

Southern Illinois University Edwardsville

SPARK

Doctor of Nursing Practice Projects

School of Nursing

Spring 5-5-2024

Ketamine Infusion Protocol & Patient Education Pamphlet for Complex Regional Pain Syndrome

Ricardo Aranda

Giles Howard

Southern Illinois University Edwardsville

Follow this and additional works at: <https://spark.siu.edu/dnpprojects>

Recommended Citation

Aranda, Ricardo and Howard, Giles, "Ketamine Infusion Protocol & Patient Education Pamphlet for Complex Regional Pain Syndrome" (2024). *Doctor of Nursing Practice Projects*. 298.

<https://spark.siu.edu/dnpprojects/298>

This DNP Project is brought to you for free and open access by the School of Nursing at SPARK. It has been accepted for inclusion in Doctor of Nursing Practice Projects by an authorized administrator of SPARK. For more information, please contact jkohlbu@siue.edu.

Implementation of provider education for a ketamine infusion protocol for analgesia in patients with Complex Regional Pain Syndrome

Ricardo Aranda DNP & Giles Howard DNP

Executive Summary

Introduction to Problem

Complex regional pain syndrome (CRPS) is a severe and debilitating painful disorder that is resistant to traditional anesthetic management (Mundluru & Saraghi, 2020). Despite various available interventions and medications, patients with CRPS are highly resistant to treatment and continue to suffer chronic and severe pain leading to poor quality of life (Zhao et al., 2018). Approximately 80% of people suffering from CRPS are severely disabled and experience vastly higher prescription and medical treatment costs than their annual baseline (Elsamadicy et al., 2018). The eight-year costs associated with a CRPS diagnosis may be more than \$43 thousand USD and over \$12 thousand in prescription pain medication costs alone (Elsamadicy et al., 2018). Meta-analysis studies have shown that ketamine infusions effectively lower pain scores for patients with CRPS. Therefore, developing a protocol for ketamine infusion management may aid providers in safely lowering pain scores in CRPS patients. This projects aims to enhance provider knowledge in managing outpatient ketamine infusions at a critical access hospital in Southern Illinois.

Literature Review

Current treatment regimens for CRPS are based on a trial-and-error approach utilizing opioids, antidepressants, and antiepileptics and showing only a 30-40% rate of pain relief (Niesters et al., 2014). Other methods of treatment include physical, occupational, and psychological therapy, anti-inflammatories such as Ketorolac or Parecoxib, and interventional procedures such as nerve blocks or spinal cord and dorsal root stimulation (Shim et al., 2019). A

placebo-controlled study by Schwartzman et al. showed a significant reduction in pain scores in the ketamine-treated group. A systemic review of 14 studies using ketamine infusions found decreased pain scores and symptom relief in 13 studies (Chitneni et al., 2021)—similarly, a double-blind, randomized, placebo-controlled group trial by Sigtermans et al. (2009) found significantly lower pain scores in the ketamine treated group compared to the placebo group, but by week 12, the significance of pain relief was lost between the two groups. Long-term and large-scale studies were not found during the literature review. However, Magnus et al. (2021) reported that 62% of patients recounted lower pain scores at the time of discharge, and 48% reported reduced pain scores one-month post-infusion/discharge.

CRPS patients are at increased risk of co-existing depression and PTSD. The link between ketamine and anti-depression has been well documented. A systematic review with a meta-analysis of 28 studies by Marcantoni et al. (2020) found that a single ketamine infusion (0.5mg/kg) was successful in reducing depression scores. Furthermore, evidence points to a higher prevalence of PTSD in CRPS patients as psychological stress influences disease progression (Shim et al., 2019). Shim et al. (2019) proposes a link between patients with high anxiety levels and an associated catecholamine release causing an increase in nociceptive sensitization and progressive adrenergic symptoms. A study conducted by Feder et al. (2021) compared treatments for PTSD using ketamine infusions vs. midazolam infusions over 2 weeks. Patients in the ketamine infusion group reported, on average, 11.88 points lower than the midazolam group using the CAPS-5 reporting system. The same study found that 67% of patients responded to ketamine treatment, with improvement in PTSD lasting 27.5 days post-2-week infusion completion. Barriers to clinical ketamine infusion use include longstanding stigmas, lack of literature on long-term use, an extensive side-effect profile, and accessibility to

the drug. The lack of standardized protocols to drive evidence-based practice also contributes to the lack of widespread use.

