

# Ropivacaine: An Unusual Cause of Neuroleptic Malignant-Like Syndrome

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## ABSTRACT

Ropivacaine is commonly used for post-operative pain management. We describe a case of neuroleptic malignant-like syndrome in a woman administered ropivacaine delivered using a drug infusion balloon. The presenting symptoms were confusion, agitation and fever. Blood analysis showed elevated C-reactive protein, leucocytosis and increased creatine phosphokinase. As intoxication was suspected, ropivacaine was suspended and the patient gradually improved. Possible leakage of ropivacaine into the intrathecal space may have resulted in central nervous system toxicity.

## LEARNING POINTS

- It is important to be aware of the secondary effects of common drugs.
- The differential diagnosis should always include side effects and drug interactions.
- Intoxication can lead to poor outcomes, so early recognition is key.

## KEYWORDS

Ropivacaine, intoxication, neuroleptic malignant syndrome, secondary effects

## INTRODUCTION

Ropivacaine is a long-acting amide local anaesthetic agent, commonly used for post-operative pain management. It is widely administered by epidural infusion using a drug infusion balloon (DIB) in a number of procedures, including abdominal surgery<sup>[1,2]</sup>. It can cause cardiac and central nervous system toxicity, but this is uncommon<sup>[1-3]</sup>.

Neuroleptic malignant syndrome (NMS) is a relatively rare but potentially fatal complication of neuroleptic drug use<sup>[4]</sup>. It can present with various findings, including hyperthermia, elevated creatine phosphokinase, altered consciousness ranging from agitation to stupor or coma, diaphoresis, tachycardia and abnormally high arterial pressure<sup>[4]</sup>. Although it has been classically described as associated with the use of neuroleptic drugs, several other drugs have also been implicated<sup>[4]</sup>.

This report describes a patient who developed neuroleptic malignant-like syndrome as a consequence of ropivacaine infused through a DIB device, demonstrating the diagnostic challenge as well as the importance of being alert to and recognizing drug side effects.

## CASE DESCRIPTION

A 73-year-old woman was admitted to the Emergency Room for abdominal pain. She was diagnosed with an incarcerated inguinal hernia and underwent abdominal surgery.

After the procedure she was transferred to the general surgery ward. A drug infusion balloon (DIB) was implanted for post-operative pain management, delivering ropivacaine 0.2% at 4.5ml/h to the epidural space. This system was locked so that no changes in the infusion rate could be implemented without the agreement of the anaesthesia team. Twenty-four hours after the procedure, the patient presented confusion and agitation as well as fever refractory to medical treatment. Blood analysis showed elevated C-reactive protein, as well as leucocytosis and raised creatine phosphokinase. Sepsis secondary to peritonitis was noted and blood cultures were collected. The patient started antibiotic treatment with piperacillin/tazobactam. An abdominal CT scan was performed but showed no signs of peritonitis or surgical complications. By this time, several hours after onset of the initial symptoms, the patient was still hyperthermic but her neurological state had worsened and she was stuporous but reacting to physical stimuli.

The patient was then admitted to the Intermediate Care Unit. CT of the head, and the thorax, abdomen and pelvis was performed in a search for other causes and other sites of infection. These investigations were negative, so a lumbar puncture was performed which showed slight elevation of protein levels, but no leucocytes in spinal fluid. Blood cultures were still negative 24h after collection.

At this point, around 24h after symptom onset, the intoxication hypothesis was considered and ropivacaine was suspended. Six hours after the suspension of ropivacaine, the patient's temperature decreased to normal. Her neurological state began to improve 12h after ropivacaine was stopped, and she slowly became more responsive. By 24h after DIB suspension, she was conscious, orientated and collaborative, and blood tests revealed a lower leucocyte count and decreased C-reactive protein.

## DISCUSSION

Ropivacaine has several side effects including hypotension (in up to 54% of patients), bradycardia (19.5%) and headache (10%)<sup>[1,4]</sup>. It can also cause hypertension (up to 10%), fever (1–0%) and CNS toxicity (0.1–1%)<sup>[1,4]</sup>.

Our patient presented an unusual constellation of symptoms, which proved to be a diagnostic challenge. The association between fever, hypertension and altered mental state suggested a neuroleptic malignant-like syndrome, and after some research, ropivacaine was identified as the only drug that could explain all the symptoms. The patient gradually improved after suspension of the drug.

DIB implantation is a simple technique, but possible leakage into the intrathecal space could explain the higher central nervous system toxicity in our patient.

Drugs undergo a long process before approval for medical use, and safety concerns are always part of this process. Nevertheless, every medical drug can have secondary effects, so it is very important that intoxication is recognized and treated as quickly as possible.

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