

Authors response to the reviewer comments

Reviewer 1: 021-03-25 19:10

Specific Comments To Authors: This excellent manuscript gives a good overview on the topic of regional anesthesia for orthopedic procedures. I presents all relevant techniques for the different orthopedic surgeries. The topic is of high interest, as the techniques described are very commonly used. Most complications that can arise by the regional anesthesia are described. This work will be of high interest to your readers. All conclusions drawn are comprehensible. The linguistic style is very good making the manuscript easy to read and understand. In summary, I strongly recommend publication. One set of complications is however not included: this is CNS toxicity after regional anesthesia. This should be added to increase the awareness of the readers for this very important issue. I.e. a recent publication describes three patients and gives a good comprehension on the topic: Spitzer, Daniel et al. "Local Anesthetic-Induced Central Nervous System Toxicity during Interscalene Brachial Plexus Block: A Case Series Study of Three Patients." Journal of Clinical Medicine vol. 10,5 1013. 2 Mar. 2021, doi:10.3390/jcm10051013

Scientific Quality: Grade A (Excellent)

Language Quality: Grade A (Priority publishing)

Conclusion: Minor revision

Authors response:

The authors thank the reviewer for the insights and comments. The authors decided to include the article referred to in the reference and the complications section.

Edits are included in page 30. Please see below the section added in response to the reviewer's comments:

Local Anesthetic- Induced Central nervous system toxicity (toxic left hemispheric syndrome)

Recently, severe stroke-like symptoms following intrascelene block has been reported. Patients had typical hemispheric symptoms in the absence of cerebral vessel occlusion. Hemispheric syndrome in the reported cases occurred in the ipsilateral side of the interscalene block. The proposed mechanism of injury in these cases was apoptotic cell death due to local anesthetic neurotoxic effects. Patient presented with impaired consciousness, slow-wave EEG activity in the affected hemisphere, epilepsy, global aphasia, dysphagia,

dysarthria, facial palsy, hemiparesis, pyramidal tract signs, and complex behavioral manifestations. No abnormal CT or MRI imaging was observed in the immediate postoperative period. MRI imaging abnormalities were appreciated postoperative days 1 through 5 in some patients which included hyperintensity of cortical grey matter and basal ganglia. Hospital stay ranged from 9 to 19 days. Most patients experienced gradual improvement of the functional outcome after a prolonged course of rehabilitation but still had residual symptoms.¹³⁴

Reference

134. Spitzer D, Wenger KJ, Neef V, Divé I, Schaller-Paule MA, Jahnke K, Kell C, Foerch C, Burger MC. Local Anesthetic-Induced Central Nervous System Toxicity during Interscalene Brachial Plexus Block: A Case Series Study of Three Patients. *Journal of Clinical Medicine*. 2021; 10(5):1013. <https://doi.org/10.3390/jcm10051013>

Reviewer 2: Review Date: 2021-03-28 01:51

Reviewer Name: Anonymous

Specific Comments To Authors: This article reviews the progress of local anesthesia, each part needs to add personal views and opinions, and points out the follow-up research hotspots and controversies in the summary.

Scientific Quality: Grade B (Very good)

Language Quality: Grade B (Minor language polishing)

Conclusion: Minor revision

Re-Review:

Yes

No

Specific Comments To Authors (File):

Authors reponse:

The authors than the reviewer for the insights and comments. The authors revised the manuscript to add the points listed below.

Page 8: EVALUATING THE ORTHOPEDIC PATIENT FOR REGIONAL ANESTHESIA

The authors added the following statement: “For patients on anticoagulation/antiplatelet medications receiving superficial peripheral nerve blocks, the decision to proceed is largely dependent on a careful analysis of factors including site compressibility, vascularity, and consequences of bleeding, should it occur. This is often determined on a case-by-case basis.”

