she had fever (38.3°C), pancytopenia (RBC 3.44x10<sup>9</sup>/ml, Hb 7.7 g/l, Hct 24.6%, Plt 55x10<sup>3</sup>/ml, WBC 1.3x10<sup>3</sup>/ml, Grt 0.5x10<sup>3</sup>/ml), gastroenteritis and urinary system infection. Cultures were obtained from the blood, faeces, urine, throat, the entrance of the EP catheter, and EP catheter aspiration solution (Table 1).

Table 1. — *The culture and antibiogram results of the patient*

Material	Microorganism cultivated	Antibiogram
Blood	-	-
Throat	αhemolytic streptococcus	P
Urine	E. Coli	C, A
Feces	Enterobacter cloacae	C, A
Exit-site track	-	-
Catheter aspiration	-	-
Catheter	-	-

C; cephalosporins (3<sup>rd</sup> generation), A; aminoglycosides, P; piperacillin

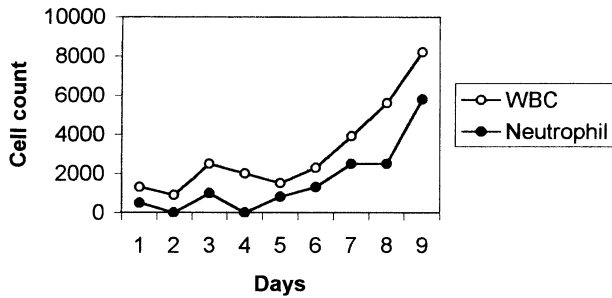


Figure 1. — WBC/Neutrophil counts of the patients.

Although the fever disappeared two days after the antibiotic (meropenem), immunotherapy (MG-CSF) treatment and blood transfusion, there was no change in the clinical and laboratory results of the patient (Figure 1). She did not have neck stiffness at all. There was no sign of inflammation or infection in the entrance site of the catheter. Magnetic resonance imaging (MRI) was carried out with a Magnetom Vision system with a 2.0/1.5-T superconductive Helicon Magnet (Siemens, Erlangen, Germany). Her scans were evaluated by a neuroradiologist blinded to the patient's clinical status. The EP region appeared normal on radiologic assessment.

EP analgesia was continued since there was no paraesthesia or pain during EP injection. VAS score was 2-3. Combined antibiotherapy (ceftriaxone, ornidazole, gentamicin) was started in the fifth day of the neutropenia according to the result of the antibiogram.

Since neutropenia persisted, the EP catheter was removed on the sixth day of neutropenia due to the suspicion of spinal epidural infection despite the absence of signs and symptoms of infection. Culture was obtained from the tip of the EP catheter, but no microorganism was grown. The pain was controlled by administering subcutaneous morphine after the removal of the EP catheter. When the clinical and laboratory results became normal, an EP port (Periplant® Braun) was placed and pain therapy was continued via that catheter.

## Discussion

A potentially serious complication of long-term EP catheterization in cancer patients is infection. Prospective clinical studies by Barreto revealed an incidence of positive cultures from routine EP catheter cultures from as high as 22% and positive skin cultures after aseptic procedures with no signs of epidural infection at the time of culture or during follow-up [9]. Fine *et al.* noted the inconsistency between the positive catheter cultures and the low incidence of EP infection [10]. However there is no report on spinal infection in neutropenic patients having EP catheters. This is the first report in which EP catheter cultivation was assessed in an immunocompromised and febrile neutropenic cancer patient.

The bacteria cultured from the EP space are most frequently from skin flora contamination. Exit site and superficial catheter infection were all caused by skin flora contaminants and were usually successfully treated with exit-site care, and the use of topical povidone iodine or antibiotic ointment. These were found with or without the presence of superficial track infections, which implicated

contaminated injectate or colonisation from distant infectious processes when no track infection was detected [5].

In our case, the relatives of the patient performed the exit-site care with povidone iodine solution, and there was no sign or symptom of exit-site infection.

EP space and deep track infections were only successfully treated with catheter removal and parenteral antibiotic therapy. Serial MRI evaluation of EP abscess confirmed treatment response [5]. Although there was no sign or symptom of spinal infection in our patient, the catheter was removed due to the likelihood of infection.

Spinal epidural abscess (SEA) in the general population is rare and usually arises by hematogenous spread of organisms in patients with predisposing conditions such as an underlying disease (e.g., diabetes), a source of the infection elsewhere, or an abnormality of the spine [11].

The main predisposing factor for the development of SEA is the presence of a foreign object in the EP space [7]. Gadolinium enhanced MRI of the spine is the imaging modality of first choice to demonstrate SEA [12]. MRI is a sensitive and noninvasive method, and helps differentiate the SEA and metastatic disease. In the individual patient it may be unclear whether there is inflammation of EP tissue ("epiduritis") or a true abscess [13]. Spinal MRI was normal in our case.

Du Pen *et al.* [5] previously reported 55 patients who had long-term silicone rubber EP catheters without having any of the classical signs of intraspinal infection. Also, the use of intrathecal [14] and Teflon-coated catheters [15] may result in lower infection rates, although comparative studies have never been carried out.

Smitt *et al.* has performed long-term EP analgesia with a polyamide catheter to cancer patients. A total of 137 EP catheters were placed in 91 patients, with a total of 4,326 catheter days; median survival from the time of the first catheter placement was 38 days [7]. It was a polyamide catheter in our case as well, and there was no bacterial growth in the culture of the exit site and EP catheter aspiration solution on the 87<sup>th</sup> day.

It has been suggested that the transparent strip used to cover the EP catheter during the lithotripsy procedure which is performed within a fluid media is an effective barrier to prevent catheter contamination by the microorganisms in the fluid media [16].

According to another study in which cultivation was performed from the distal end of the EP catheter [17], five (10%) of 50 of the initial cultures resulted in positive culture results.

In the same study, no microorganism was cultivated in 150 catheters after cleansing the insertion site of the catheter with antimicrobial agents.

Among several reasons for the low incidence of spinal space infections after EP catheterization, one might be antimicrobial activity of the local anaesthetics used. The bactericidal effect is concentration-related and has been shown to be most marked with 0.5% bupivacaine [18].

Our patient also received bupivacaine in a concentration of 0.25% (diluted by addition of opioid). The EP solutions were made up by a ward nurse under aseptic conditions using 5-ml syringes that were used immedia-

tely and changed in less than 12h. It can be thought that the lack of bacterial growth and spinal infection in our case may be related to the antimicrobial effect of bupivacaine together with the strong antibiotic therapy.

In conclusion, the local anaesthetic-opioid combination used in EP analgesia and early beginning of antibiotherapy may prevent infection and microorganism contamination even in neutropenic cancer patients.

### Acknowledgement

The authors thank Yıldıırım A. Bayazıt, MD for his assistance with this manuscript.

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