Project Methods

An in-person PowerPoint presentation was given to medical staff caring for patients with Complex Regional Pain Syndrome (CRPS) at a critical access hospital in southern Illinois. The presentation introduced the latest ketamine infusion recommendations for treating outpatient CRPS patients and a patient education pamphlet. A 15-question post-test was administered to participants after they attended the presentation. The post-test included ten questions utilizing a Likert scale to measure participants' responses to the educational experience and the clinical usefulness of the presentation.

The post-test also contained three questions about participant demographics: age, gender, and job title. The last two open-ended questions asked participants for recommendations on improving the presentation and additional feedback. Ten questions were asked using a five-point Likert scale to assess the effectiveness and clinical usefulness of ketamine infusion protocol and patient education pamphlet. Descriptive statistics and frequency tables were used to define demographics within the sample. The 10-Likert scale questions were analyzed to compare percentages of positive feedback to education compared to negative or neutral responses.

Evaluation

Descriptive statistics and frequency tables were used to define demographics within the sample. The 10-Likert scale questions were analyzed to compare percentages of positive feedback to education compared to negative or neutral responses. Six participants attended the presentation and filled out the post-test survey. The attrition rate of participants who attended the presentation and completed the post-test survey was 0%. The small sample size and low attrition rates were

likely due to the small hospital setting. The audience demographics included four male and two female participants, of which three were CRNAs, one physician (other), and two PACU nurses. One participant was classified as 18-29 years old; four were 30-29 years old, and one was 50-64 years old. All Likert style questions received a 6 (strongly agree), indicating that the educational in-service was effective at educating staff on ketamine infusions for patients suffering from CRPS. The free text option for the question “How can we improve the learning experience?” included two answers: “Great job. No changes.” and “Nothing. Great presentation

Multiple aspects of the project provided limitations. The small sample size ($N = 6$) was a notable limitation resulting from implementation at a small critical access hospital. Extrapolation of results is diminished as post-test results cannot be applied to larger sample sizes. Additionally, participants’ 100% response rates were likely influenced by sample size, and all participants strongly agreed to all Likert questions. The small sample size may have also contributed to the limited number of responses to free-text questions. Including anesthesia providers (66% of participants) may have influenced the results as they were adept at using ketamine infusions. Medication bias and existing practices may have also contributed to favorable responses, as anesthesia providers were familiar with using ketamine infusions for CRPS and depression. Familiarity with treating patients with CRPS frequently may have also contributed to positive qualitative responses.

Impact to Practice

The literature review supports the safe and effective use of ketamine infusions to treat chronic pain in CRPS patients. Evidence in the literature review demonstrates statistically significant reductions in pain scores with consistent use of ketamine infusions. The host site does not have a definitive protocol or guidelines for utilizing ketamine infusions in treating CRPS pain. The

evidence-based protocol is a valuable tool in aiding providers with information on initiating and managing ketamine infusions. Providers may benefit from utilizing the protocol as a reference.

The host site does not have patient education pamphlets for patients undergoing ketamine treatments. Patient education pamphlets utilized at the site may help set patient expectations, lead to knowledgeable patient participation, and positively impact patient satisfaction scores.

Collaborating with the host site's medical staff is essential to further development and iterations.

Lastly, evidence-based research on long-term patient outcomes in response to ketamine infusions is also recommended.

Author Contact Information

Ricardo Aranda, DNP

riarand@siue.edu

Giles Howard DNP

gihowar@siue.edu