Letters to Editor

An algorithm for management of failed ultrasound-guided peripheral nerve blocks

To
The Editor,

Modern anesthetic management incorporates regional anesthesia or analgesia (RA) as a prominent component in multimodal pain management whenever applicable. With the advent of ultrasonography (USG) guided techniques, the choice of RA is gradually being shifted from central neuraxial to peripheral nerve block (PNB), concerning patient safety and satisfaction. To perform a successful PNB, a sound knowledge of relevant anatomy, technical skills, and precise deposition of local anesthetic (LA) is essential. Various factors related to anatomy, surgery, patient, and LA may determine the
success or failure of a PNB. Although the time required to acquire this knowledge and skill is variable, it might reduce the incidence of failure at fruition. Failed blocks may lead to increased suffering for the patient and cause embarrassment for the anesthesiologist.

With the application of USG, localization of the nerve, plexus, or fascial plane has become more convenient, the learning curve has shortened, and the incidence of failure has reduced. In 2007, Sites et al.[1] demonstrated that the block failure rate for USG-guided nerve blocks by trainees was about 6.4%. Though this failure rate may seem low, in this era of the technology-driven resurgence of RA, every failed block is one too many. The current focus of regional anesthesiologists is on the successful performance of PNB, reducing the incidence of failed blocks and effectively managing those that fail. After going through the relevant literature, we have designed a simple flowchart to assess and manage failed blocks based on our clinical experience [Figure 1]. This protocol aims to groom the anesthesiologist to detect the type of block failure and its subsequent appropriate management.

Our management strategy is divided into three phases: 1) Plan A, 2) Block assessment, and 3) Plan B. Plan A is the actual application and performance of PNB depending on the patient characteristics and site of surgery. It includes primary and supplementary blocks. The block failure can be avoided by proper planning and execution of PNB based on a clear understanding of the surgical plan and thorough knowledge of dermatome, myotome, and osteotome. Supplementary blocks are the additional blocks performed to cover the expected area of sparing of the primary block. The implementation of Plan A in a well-equipped block room, using proper equipment, drugs, and techniques, is critical to reducing failure.[2] The ergonomic factors such as the position of the USG machine, alignment of the transducer, needle visualization, and accurate deposition of LA are the keys to a successful PNB.[3]

The adequate time interval for effective PNB is usually considered as 30 min.[4] After that, detailed assessment should be carried out for subjective signs like loss of sensation to cold, touch, pressure, and objective signs like change in heart rate and blood pressure and pain score on noxious stimulus in the desired area. Nerve block failure can be classified into a) complete failure: No block action in the nerve distribution; b) partial failure: There maybe some numbness in the surgical field but not adequate for surgery; and c) secondary block failure: Primary block was successful, but surgery has outlasted the block duration.[4] Anxious patients may perceive tingling, vibration, or other unrelated sensation as pain. This should not be labeled as block failure in the absence of other objective signs. Anxiety should be managed with proper counseling and anxiolytic drugs. Furthermore, the breakthrough tourniquet pain after a specific duration should not be considered block failure.[5]

The complete or partial block failure could be due to various reasons. In case of misplaced intramuscular or intravascular injection, myotoxicity or LA systemic toxicity can occur. The additional block required to cover an ultrasonography (USG) guided techniques, following the primary block (± supplementary block) is called the rescue block. The decision to perform a repeat or rescue block should be systematically evaluated if the drug safety margin is not crossed.[5] Careful

![Figure 1: Flowchart for management of failed ultrasound-guided peripheral nerve block](image-url)
reassessment following the repeat or rescue block is advised to avoid failure and complications. In secondary block failure, analgosedation or general anesthesia would be the only option.

To conclude, timely detection of block failure and appropriate management according to the protocol may reduce the delay and minimize the difficulties in managing failed blocks in clinical practice.

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Conflicts of interest
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