**Journal Club Research Article Critique Form**

Reviewer name: \_\_\_\_Lindsey Bollig\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_7/4/2020\_\_\_\_

Research study (APA reference):

Mo, H., Campbell, M., Fertel, B., Lam, S., Wells, E., Casserly, E., Meldon, S. (2020). Ketamine Safety and Use in the Emergency Department for Pain and Agitation/Delirium. Western J Emerg Med. 21(2), 272-281.

Please complete the following:

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| **1. Description of the study** |
| * The purpose of the research is:   Evaluate the safety of these two ketamine protocols implemented in 18 EDs within a large health system. The goal was to evaluate the safety of sub dissociative-dose ketamine (SDDK) for analgesia and dissociative sedation ketamine for severe agitation/excited delirium in patients at 18 EDs of a large, integrated health system. The primary objective of this study was to describe the incidence of serious respiratory and cardiovascular adverse events requiring intervention within two hours after ketamine administration. Secondary objectives included describing the incidence of neuropsychiatric adverse events after SDDK administration during the ED encounter; determining the percentage of ketamine orders in the ED for analgesia or severe agitation/excited delirium that were adherent to the approved protocols; and evaluating real-world ketamine use in a large, integrated health system with a diverse group of providers. |
| * Explain why this problem is significant to nursing practice:   This drug is being used more and more in the emergency departments. Ketamine has been explored as a novel therapy for analgesia and severe agitation/excited delirium in many EDs. |
| **2. Evaluation of literature** |
| * Describe the previous research pertaining to the topic that the authors reference (hint: look for a literature review section in the article)   Multiple studies have described the efficacy and safety of sub-dissociative dose ketamine for analgesia in the ED. The study cites numerous other articles using Ketamine in emergency departments. |
| **3. Study sample** |
| * The study sample was obtained from: (hint: describe the population and where the study is performed)   This study was a multicenter, retrospective, electronic medical chart review. The study site included 12 hospital based EDs and 6 freestanding EDs with a combined annual census of over half a million ED visits. The hospital-based EDs include a quaternary care, academic medical center, a Level 1 trauma center, and 10 community hospitals, including two Level 2 trauma centers, in both suburban and urban locations. Medical care at the study sites was provided by emergency physicians, medical residents, advanced practice registered nurses, and physician assistants. The health system uses a comprehensive, integrated electronic health record (EHR) (EPIC, Verona, WI) at all hospital-based and freestanding EDs. |
| * What is the sample size?   A total of 247 ED encounters |
| * List the inclusion criteria used in the study.   Adult patients, at least 18 years old, who received IV SDDK for analgesia and or IM dissociative sedation ketamine for severe agitation/excited delirium at any study ED from May 9, 2017-May 9, 2018. |
| * List the exclusion criteria used in the study.   Exclusion criteria included less than 18yrs old, administration of ketamine for indications other than analgesia or severe agitation/excited delirium or administration of ketamine via route other than IV or IM. |
| **4. Study methods/design** |
| * Describe or identify the study design (hint: quantitative/qualitative, experimental, meta-analysis, etc)   Standardized data collection forms and used it to record retrospective patient information regarding ketamine use. |
| * Describe the study procedures. (hint: describe the intervention and how the data was collected)   Emergency providers and nursing were educated via email communication and staff meetings regarding the data supporting the new ketamine protocols and the operational changes associated with them. Afterward, the ketamine protocols were implemented on May 9, 2017. SDDK ketamine would be dosed 0.2–0.3 mg/kg, maximum dose 25 mg, as a slow IV push over five minutes with a potential repeated dose in 30 minutes. Ketamine for severe agitation/delirium would be dosed 4 mg/kg IM once, with a maximum dose of 500 mg. Providers were reminded monthly of the new protocol doses and indications through emails, especially with consideration of the opioid crisis and the desire to use alternative, non-opioid analgesics.  We conducted a query of our EHR to identify all patients who received either IV bolus or IM ketamine at a study ED within the study period. A standardized electronic data collection form was developed within Research Electronic Data Capture, a secure data collection tool. A single investigator manually conducted chart review within the EHR to collect data points such as ketamine regimen details; vital sign data; psychiatric comorbidities; concomitant medications (benzodiazepines, antipsychotics, opioids, and antihistamines) administered within one hour before and two hours after ketamine use; predefined ketamine-related adverse events; and additional relevant points for all eligible patients.  Adverse event data was identified through review of physician and allied health documentation during the ED visit, as well as review of the medication administration record and respiratory documentation flowsheets within the EHR. Data collected in the respiratory documentation flowsheets included the patient's respiratory status (i.e. endotracheal intubation, bag valve mask, Bi-PAP, non-rebreather mask, nasal cannula, or room air), and the timing of respiratory intervention, if used. A single investigator collected and reviewed all data to ensure consistency in data interpretation. |
| **5. Results** |
| * Describe the results of the study.   Approximately 570,000 ED visits occurred during the study period. SDDK was used in 210 ED encounters, while dissociative sedation ketamine for severe agitation/excited delirium was used in 37 ED encounters. SDDK was used in 83% (15/18) of sites while dissociative sedation ketamine was used in 50% (9/18) of sites. Endotracheal intubation, non-rebreather mask, and nasal cannula ≥ four liters per minute were identified in one, five, and three patients, respectively. Neuropsychiatric adverse events were identified in 4% (9/210) of patients who received SDDK.  Dissociative sedation ketamine dosed at 4 mg/kg IM for severe agitation can result in serious respiratory adverse events. However in our experience, this occurred less frequently than previously reported in single-center studies. When used at sub-dissociative doses for analgesia at 0.2–0.3 mg/kg and administered as slow IV push over five minutes, ketamine is associated with minor and self-limited neuropsychiatric adverse events that resolve without further intervention.  The overall favorable safety profile of ketamine use as described in our experience in a number of diverse ED settings supports a more widespread use of SDDK and dissociative dosing for acute agitation.  Further research is needed to address barriers that prevent more extensive usage of ketamine by ED providers. |
| **6. Clinical significance** |
| * Explain how you will use this information for your nursing practice at your place of work or community.   This information will be helpful in my nursing practice because I work in rural community and we have a lot of people that come in for pain relief and a lot of the normal opioids do not work for them anymore. This is something that a couple for our newly employed doctors are using in the ED. |

***Please use the back of this paper for other comments.***