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Using the Tubing Clamp to Prevent the Dislodgement of a Double Lumen Endotracheal Tube: Comment

To the Editor:

In the recent article from Hargrave *et al.*,[1] their figure 1 illustrates how a clamp is commonly applied to a double lumen endotracheal tube. The authors state: "Supporting the antiviral filter prevents dislodgement of the double lumen tube or bronchial blocker."[1] Although supporting the antiviral filter may help prevent dislodgement of the double lumen endotracheal tube, the weight of the tubing clamp as illustrated may be a factor in dislodging the double lumen endotracheal tube. Also, if the airway gradually narrows as one moves deeper into the bronchial system, the inflation of the bronchial cuff would tend to create a force that works to push the double lumen endotracheal tube out.

An alternative technique is to apply the clamp so that the finger rings are directed downward and toward the patient. A drape clamp can be used to secure the finger ring portion of the clamp to either the bed sheet or the head support. This can create a dislodgement stop and/or a small vector force directed to pushing the double lumen endotracheal tube inward. It is doubtful this force will contribute significantly to the pressure exerted by the bronchial balloon on the airway mucosa, particularly if the bronchial balloon is reinflated after applying and securing the clamp. Anecdotally, since using this technique, I have not experienced a double lumen endotracheal tube dislodgement.

Competing Interests

The author declares no competing interests.

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This letter was sent to the author of the original article referenced above, who declined to respond.—Evan D. Kharasch, M.D., Ph.D., Editor-in-Chief

Cryoneurolysis and Peripheral Nerve Stimulation: Comment

To the Editor:

We read the excellent review "Cryoneurolysis and Percutaneous Peripheral Nerve Stimulation to

Treat Acute Pain"[1] with a particular interest in the potential application of neuromodulation for acute pain management. With the accelerating drive for early mobilization and hospital discharge, there is a need to explore alternative pain management strategies in addition to the traditional loco-regional techniques using chemical means to interrupt nerve conduction. Loco-regional analgesic techniques may often result in undesirable effect of motor weakness hindering mobilization or physiotherapy. The infusion of local anesthetics has additional concerns of sterility of the infused solution and the temporal limitation of the duration of infusion. We concur with the authors that analgesic effects with neuromodulation opens a new avenue in augmenting the quality of analgesia while minimizing the risk of motor blockade. Rather than selecting one modality over another, we proposed that there is a case to be made to integrate both loco-regional analgesia with early neuromodulation, the novel concept of "hybrid regional technique."

By utilizing local anesthesia in the acute phase perioperatively, and transition with concomitant neuromodulation, the hybrid technique of conduction blockade complemented by neuromodulation of unblocked fibers *via* gate-control theory[2,3] may offer patients with the "best of both worlds" and can potentially smoothen the course of acute postoperative pain transition. The concept of multimodal analgesia[4,5] has its roots in the idea that different analgesic techniques target different pain pathways or the mechanisms of pain causation. The principle of integrating loco-regional conduction blockade with electrical neuromodulation aligns along the basic tenet of multimodal analgesia in that each modality complements the other.

The authors also appropriately highlighted that the cost of currently employed specialized peripheral nerve stimulator systems may discourage its general adoption. Additional procedures in placing these delicate catheters and its paraphernalia may need special expertise or resources and hence may impede its widespread use. Thus, further work is essential to investigate the possibility to safely amalgamate electrical analgesia technique to the traditional continuous regional analgesic block as a single procedure with suitable catheter and its associated equipment. Nevertheless, peripheral nerve block catheters used in regional anesthetic block have been successfully used for neuromodulation trialing[6] and may serve as a precedent to integrate the dual modalities in the arena of acute pain management.

Competing Interests

The authors declare no competing interests.

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Cryoneurolysis and Peripheral Nerve Stimulation: Reply

In Reply:

We would like to thank our colleagues for their thoughtful letter[1] regarding the use of percutaneous peripheral nerve stimulation to treat postoperative pain.[2] We agree that combining a local anesthetic–based peripheral nerve block with percutaneous peripheral nerve stimulation will most likely prove the optimal management after painful surgical procedures, although we hesitate to describe it as "novel" given this combination was reported in multiple publications previously.[3–6] Several feasibility studies found that the acute pain from orthopedic procedures such as rotator cuff repair frequently required the addition of local anesthetic–based nerve block to percutaneous peripheral nerve stimulation in the recovery room.[3–6] Therefore, in a recently completed randomized, double-masked, sham-controlled trial (n = 66),

we administered a single-injection ropivacaine peripheral nerve block after ultrasound-guided percutaneous lead insertion in all participants (NCT03481725). While the ropivacaine peripheral nerve block did provide effective postoperative analgesia as our colleagues suggest in their letter, the transition to stimulation during block resolution proved very challenging for the majority of participants—it was not a "smooth" transition from one modality to the next. The problem stems from the finding that current intensity requirements can vary dramatically—and unpredictably—preoperatively and postoperatively,[3–6] and that percutaneous peripheral nerve stimulation current can induce pain and muscle contractions with an intensity that is too high.[3] Therefore, the pulse generator must be set to a relatively low intensity in the recovery room to ensure that the electrical current does not induce pain and/or contractions during block resolution 4 to 12 h postdischarge (and providing suboptimal analgesia until increased by the patient).

We agree with our colleagues that the cost of the available percutaneous peripheral nerve stimulation system may discourage its general adoption and that the (off-label) use of existing stimulating perineural catheters is enticing due to their availability and dramatically lower cost. This possibility certainly deserves investigation. However, we are somewhat pessimistic regarding the probability of providing adequate analgesia using a single stimulating catheter to deliver both perineural local anesthetic and, subsequently, electrical current. In general, perineural catheters must be inserted within the same fascial plane as the target nerve/plexus for adequate local anesthetic administration. In contrast—and as described in our review article—for percutaneous peripheral nerve stimulation, "…the optimal distance from the lead tip to epineurium of the target nerve was consistently 1.0 to 1.5 cm… A relatively remote distance theoretically promotes selective stimulation of the desired larger-diameter myelinated sensory neurons without activating motor or smaller-diameter sensory neurons that induce muscle contraction and discomfort, respectively… In addition, leads placed at this distance from the nerve are less sensitive to small changes in positioning due to movement which is critical in avoiding unpleasant sensations with purposeful muscle contraction."[3] Therefore, at more than 1.0 cm from the target nerve and rarely within the same fascial plane, it is improbable that a perineural local anesthetic infusion would provide significant analgesia.

Competing Interests

The University of California at San Diego has received funding and product for other research projects of Drs. Ilfeld and Finneran from: Epimed (Farmers Branch, Texas); Infutronics (Natick, Massachusetts); and a manufacturer of percutaneous peripheral nerve stimulation devices, SPR Therapeutics (Cleveland, Ohio).

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