

## A Call for an Evidence-Based Guideline for the Perioperative Management of Hyperkalemia

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### Abstract

Hyperkalemia is a medical condition commonly encountered in perioperative medicine. However, there is no consensus in the management of these hyperkalemic patients. A significant variation exists in dealing with patients with hyperkalemia especially in deciding to proceed with scheduled surgery or postpone it. We are advocating for creating of an evidence-based guideline for the perioperative management of hyperkalemia to minimize perioperative adverse outcomes and minimize practice variability between medical professionals.

### Keywords

Evidence-based guideline, Hyperkalemia, Renal failure, Dialysis

### Introduction

Dr. Douglas Slakey's article reignited a call for an evidence-based guideline for the management of perioperative hyperkalemia [1]. With great interest I read the article submitted to the Journal of Translational Perioperative and Pain Medicine (TPPM) [1]. Potassium is an important electrolyte for physiological functions and its normal serum level is 3.5 to 5.5 mEq/L. Hyperkalemia can be caused by various etiologies including acute and chronic renal failure, massive tissue injury in rhabdomyolysis, hypoaldosteronism, and excessive potassium release from the intracellular space. Hyperkalemia is a medical condition very commonly encountered by perioperative medical professionals, and it is well documented to be associated with increased adverse clinical outcome, and is an independent risk factor for all-cause hospital mortalities [2]. A familiar scenario is that a chronic renal failure patient schedule for a surgical procedure who has an elevated potassium level of 6.3 mmol/L. The immediate questions the anesthesiologists need to answer are, "should we proceed or postpone the surgery? How risky if we proceed with the scheduled surgery? How harmful if we postpone the procedure scheduled? [3]. As we know, hyperkalemia can potentially be life-threatening intraoperatively or postoperatively if plasma potassium

exceeds certain level, but what is the cutoff level exceeding which we will absolutely cancel the surgery? What if the surgery is for the establishment of dialysis for the purpose of lowering potassium level?

Dr. Douglas Slakey's study found that 39% medical professionals in their institution believe serum potassium level  $\geq 6$  mEq/L is clinically significant hyperkalemia while 47% believe 5.6-5.9 mEq/L is clinically significant. Only half of their practicing medical professionals recognized that Renin-angiotensin-aldosterone system inhibitor is a risk factor for hyperkalemia. The authors analyzed 645,073 surgical cases in their health system, 9,166 (1.4%) had preoperative hyperkalemia. And they also found that African American and Hispanic patients were significantly more likely to have preoperative hyperkalemia ( $\geq 6.0$  mEq/L) when compared to White patients. Additionally, they unveiled patients with a potassium level  $\geq 6.0$  mEq/L within 24 hours will have significantly higher probability (2.40 times) to get their surgery cancelled when compared to patients with a potassium level at 5.1-5.9 mEq/L. Zaki, et al. reported that patients with a serum potassium level over 5.5 mEq/L were twice likely to require intraoperative management to lower potassium level when compared to patients with a potassium level  $\leq 5.5$  mEq/L [4].

Should potassium level 5.5 or 6.0, or even 6.5 mEq/L be the cut-off criteria? Any subset patients maybe be reasonably safe even with potassium level at 6.5 mEq/L? What if the patient does not have dialysis avenue and the surgery is scheduled to establish one?

There is no consensus in dealing with these patients with perioperative hyperkalemia by medical professionals even in the same department and same institution. We need an evidence-based hyperkalemia guideline badly!

### What Should be Included in the Evidence-Based Guideline for Hyperkalemia Management?

1. A generally accepted cutoff level of preoperative serum potassium.

2. Any subset patients in whom it may be reasonably safe to proceed with potassium level at 6.5 mEq/L.
3. Factors should be included in the decision-making process? Especially the co-morbidities, Collins reported that mortality risk increases progressively with potassium levels in patients with hyperkalemia, especially those with heart failure, chronic kidney disease and diabetes [5], and pertinent preoperative laboratory and special tests.
4. If we proceed with the scheduled surgery, what strategies we should have intraoperatively to manage these patients with hyperkalemia? Any specific management needed? Such as hyperventilation, administering insulin and glucose, giving alkalizing solution to neutralize acidosis associated with hyperkalemia, etc.
5. Any specific recommendations in terms of what kind of intravenous solution should we administer? Normal saline, Lactated ringers, or others? Any drugs recommended or should be avoided?

The decision to postpone or proceed with a scheduled surgical procedure can be a daunting task in managing patient with hyperkalemia level  $\geq 6$  mEq/L. An evidence-based guideline should be available to help minimize perioperative adverse outcomes and reduce the conflicts among medical professionals.

## Conflict of Interest

None.

## References

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