



"Not Hesitate, Use Etomidate: Use Etomidate, Not Hesitate!" Alternates Opine, "Whyn't Ketamine!"

Peer review status:

No

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Article ID: WMC005224

Article Type: My opinion

Submitted on: 15-Nov-2016, 02:31:26 AM GMT **Published on:** 15-Nov-2016, 09:45:31 AM GMT

Article URL: http://www.webmedcentral.com/article_view/5224

Subject Categories: ANAESTHESIA

Keywords: Etomidate, Ketamine, Propofol, Cardiovascular Frailty, Adrenal Suppression, Catecholamine Depletion States

How to cite the article: Gupta D, Aftab N, Pallekonda V. "Not Hesitate, Use Etomidate: Use Etomidate, Not Hesitate!" Alternates Opine, "Whyn't Ketamine!". WebmedCentral ANAESTHESIA 2016;7(11):WMC005224

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Source(s) of Funding:

Not applicable

Competing Interests:

Not applicable

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Abstract

The human population is NEITHER getting smaller in terms of weight gain trends NOR healthier in terms of cardiovascular health trends. Irrespective of fluctuating time-trends in regards to cardiovascular mortality, cardiovascular diseases' societal burden related to cardiovascular morbidity may be increasing overall, reinforcing that the human population may be living longer but may NOT be living healthier. Ironically, irrespective of or because of their increasing co-morbidities, the populations in general are increasingly presenting for non-cardiac procedures/surgeries or cardiac procedures/surgeries under anesthesia. That leads to the question of safe use of intravenous anesthetic agents. Propofol has been the most popular anesthetic induction agent. However, the issue raised is about the alternates namely etomidate and ketamine. The procedure-based medicine almost always requires involvement of sedative-anesthetics wherein the anesthesia providers have to shoulder the changing milieu of patient population that are undergoing frequent and complex procedures under anesthesia each passing day. Therefore, the call for anesthesia providers could very well be, "Not Hesitate, Use Etomidate: Use Etomidate, Not Hesitate!" Alternates Opine, "Whyn't Ketamine!"

Perspective

Per available data among the global populations in general and from the United States in particular^{1, 2}, the human population is NEITHER getting smaller in terms of weight gain trends NOR healthier in terms of cardiovascular health trends. Irrespective of fluctuating time-trends in regards to cardiovascular mortality, cardiovascular diseases' societal burden related to cardiovascular morbidity may be increasing overall, reinforcing that the human population may be living longer but may NOT be living healthier. Ironically, irrespective of or because of their increasing co-morbidities, the populations in general are increasingly presenting for non-cardiac procedures/surgeries or cardiac procedures/surgeries under anesthesia. That leads to the question of safe

use of intravenous anesthetic agents^{3, 4} because the induction of anesthesia is almost analogous to critically important "take off" by aircrafts and correspondingly needs to be as smooth and safe as possible irrespective of the natural weather (analogous to patients' co-morbidities) in which to climb or the man-made technology (analogous to providers' arsenal of medications and techniques) with which to climb. Safe "take off" does NOT ensure that critically important "landing" (or analogous waking up from anesthetics) by aircrafts will be smooth but the erroneous "take off" would end up in premature and potentially catastrophic "landing" (analogous fatal or non-fatal anesthesia related outcomes or mortality or morbidity).

Propofol has been the most popular anesthetic induction agent since the poor availability of inaccessible thiopental for anesthesia purposes. However, propofol-related hemodynamic changes⁵, intertwined with its use for induction and maintenance of anesthesia, call for exploring "safer" induction agents at least for the ever-growing procedural-patient-populations with underlying cardiovascular frailty. The issue is not whether to get rid of propofol altogether from the arsenal of providers caring for these frail patients. However, the issue raised is whether the alternates namely etomidate and ketamine are as good as they are presumed to be⁶.

In simpler terms, it can be stated that induction with etomidate or ketamine maintains better cardiovascular stability than induction with propofol. However, the major issue with etomidate is prolonged adrenal suppression⁷ observed and documented in medical literature that is inferred to be associated with (and unclearly causative of) concerns for increased morbidity or mortality in critically ill patients. This adrenal suppression does NOT show a clinical response in one direction or the other direction when a prolonged steroid supplementation (42-hour 200mg/day continuous infusion of hydrocortisone⁸) is given to the patients, exposed to even single induction dose of etomidate. Moreover, the prolonged maintenance infusions of etomidate can NOT be used because of the above concerns. Ironically, this adverse effect of etomidate is put to good use as urgent counter-measure against medical conditions involving hypercortisolemia⁹.

Contrastingly, the hemodynamics maintenance by ketamine need the natural levels of catecholamines in the body so that its indirect sympathomimetic properties can overcompensate its direct myocardial depressive property (negative inotropy)^{6, 10}. However, the patients suffering concomitantly from catecholamine depletion states are not able to ride on the indirect sympathomimetic activity of ketamine and consequently, its myocardial depressive activity is exposed that can be further detrimental to the patients in catecholamine depletion states. Most of the patients exhibiting this myocardial depressive activity in response to ketamine are critically ill patients prone to cardiovascular and hemodynamic instability. The good thing with ketamine is that in contrast to etomidate, ketamine can be used as continuous infusions^{11, 12} for analgesia-anesthesia almost as similar as propofol infusions while being devoid of propofol's corresponding hemodynamic frailty.

In a nutshell, it is amazing that where this all leads the modern day anesthesia care providers to. There is relentless progression of procedure-based medicine that is apparently not going to display stabilization trends in the near future. The procedure-based medicine almost always requires involvement of sedative-anesthetics wherein the anesthesia providers have to shoulder the changing milieu of patient population that are undergoing frequent and complex procedures under anesthesia each passing day. Therefore, the call for anesthesia providers (who may have concerns in regards to propofol use in the frail-cardiovascular patients) could very well be, "Not Hesitate, Use Etomidate: Use Etomidate, Not Hesitate!" Alternates Opine, "Whyn't Ketamine!" All medications have their inherent adverse effects but in the end, each anesthesia provider would need to weigh-in the immediate benefits of their drugs' cardiovascular stability (analogous to aircraft's critical "taking off") against their potential late-delayed risks; and, if the procedure-based medicine has to continue to flourish, either (a) in the future, we may have to develop better anesthesia induction agents completely devoid of hemodynamic instability/frailty, or (b) we may have to, either (i) NOT hesitate (when cautioned against the popular use of etomidate despite the unclear-dubious clinical impact of its inherent pharmaco-dynamic safety concerns), and USE etomidate (without hesitation for safely anesthetizing complicated patients for their procedures/surgeries), or (ii) else may have to respect what others opine, "Why NOT use ketamine!".

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