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Case report

Case report: Opioid tolerance and hyperalgesia after abdominal injury☆

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ABSTRACT

Introduction: Opioid tolerance and hyperalgesia are two occurrences that can pose great difficulty in managing both acute and chronic pain. The diagnostic and therapeutic approach requires profound knowledge of opioid pharmacology and related issues such as addiction and pseudoaddiction.

This paper presents the case of a patient with multiple interventions, non-functional gastrointestinal tract, increasing uncontrolled pain, exposed to high-dose opioids.

Opioid tolerance and hyperalgesia were diagnosed. An opioid rotation regimen was initiated followed by ketamine and dexmedetomidine infusions until a response was finally obtained.

Conclusion: Opioid tolerance and hyperalgesia are very difficult to manage and treatment is very complex in the absence of a functional gastrointestinal tract. Opioid rotation, ketamine and dexmedetomidine were the mainstays of treatment in this case.

Informe de caso: tolerancia e hiperalgesia por opioides posterior a traumatismo abdominal

Palabras clave:
Manejo del dolor
Analgésicos, opioides
Ketamina
Dexmedetomidina
Hiperalgesia

RESUMEN

Introducción: La tolerancia e hiperalgesia por opioides son dos fenómenos que pueden generar grandes dificultades en el manejo del dolor tanto agudo como crónico, el enfoque diagnóstico y terapéutico exige gran conocimiento de la farmacología de los opioides y de fenómenos relacionados como adicción y pseudoadicción.

En el presente artículo se expone un caso de una paciente poli intervenida, con tracto gastrointestinal no funcional, con dolor de aumento progresivo, no controlado y expuesta a altas dosis de opioides.

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Se diagnosticó tolerancia e hiperalgesia por opioides, se inició esquema de rotación de opioides y posteriormente infusiones de ketamina y dexmedetomidina con lo que finalmente se obtuvo respuesta.

Conclusión: la tolerancia e hiperalgesia por opioides son dos fenómenos cuyo enfoque terapéutico es supremamente complejo en ausencia de tracto gastrointestinal funcional. La rotación de los opioides, la ketamina y la dexmedetomidina fueron pilares del tratamiento en este caso.

Introduction

The deleterious effects of uncontrolled pain on patient quality of life are well known, consisting of increased incidence of cardiac, pulmonary, thromboembolic and infectious complications.[1,2] Consequently, any issue that might interfere with optimal pain control is of special interest.

Clinical case

A 24-year old female patient, 60 kg, 14-week pregnant housewife who sustained multiple gunshot wounds to the abdomen. She was seriously compromised on admission, with hypovolemic shock and 3000 cc hemoperitoneum, injuries to the stomach, spleen, splenic flexure and descending colon, and multiple injuries to the proximal jejunum from the first portion posterior to Treitz angle, left kidney and left psoas muscle (through-and-through section).

Damage control surgery was performed consisting of left nephrectomy, splenorrhaphy of the lower pole of the spleen, partial gastrectomy, ligation of the splenic flexure, ligation of portion IV of the duodenum and proximal jejunum, multiple ligations in the mesocolon, cavity lavage, packing of the abdominal cavity and placement of a vacuum system.

Transfusion of multiple red blood cell, plasma, cryoprecipitate and platelet units was required for the management of coagulopathy. The patient was put on vasoactive support and mechanical ventilation.

She was taken to surgery later, with findings of intestinal necrosis in an 80 cm portion of the jejunum, ligated openings of the duodenum, distal ileum and transverse and descending colon, requiring side-to-side ileo-duodenal anastomosis, and side-to-side anastomosis of the transverse and descending colon. The abdomen was left open with the vacuum system, and lavage and debridement were required repeatedly because of evidence of necrotizing fasciitis.

The course was torpid, with development of peritonitis secondary to the injuries and then sepsis, requiring prolonged stay in the ICU. The patient developed multiple leaks, abdominal obstruction, short gut and abdominal wall necrosis; she underwent multiple surgical interventions and developed severe abdominal pain that was difficult to control. Initial pain management was instituted by the intensive care team based on fixed-dose opioid escalation and rotation (morphine and hydromorphone), in accordance with a specific time schedule. However, despite this management, the patient continued to experience severe pain with a score always above seven on the pain scale.

An additional difficulty in this patient was a non-functional gastrointestinal tract that limited the use of oral adjuvants and analgesics, compounded by a phenomenon of pseudoaddiction with a negative effect on the rescue provided by nursing and the patient's trust in the healthcare team.

After a consult with the pain team was prompted by this situation, the decision was made to rotate the hourly morphine regimen with unlimited hydromorphone treatment using PCA plus a continuous infusion with 0.1 mg/h, associated with paracetamol IV and transdermal fentanyl titrated up to 200 mcg and 30 mg/day of hydromorphone, with worsening of the symptoms and pain extending to the lumbar region.

No regional techniques were considered given the presence of infectious foci in close proximity of the puncture areas.

The use of methadone was not considered because of its availability only in oral form.

Given the poor response to the therapy, the diagnosis of opioid-induced hyperalgesia was considered. Therefore, opioid tapering was started in association with a continuous infusion of ketamine titrated up to a maximum dose of 0.3 mg/kg/h, with slight improvement of the pain score[6] but onset of hallucinations. This required discontinuation of this regimen with worsening of the pain score (intensity of 8–10).

It was then decided to initiate combined therapy with continuous infusion of ketamine 0.1 mg/kg/h and dexmedetomidine titrated up to 0.5 mcg/kg/h, with a dramatic improvement on the pain scale (score of 2–3) and minimum sedation, finally allowing opioid tapering and discontinuation.

Discussion

Several challenges were faced during the management of this case, including the absence of a functional gastrointestinal tract, the presence of concomitant infection adjacent to the sites that could be used for regional analgesia, and phenomena such as pseudo-addiction, tolerance and hyperalgesia. These challenges were finally overcome by means of careful titration of intravenous medications and slow opioid tapering.

Opioid tolerance and hyperalgesia are related occurrences that may manifest in the context of acute or prolonged opioid treatment,[3] and they require different management approaches and often pose a great challenge to pain specialists.[4,5]