Canadian Journal of Emergency Medicine (2024) 26:71–72
https://doi.org/10.1007/s43678-024-00647-x

EDITORIAL

Caution Is Indicated When Using Fentanyl or Midazolam for Procedural Sedation in the Emergency Department

Jeffrey J. Perry[1,3] · **Yair Rubin**[2]

Published online: 8 February 2024

Keywords Atrial fibrillation · Conscious sedation · Electrical cardioversion

Mots-clés Fibrillation auriculaire · Sédation consciente · Cardioversion électrique

Liu and colleagues assessed the safety of sedation given for electrical cardioversion in a secondary analysis of pooled study data from four previous multi-centered studies of atrial fibrillation (AF) and flutter (AFL) in the emergency department (ED) [1, 2]. The four original studies collected data from 2008 to 2019. The authors assessed the agents used for sedation and correlated these with adverse events including hypotension and respiratory events. Most AF/AFL patients were treated aggressively with pharmacological or electrical cardioversion, if onset < 48 h or < 7 days and adequately anticoagulated or cleared by an urgent transesophageal echocardiogram. Since the time of these studies, guidelines have reduced the safety window for electrical or pharmacologic cardioversion, depending upon co-morbidity [3, 4]. The original studies varied in design, including a health records review, a prospective cohort study, a randomized controlled study assessing drug-shock versus shock alone, and a step-wedge cluster implementation study of the Canadian Association of Emergency Physicians (CAEP) AF/AFL best practice checklist [4]. The original study of 1,736 patients undergoing electrical cardioversion found that 18.0% had an adverse event, including 13.9% that required intervention and 0.4% that were considered life-threatening. Another 5.6% had adverse events that did not require treatment. Overall, respiratory events occurred in 10.3% of patients and hypotensive episodes in 3.6%. Independent factors for adverse events were older age, coronary artery disease, use of midazolam, and use of fentanyl.

This study by Liu assessed 1,712 cases for hypotension and found it was related with the use of beta-blockers at home and the use of fentanyl for sedation in the ED. It is reassuring that these episodes were not related to ED administered medications for rate control. While we are not given the specifics in this secondary analysis about the nature of interventions required to manage the hypotension, the original paper does have these data [2]. Most of the hypotensive patients only required a fluid bolus with just three (0.2%) patients receiving a vasopressor. There were no deaths and there were no patients suffering a stroke in the ED.

As with hypotension, the actual intervention(s) for the respiratory events are not provided in this paper but are listed in the original study [2]. Most, 116 (6.7%), required jaw repositioning. However, there were more serious interventions, including 32 (1.8%) who required bag-valve-mask ventilation, 2 (0.1%) required an oral airway, and 1 received naloxone. Other more significant respiratory events included 57 (3.3%) with oxygen desaturation to less < 90% and 3 (0.2%) who aspirated. Finally, there were two (0.1%) who had a prolonged time to recover of greater than 30 min. The dose and the dosing intervals were not provided in neither this analysis, nor the original papers, nor was the co-administration of other sedative agents provided, which would result in a deeper, more prolonged sedation. We also do not know other potential confounders including home use of anxiolytics,

✉ Jeffrey J. Perry
jperry@ohri.ca

[1] Department of Emergency Medicine and School of Epidemiology, Public Health and Preventative Medicine, University of Ottawa, Ottawa Hospital Research Institute, Ottawa, ON, Canada

[2] Department of Anesthesia-Carver College of Medicine, University of Iowa Hospitals and Clinics, Iowa City, Iowa, USA

[3] Clinical Epidemiology Unit, F647, The Ottawa Hospital, 1053 Carling Avenue, Ottawa, ON K1Y 4E9, Canada

body mass index or suspected/confirmed obstructive sleep apnea. Propofol was used in 94.6% of the sedations. This shows that the physicians administering sedation are more comfortable with propofol than midazolam.

From these findings, one can conclude that: (1) physicians should be careful when deciding which medications to use for sedation for electrical cardioversion, and likely any other procedure, with careful consideration of the anticipated pain and the expected duration of the procedure; (2) fentanyl should be omitted for procedures which are quick and not overly painful; and (3) physicians need to be aware of the potential interactions of home medications, particularly beta-blockers, with any medication they administer for sedation when performing electrical cardioversion.

The other take-home message is the importance of having patients carefully monitored and skilled clinicians at the bedside while providing procedural sedation. The CAEP checklist recommends 1–2 physicians at the bedside plus two allied health providers (either respiratory therapist and nurse or two nurses) regardless of the size of the hospital [4]. Adverse events happened in over one in ten sedations. While this study focused on electrical cardioversion, one would expect similar, or more, complications during sedations for other clinical conditions which are typically longer or requiring a deeper level of sedation. While hypotension requiring a small fluid bolus or a respiratory event managed by a chin lift is benign, it is only benign if (1) someone notices it quickly and (2) an intervention is done quickly to correct it. If not, it could lead to more doses of sedation given prior to correction which could create a dangerous situation requiring aggressive blood pressure or airway management. Who the second physician is will vary depending on the skill set of those available. Emergency physicians are trained to provide procedural sedation and they provided such in the vast majority of the patients in this study. However, caution should be had if the patient is predicted to have a difficult airway or likely to get hemodynamic compromise. If proceeding to electrical cardioversion in such high-risk patients having a second experienced emergency physician or an anesthesiologist would be prudent, or utilizing rate control and anticoagulation with delayed cardioversion if a second physician is not available.

In conclusion, while the choice of pharmacological versus electrical cardioversion is left to treating physicians, this study clearly indicates that there are risks associated with the sedation for electrical cardioversion. As such, physicians should consider initially utilizing pharmacological cardioversion to avoid the potential side effects of electrical cardioversion. If the pharmacological cardioversion fails, or the decision to proceed to electrical cardioversion is made, fentanyl and midazolam should be avoided in most situations. Extra care is required in older patients and those who are already on beta-blockers. Finally, having patients carefully monitored with appropriate equipment and trained clinicians is very important when giving sedation, so clinical deterioration is detected and managed so that adverse events are mitigated.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

References

1. Liu S, Stiell I, Eagles D, Borgundvaag B, Grewal K. Hypotension and respiratory events related to electrical cardioversion for atrial fibrillation or atrial flutter in the emergency department. Can J Emerg Med. 2023. https://doi.org/10.1007/s43678-023-00621-z.
2. Stiell IG, Eagles D, Nemnom MJ, et al. Adverse events associated with electrical cardioversion in patients with acute atrial fibrillation and atrial flutter. Can J Cardiol. 2021;37(11):1775–82. https://doi.org/10.1016/j.cjca.2021.08.018.
3. Andrade JG, Aguilar M, Atzema C, et al. The 2020 Canadian cardiovascular society/Canadian heart rhythm society comprehensive guidelines for the management of atrial fibrillation. Can J Cardiol. 2020;36(12):1847–948. https://doi.org/10.1016/j.cjca.2020.09.001.
4. Stiell IG, de Wit K, Scheuermeyer FX, et al. CAEP acute atrial fibrillation/flutter best practices checklist. CJEM. 2021. https://doi.org/10.1007/s43678-021-00167-y.