

Best of both worlds-endotracheal intubation without paralysis

The current issue of JOACP contains an interesting paper “Transtracheal Lidocaine: An Alternative to Intraoperative Propofol Infusion When Muscle Relaxants Are Not Used”.^[1] In the present era of rising healthcare costs, any new technique that provides high quality of anesthesia without adding to the expenditure is a welcome move. In fact, the study describes a technique that can potentially reduce the costs — both direct and indirect. The direct costs involve savings in terms of medications used (lower amount of propofol, avoidance of muscle relaxants) and indirect costs are avoidance of complications associated with skeletal muscle relaxants. Obviously, the patients need to be adequately anesthetized before attempting endotracheal intubation. We have more than one way to achieve this.

A large proportion of “Monitored anaesthesia care (MAC) requirement” probably goes toward suppressing the response to endotracheal intubation and later “tube tolerance.” Muscle relaxation for the sole purpose of tolerating the tube is unnecessary once sufficient MAC is provided to achieve unconsciousness. However, not many of us know how to intubate/anesthetize without muscle relaxants. Since Griffith and Johnson^[2] reported the first clinical use of skeletal muscle relaxants, we have come a long way. Many of our residents even think that muscle relaxation is one the requirements for general anesthesia. However, we have innumerable situations (surgeries and procedures), where in muscle relaxation is unnecessary except, may be to facilitate endotracheal intubation. Most of nonabdominal and nonthoracic surgeries fall into this category. Additionally, muscle relaxants do not come cheaply. Increased incidence of postoperative pulmonary complications, residual paralysis, and recurarization are well-known drawbacks.^[3]

What are the alternatives to skeletal muscle relaxation in these situations? Remifentanyl certainly is a good choice.

Innumerable publications have proved its usefulness in this scenario. Apart from rare muscle rigidity (that might even require suxamethonium to allow ventilation) and occasional bradycardia, it consistently allows intubation without relaxants. High dose propofol bolus is another attractive option. Both require propofol and (or) remifentanyl infusions for tube tolerance. Even though, both drugs are off patent, they are still considered expensive for routine use, especially as infusions.

The second option might be to use lidocaine in various forms to suppress responses associated with airway instrumentation. Laryngotracheal spray is commonly used both by anesthesiologists and pulmonologists. The plasma concentrations with doses up to 8.2 mg/kg body weight were found to be safe.^[4] However, it would still be prudent to keep total dose administered within recommended limits, as transmucosal absorption is variable. Endotracheal administration of lidocaine can also suppress coughing and airway responsiveness, even in asthmatics. Aerosol is another well-accepted mode of airway topicalization useful in airway procedures, with advantage of being completely noninvasive. The success of nebulization relies upon the appropriate concentration of lidocaine (4%) and gas inflow (4-6 L/min). It is a common error to increase the speed of nebulization; gas flow rates are stepped up. This actually decreases the particle size, which not only increases systemic absorption, but also makes the whole process ineffective.^[5]

Transtracheal injection, for the purpose of avoiding muscle relaxants, may not be acceptable to patients from all cultures and countries. In USA, any awake needle insertion (apart from intravenous cannulation) would be unacceptable to patients. Moreover, transtracheal injections primarily rely upon patient’s coughing effort. Poor cough may lead to unpredictable drug spread and ultimately ineffective anesthesia. Additional blocks are often recommended with transtracheal injections as supraglottic structures are frequently spared, leading to excess gag reflex and procedure failures.^[6] Additionally, airway trauma is more frequent in patients intubated without using relaxants.^[7]

Other innovative approaches are available for lidocaine administration. Use of hydrophobic lidocaine solutions to inflate the endotracheal tube cuff is one such option. This technique allows gradual migration of up to 2/3rd of the drug into tracheal mucosa providing clinically significant local anesthetic effect.^[7] Tubes capable of instilling local anesthetic into tracheal mucosa both above and below the cuff via a

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specialized side port (LITA Tube- Sheridan Catheter Corp, NY, USA) can achieve the above goals without the need of any additional intervention. Such modifications may not only be useful in situations like the present trial but can also bring down sedation requirement for tube tolerance in the critically ill patients requiring ventilation.^[8] Laryngeal mask airway can help securing airway without muscle relaxation especially in peripheral nerve surgeries, where intraoperative motor nerve monitoring is critical for procedural success.

However, the question regarding the safety of intubation without muscle relaxants needs to be addressed. The adequacy of depth of anesthesia while intubation is attempted without relaxation is beyond doubt. The laryngoscopy and intubation without relaxants require far greater depth of anesthesia (in spite of transtracheal lidocaine or lidocaine spray) than with relaxants.^[9] The question is can it be achieved safely? Airway trauma, multiple attempts, inadequate ventilation (due to remifentanyl induced rigidity), and patient movement are some of the drawbacks. The inability to intubate on first attempt might be frustrating to a new trainee. As a result, intelligent case selection is important, patients with anticipated difficult intubation/ventilation are not appropriate. The threshold for taking “another look” in case of difficulty on first attempt should be low. Supplemental dose of propofol might do the “trick”. Wider availability of video laryngoscopy might help greatly in this regard. Last, timely administration of short-acting muscle relaxant should be considered in unanticipated difficulty. Maintenance of anesthesia without skeletal muscle relaxants is far easier than intubating.

In conclusion, the present study validates that under general anesthesia, neuromuscular blockade is not a must for endotracheal tube tolerance. However, more acceptable and effective methods other than transtracheal injections exist. The choice depends on availability, affordability, and personal expertise.

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