ROSS UNIVERSITY
SCHOOL OF MEDICINE

Ketamine use in the setting of Opioid-Induced Hyperalgesia in a patient with Sickle Cell Disease

Robert Dunn MSIII, Frederick Venter MD, Shika Mishra MD, Everado Cobos MD

Kern Medical Center, Ross University School of Medicine

Introduction

• Sickle Cell Disease (SCD) occurs by a genetic mutation causing polymerization of the hemoglobin molecule, altering the shape of erythrocytes, leading to small vessel occlusion
• A Vaso-Occlusive Crisis (VOC) is caused by local hypoxia leading to release of inflammatory mediators and free radicals that contribute to reperfusion injury
• A common treatment is aimed at prevention by avoiding triggers and appropriate analgesia including opioid analgesics
• USA Prevalance: 100,000 ppl
• 1/365 African-American/Black Births
• 1/16,300 Hispanic-American births

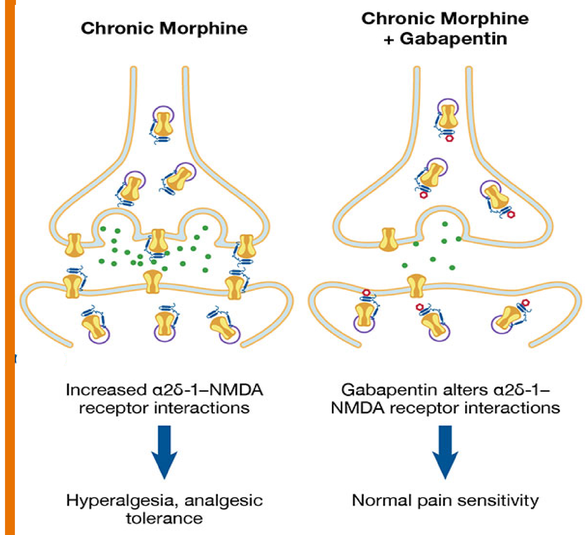
Case Presentation

• 36-year-old African American female with SS genotype SCD presents with diffuse pain to arms, legs, and back for four days, similar to previous VOC episodes
• Unimproved with home medications: Hydromorphone 4 mg, Hydrocodone-Acetaminophen 10-325 mg, Gabapentin 800 mg, and Tizanidine 4 mg
• Previously failed Crizanlizumab (ADAKVEO) a P-selectin inhibitor
• Hospital Day (HD) 1-3: IV Dilaudid was administered 2mg – 5mg every 3-4 hours. States pain is relieved for 5 minutes and returns worse
HD 4-5: Crying of severe unrelenting pain. Sneaking into ED for more pain medication. Found in scalding hot shower that relatively relieved her pain

Treatment

• Low dose IV Ketamine started at 0.1 mg/kg/hr
• Increased to 0.2 mg/kg/hr
• Discontinued after 1 day due to dramatic resolution of pain
• Patient remained on only MS Contin maintenance medication
• Pain free for 48 hours

"Best pain relief I have ever experienced in my life" - Pt



Discussion/Conclusion

1: Opioid induced hyperalgesia

• Morphine binds to mu receptors, hyperpolarizing interneurons and depressing the release of transmitters
• When the glutamate transporter system is inhibited, there is an increase in the amount of glutamate available to NMDA receptors of primary afferent neurons
• Action becomes neurotoxic via NMDA receptor mediated apoptotic cell death of the dorsal horn, making patient hypersensitive

2: Ketamine

• Ketamine serves as an NMDA receptors antagonist, blocking glutamate's neurotoxic effect

References

1. Neri CM, Pestieau SR, Darbari DS. Low-dose ketamine as a potential adjuvant therapy for painful vaso-occlusive crises in sickle cell disease. Paediatr Anaesth. 2013 Aug;23(8):684-9. doi: 10.1111/pan.12172. Epub 2013 Apr 9. PMID: 23565738.

2. Uprety D, Baber A, Foy M. Ketamine infusion for sickle cell pain crisis refractory to opioids: a case report and review of literature. Ann Hematol. 2014 May;93(5):769-71. doi: 10.1007/s00277-013-1954-3. Epub 2013 Nov 15. PMID: 24232306