Editorial

Is it time to start some thinking about pressure monitoring during peripheral nerve blocks?

Nerve injury is a rare, but the most dreaded complication of regional anaesthesia. Fortunately, most incidents of neurological deficits resulting from the regional anaesthesia are temporary and resolve over a period. A small percent of cases have lasting sequelae. The aetiology of nerve injury is multifactorial. Direct trauma to the nerve with the rheumatoid arthritis needle, local anaesthetic (LA) neurotoxicity, ischaemic injury secondary to pressure and volume of LA or added vasoconstrictors[1] and intraneural injection of the LA have been suggested as the possible causes.[2]

The incidence of nerve injury reported after peripheral nerve stimulator-guided regional blocks varies from 0.004[3] to 14%.[4] The use of ultrasound allows direct visualisation of nerves, resulting in fewer passes of needle, reduction in volume of LA injected and detection of anatomical variance. Theoretically, use of ultrasound would provide the advantage of preventing nerve injury by allowing direct visualisation of the block needle relative to the nerves/plexus. However, Liu et al[5] found no difference in neurologic symptoms in ultrasound versus nerve stimulator guidance for interscalene block for ambulatory shoulder surgery in a prospective, randomized, controlled trial.

It has been demonstrated that intraneural intrafascicular injections are associated with neurologic deficit. In 2004, an animal study found that perineural injection was associated with low injection pressures (<4 psi) and no neurologic deficit. Intraneural injections associated with pressure <11 psi (possibly extrafascicular) resulted in no neurological deficit, while those associated with high pressures (>25 psi, possibly intrafascicular) resulted in persistent neurologic deficit.[2]

However, more recent case reports and studies suggest that intraneural injection does not always result in nerve injury. A case report described two patients in whom an intraneurally placed sciatic nerve catheter resulted in an effective block but did not result in any neurologic deficit.[6] Another case report described accidental intraneural injection of the musculocutaneous nerve with no neurological deficit.[7]

One study found the intraneural injection of LA is a common occurrence (66%) after nerve stimulator-guided sciatic nerve block at popliteal fossa, as demonstrated by increase in the diameter of nerve. However, no neurological complication was observed in any patient.[8] Another study reported intraneural injection in popliteal sciatic block in 24 patients with good effect but no neurologic injury.[9] A cadaver study suggested that intraneural needles are more likely to traverse the connective rather than the tightly packed poorly compliant fascicles.[10] This may explain the lack of nerve injury in the studies described above.

The proximity of needle and hence incidence of intraneural injections may be on rise due to increased use of real-time ultrasound guidance for nerve blocks. Sometimes it is difficult to recognise the exact location of the needle tip on ultrasound imaging in anaesthesia setup due to time constraints and especially when a low specification ultrasound system is used. The 'Glide Sign' provides some help in determining the intraneural or perineural position of needle tip during real-time ultrasound guidance but does not give any information about intra- or extrafascicular placement.[11] Has the time come to start routine pressure monitoring to enhance the safety during all ultrasound-guided nerve blocks?

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