CASE REPORT

The Technique of Intravenous Ketamine Infusion on Post-Operative Hyperalgesia in Gluteal Sarcoma

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ABSTRACT

Post-Operative Hyperalgesia (POH) is an uncommon painful condition suffered after surgery. It is poorly identified and usually needs a large dose of strong opioids administration to attenuate pain. Primarily POH originated from the activation of N-Methyl-DE Aspartate Receptor (NMDAR) located at the spinal cord. Hence NMDAR antagonist (ketamine) may inhibit this pain mechanism leading to desirable post-operative pain relief. We presented a case report on how to recognize POH, initiated ketamine infusion, and its limitation. We found ketamine therapy reduced opioid requirements and drastically improve patient daily bed activities.

Keywords: Ketamine, Post-Operative Hyperalgesia (POH), N-Methyl-DE Aspartate Receptor (NMDAR)

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INTRODUCTION

POH is a sign and symptom of severe pain that occur even after an adequate dose of strong opioid administration perioperatively. POH is a hyper-excitation of the central nervous system's pain pathway, which is the brain and spinal cord. It occurs when glutamatergic excitatory pathways, NMDAR at the spinal cord are being stimulated. Theoretically, this is currently explaining how glutamine group neurotransmitter is activated, leading to sensitization of the pathway causing hyperalgesia. Pain also promotes the synthesis of glutamic acid, which later floods in the area of NMDAR and facilitates sensitization. (1)

Ketamine has been studied for years in treating POH. Ketamine is an NMDAR antagonist as it will cause desensitization via inhibition. It also acts as immunomodulation rather than immunosuppressive, whereby it prevents the release of local pro-inflammatory mediators and cytokines secretion without blunting the local process and delays tissue healing.

CASE REPORT

This is a case of a 53-year-old Malay lady who presented with painful right buttocks with limitation of Activities daily living (ADL) for four months. It was associated with progressive increased right gluteal swelling from tennis ball size to a football-size within a year. The pain was lancinating in nature, associated with numbness and tingling sensation at the right lower limb. Analgesics (OxyContin, Paracetamol) and anti-neuropathic (Gabapentin, Amitriptyline) were started, resulted in good pain relief for the initial three months. The incisional biopsy finding was Gluteal Sarcoma.

A month before Wide Local Resection (WLE) of Right Gluteal Sarcoma (Figure 1), the pain was moderate to severe in intensity with frequent spontaneous shooting pain over the right leg. OxyContin and Gabapentin dose was escalated with episodes of uncontrolled breakthrough pain.

Surgery was uneventful, and post-operatively she was under Acute Pain Service (APS) care with Patient Controlled Analgesia (PCA) morphine, and oral medication resumed. The pain was well managed until day four post-operative. She began to consume an extraordinarily high dose of morphine due to severe pain. The miserable condition went for two days with a PCA morphine requirement was about 90mg per day. IV ketamine 0.1mg/kg/H with escalation to 0.2mg/kg/H on next day was added. Increment of ketamine infusion further was limited by its undesirable side effects like hallucination, illusion, nightmare, and body discomfort. After two days starting on ketamine infusion, the patient began to consume less PCA morphine (30mg/day), pain intensity improved to mild even on movement and wound dressing. Ketamine was infused for six days until the PCA morphine requirement was < 20mg/day. Since then, further tapering of earlier analgesic and anti-neuropathic was successful, and the patient was

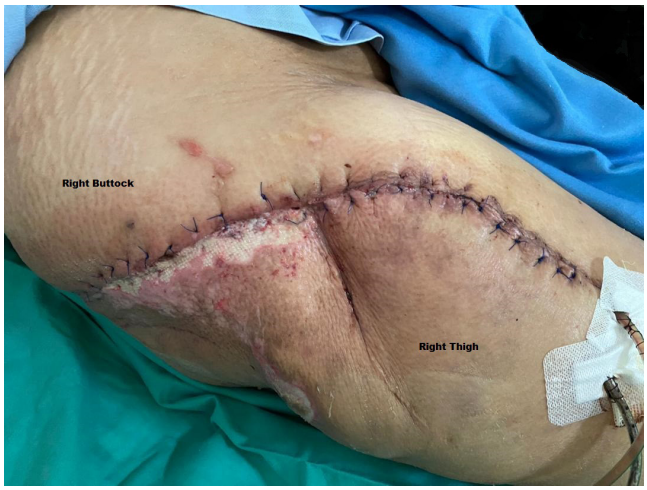

Figure 1: Extensive surgical site from right buttock to the upper part of the lateral right thigh with wound inflammation.

discharged from APS care.

DISCUSSION

This patient had predisposing factors for POH: unexplained pain, increased sensitivity to previously tolerated pain, presence of allodynia and hyperalgesia, and post-operatively increased morphine requirement (90mg/day). (3) History of chronic moderate to severe pain before hospital admission also contributed to POH. The correct diagnosis of POH will deter the right management. Explanation of the cause of pain and reassurance about the implementation of deep breathing exercise, analgesics, and adjuvants that will attenuate pain is compulsory. A possible side effect of ketamine infusion was thoroughly explained as it will determine the maximum dose that can be given. To avoid the unwanted side effect of ketamine, we started with a suboptimal dose first 4 mg/H regardless of body weight and slowly increased to a therapeutic range of 0.15-0.5mg/kg. (4) This patient only tolerates ketamine infusion up to 0.2mg/kg only as beyond this range, and she reported a hallucination and nightmare. The study reported the incidence of nightmares was 30.7% of patients in the group receiving 0.25mg/kg for 48 hours without hallucinations post-operatively (5).

As infusion usually will be given beyond 48 hours postoperatively, it is important to avoid these side effects because the patient may refuse further continuation of ketamine therapy. This patient required 6 days of ketamine infusion without unwanted side effects until the opioid requirement is becoming less. Drastically during ketamine infusion, the patient consumed significantly less morphine, and further tapering of the strong opioid to weak opioid is possible. The patient only received a ketamine infusion for six days, resulting in significant pain relief and improvement of body mobility on the bed.

CONCLUSION

The role of ketamine in antagonizing NMDAR hyperexcitation pain facilitation is significant as it will attenuate uncontrolled pain that happened after surgery. Current evidence suggested that ketamine has anti-inflammatory too. As this patient predisposes to POH and surgery causes activation of nociceptor and grave wound inflammation. And yet she responded well to ketamine. A physician needed to be familiarised with the technique of administering ketamine as its side effect might limiting its usage. Even though ketamine is only an adjuvant, opioids are still required as the main analgesic agent.

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