Page 14-15: COMBINED SPINAL-EPIDURAL

The authors added the following statement: “While the combined spinal-epidural approach has several benefits over spinal or epidural anesthesia, there is a risk that the epidural may become dislodged during patient positioning. This may not be detected until later in the case, as the spinal anesthetic will provide reliable anesthesia for the first portion of the case, and may mask a poorly-functioning epidural. This may necessitate the administration of sedatives or the conversion to general anesthesia depending on the surgical case. Patients should be considered fall-risks until their neuraxial anesthetic has completely worn off. Moreover, return of motor function often occurs prior to the recovery of functional balance. As such, the first ambulation following neuraxial anesthesia should be performed with caution.”

Page 20: Adductor Canal Block

The authors added the following statement: “The adductor canal block has widely become the standard of care for analgesia for total knee arthroplasty. It is likely that motor-sparing blocks will increase in their use for a wide array of lower extremity surgical procedures, especially in the ambulatory surgical setting.”

Page 20: iPACK Block

The authors added the following statement: “The iPACK block can be quite uncomfortable for awake patients to undergo, given the needle positioning and needle depth. As such, in certain patients, this block may be performed after the patient has been sedated in order to facilitate proper needle placement. It is likely that in the future the IPACK block will be utilized in combination with the adductor canal block as the standard of care for providing “circumferential” analgesic coverage for knee surgery. However, caution

should be exercised to the total volume of local anesthetic utilized in order to avoid inadvertent local anesthetic systemic toxicity.”

Page 23: Ankle Block

The authors added the following statement: “The ankle block is often underutilized as a technique to provide analgesia to the midfoot and forefoot. As it does not require ultrasound to perform, it can be reliably performed in settings which may not be equipped with an ultrasound. Moreover, it may be performed upon presentation to the emergency room for providing pain relief for foot fractures or soft tissue injury, as part of a multimodal analgesic plan. The ankle block may also be performed by the surgeon intraoperatively for post-operative analgesia.”

Page 23-24: Lumbar Plexus Block

The authors added the following statement: “These peripheral blocks are often performed with greater ease and reliability by most anesthesiologists, and are better tolerated by patients. Moreover, the potential for serious complications is higher for the lumbar plexus block when compared to alternative peripheral nerve blocks.”

The authors added the following statement: “However, because of the decreasing utility of the lumbar plexus block, residency training programs often do not emphasize the teaching of this block.”

Page 26: Local Anesthetic Systemic Toxicity (LAST)

The authors added the following statement: “The risk of LAST increases with the administration of large volumes of local anesthetic to perform multiple nerve blocks at the same time. For example, patients who undergo blockade of the saphenous (adductor canal block) and sciatic (popliteal block) nerves may receive a large combined total volume of local anesthetic. As such, extreme caution should be administered to the individual and combined doses of local anesthetic, especially when there are plans to administer further

local anesthetic within the surgical field intraoperatively by the surgeon. It is important to utilize the minimum effective dose of local anesthetic required to perform the nerve block.”

The authors added the following statement: “All personnel, including surgical staff, nursing staff, and anesthesia staff should be trained in recognizing and treating LAST if they work in a perioperative setting where peripheral nerve blocks are performed. Moreover, resuscitative medications should be well-marked and easily accessible by all members of the treatment team. “

Page 27-28: Block Failure

The authors added the following statement: “It is important to optimize all patient variables for increasing the rate of success. This can be achieved by proactively taking measures to optimize patient positioning with towels or pillows, using ultrasonography if available, and to take into account anatomic variation. Current graduating anesthesiology residents are receiving advanced training in peripheral nerve blockade, and are likely to be well-versed in the use of peripheral nerve blockade, which will likely decrease the rate of block failure.”

The authors added the following statement: “The risk of block failure should be discussed with the patient prior to performing the nerve block, so they are aware of this potential occurrence. As part of this discussion, it is beneficial to review alternative analgesics (e.g., alternative blocks, intravenous, and oral medication) that may be administered if the block provides limited pain relief. It is important to utilize alternative methods of analgesia for patients who experience block failure. Consideration should be given to performing an alternative nerve block, if the first block technique fails while considering the total dose of local anesthetic used. “