

Pain Management of Complicated Opioid-Induced Hyperalgesia in Setting of Sickle Cell Disease: A Case Report

Sungyoung (Hiva) Lee M.D., Anna Shapiro M.D., Anna Jenkins B.S.



Introduction

30% to 40% of adolescents and adults living with sickle cell disease (SCD) suffer from chronic pain (1). Creating individualized pain management plans in patients with SCD can be a challenge. Many patients with SCD are on chronic opioid therapy (COT), which can increase risk of opioid-induced hyperalgesia. Terms such as dependence and tolerance are often incorrectly used interchangeably for patients with opioid-induced hyperalgesia. Although the mechanism of opioid-induced hyperalgesia is not completely understood, it has been proposed that NMDA receptor activation increases excitability of neurons, and thus painful stimuli through the influx of calcium ions when given opioids extensively (2). Here we introduce the challenging case of a patient with opioid-induced hyperalgesia in the setting of COT. Our multi-disciplinary, individualized approach involving hematology, pain management, ICU, and neurology proved valuable. Shared decision making in pain management between physicians and the patient allowed for eventual safe and stable discharge. .

Results/Case Report

Our patient is a 26-year-old male with a medical history of sickle cell disease with frequent vaso-occlusive pain crises requiring admission and ICU level care. During vaso-occlusive crises, uncontrolled pain caused thrashing and writhing activity throughout his entire body. Patient was determined to likely have opioid-induced hyperalgesia, with severity of vaso-occlusive crisis characteristically increasing despite increased opioid usage.

Determination of the ideal pain management plan proved difficult, with pain regimens over the course of his hospitalizations including combinations of opioids, lorazepam, NSAIDs, baclofen, pregabalin, trazodone, olanzapine and medical cannabis. He had been previously evaluated by neurology for seizure-like activity and was placed on levetiracetam. In alignment with best practices suggested by the 2020 American Society of Hematology (ASH) guidelines (1) , a trial of ketamine was conducted as an adjunct to COT for persistent pain. Treatment was immediately discontinued as patient displayed severe agitation with hallucinations and apnea.

Episodes of agitation and uncontrolled, writhing pain were acutely reduced with dexmedetomidine in the ICU. Following reduction in acute agitation, patient was able to gradually wean off dexmetomidine. At this point, the patient and provider team jointly agreed to wean off basal hydromorphone and continue PCA hydromorphone for breakthrough pain. Patient was able to tolerate weaning of the basal hydromorphone and was eventually discharged with instructions to follow up with his chronic pain physician. On discharge, his pain regimen included methocarbamol 1000mg TID, baclofen 10mg BID, levetiracetam 500mg BID, medical cannabis tablet BID, olanzapine 5mg daily before bedtime, oxycodone-acetaminophen 325 mg q6 PRN for pain, pregabalin 200mg BID and trazodone 50mg once before bedtime.

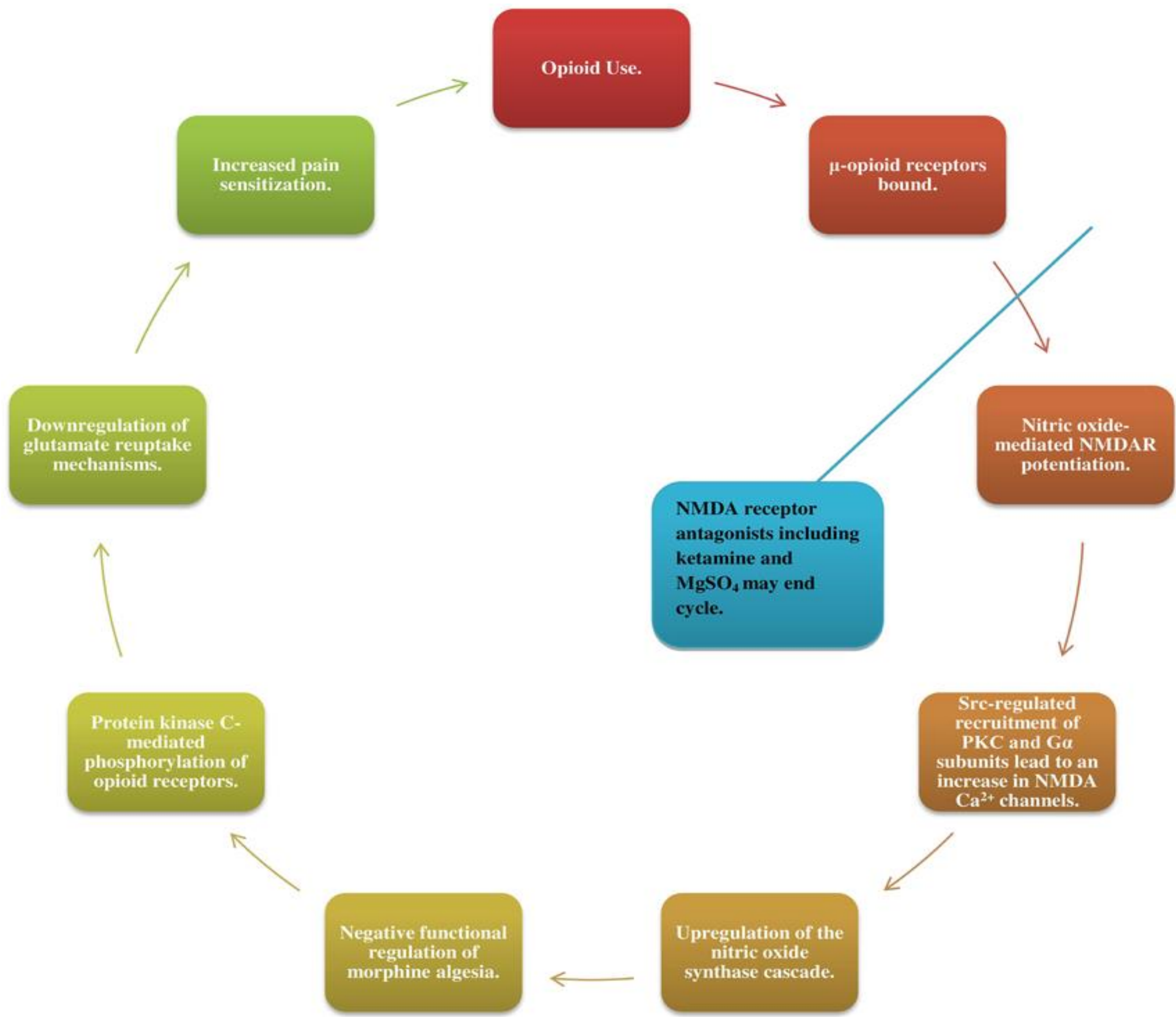


Image 1: Proposed Mechanism of Opioid-Induced Hyperalgesia through Potentiation of NMDAR Receptors (3)

Discussion

Our case demonstrated a stepwise application of ASH individualized pain management recommendations including the trial of ketamine, weaning of continuous opioids and patient participation in shared decision making. The utilization of skeletal muscle relaxants, medical marijuana, dexmedetomidine, benzodiazepines, and NSAIDs etc reduced the patient’s acute dependency on opioids. Opioid stewardship has become a critical issue in healthcare. Differentiating between tolerance and hyperalgesia can guide determination of treatment modalities. Pain management teams can refer to recommendations provided by the American Society of Hematology (1).

References

1. Amanda M. Brandow, C. Patrick Carroll, Susan Creary, Ronisha Edwards-Elliott, Jeffrey Glassberg, Robert W. Hurley, Abdullah Kutlar, Mohamed Seisa, Jennifer Stinson, John J. Strouse, Fouza Yusuf, William Zempsky, Eddy Lang; American Society of Hematology 2020 guidelines for sickle cell disease: management of acute and chronic pain. Blood Adv 2020; 4 (12): 2656–2701.
2. Youssef, F., A. Pater, and M. Shehata. "Opioid-induced hyperalgesia." J Pain Relief 4.3 (2015): 183.
3. Stoicea, N., Russell, D., Weidner, G., Durda, M., Joseph, N. C., Yu, J., & Bergese, S. D. (2015, April 28). Opioid-induced hyperalgesia in chronic pain patients and the mitigating effects of gabapentin. Frontiers.