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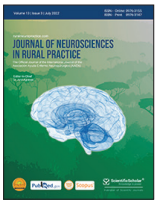

Editorial

Precise scalp block – have another look at scalp innervation

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Scalp block has become an alternative to general anesthesia in neurosurgery. It has established itself as a standard practice for awake craniotomy for lesions in eloquent areas of the brain. Apart from providing intraoperative analgesia, its analgesic effect extends into the post-operative period depending on the anesthetic technique and the drugs used. What started as infiltration of scalp incision line with local anesthetic and a vasopressor, more than a century ago, later gave way to blockade of the individual scalp nerves. Scalp block has been proven to provide better analgesia than infiltration of the incision line. Several publications have reported its indications and advantages compared with other techniques. Scalp block technique consists of blocking six nerves: Supraorbital nerve, supratrochlear nerve, auriculotemporal nerve, zygomaticotemporal nerve, greater occipital nerve, and lesser occipital nerve. Although less frequently reported, maxillary nerve block along with greater and lesser occipital nerve block is described as an alternative to classic scalp block for craniotomy.[1]

Consistent reduction of post-operative pain with scalp block following craniotomy has been shown in meta-analyses.[2] During supratentorial craniotomy, scalp block provided better control of hemodynamics in response to painful events such as skull-pin fixation and skin incision. It also provided adequate and prolonged post-operative pain control and decreased intra- and post-operative opioid consumption.[3] Analgesia nociception index-guided analgesic administration during craniotomy showed lower intraoperative fentanyl consumption in patients receiving scalp block as compared to incision-site local anesthetic infiltration.[4] Comparison of pre-operative scalp block with post-operative scalp block has shown no significant difference in post-operative analgesic requirement during first 24 h following surgery.[5] Even in pediatric patients undergoing cranioplasty for craniosynostosis, the block has been used for post-operative pain control.[6]

In countries with limited resources, operating under scalp block and continuous neurological examination has been shown to be effective in the prevention of permanent major neurologic deficits.[7] Interestingly, in patients undergoing primary malignant glioma resection, scalp block improved progression-free survival.[8]

Minor reversible complications have been reported with scalp block. Transient ptosis, facial palsy, and trigeminocardiac reflex have been documented.[9]

Different local anesthetic agents such as lignocaine, bupivacaine, levobupivacaine, and ropivacaine have been used in scalp block studies in the literature. Adjuncts such as dexmedetomidine and clonidine have been added to the local anesthetic to prolong the effect of the scalp block.[10,11] The success of the scalp nerve block has been enhanced by addition of hyaluronidase to the local anesthetic solution.[12]

Of late, scalp block is being performed under ultrasound guidance to improve the accuracy of local anesthetic deposition.[13]

Some recent studies have concentrated on the anatomy of scalp nerves to improve the accuracy of the scalp block. One study investigated the spread of the local anesthetic mixed with methylene blue in cadavers and found that all the six nerves were soaked by the local anesthetic. In addition, unintentional spread of the local anesthetic solution to the branches of the facial nerve has also been observed in this study.[14] Although they are rare, anatomical variations in the scalp nerve distribution may result in abnormalities of the scalp block. One report in patients undergoing scalp nerve block has shown failure rate for zygomaticotemporal nerve block to be higher than that of the other nerve blocks, which was attributed to the deeper distribution of the nerve below the surface of the skin and also to the anomalies of nerve distribution.[15]

This issue of JNRP has published an article which reported anatomical variations in the scalp nerves in 11 cadavers, which have implications on the technique of scalp block.[16] As has been described in the earlier literature, the authors

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found variations in the anatomy of supraorbital notch and variations in the branching of supraorbital nerve and supratrochlear nerve. Similarly, they found that the relation of greater occipital nerve to occipital artery varied between cadavers and between right and left sides in the same cadaver. These variations have important implications in the performance of scalp block. The authors also proposed alternative techniques of scalp nerve blocks based on bony landmarks, which are more consistent than the currently used technique. Whether these new recommendations improve the accuracy of the scalp block, needs to be verified in a larger sample size of patients undergoing scalp block for various indications such as awake craniotomy, post-operative analgesia, and treatment of occipital neuralgia.

REFERENCES

1. Jayaram K, Srilata M, Kulkarni D, Ramachandran G. Regional anesthesia to scalp for craniotomy: Innovation with innervation. J Neurosurg Anesthesiol 2016;28:32-7.
2. Guilfoyle MR, Helmy A, Duane D, Hutchinson PJ. Regional scalp block for postcraniotomy analgesia: A systematic review and meta-analysis. Anesth Analg 2013;116:1093-102.
3. Carella M, Tran G, Bonhomme VL, Franssen C. Influence of levobupivacaine regional scalp block on hemodynamic stability, intra-and postoperative opioid consumption in supratentorial craniotomies: A randomized controlled trial. Anesth Analg 2021;132:500-11.
4. Theerth KA, Sriganesh K, Reddy KR, Chakrabarti D, Rao GS. Analgesia nociception index-guided intraoperative fentanyl consumption and postoperative analgesia in patients receiving scalp block versus incision-site infiltration for craniotomy. Minerva Anestesiol 2018;84:1361-8.
5. Kulikov A, Tere V, Sergi PG, Pugliese F, Lubnin A, Bilotta F. Preoperative versus postoperative scalp block combined with incision line infiltration for pain control after supratentorial craniotomy. Clin J Pain 2021;37:194-8.
6. Festa R, Tosi F, Pusateri A, Mensi S, Garra R, Mancino A, *et al*. The scalp block for postoperative pain control in craniosynostosis surgery: A case control study. Childs Nerv Syst 2020;36:3063-70.
7. Abdelhameed E, Abdelghany MS, Abdelkhalek H, ElatrozyHI. Awake surgery for lesions near eloquent brain under scalp block and clinical monitoring: Experience of single center with limited resources. Egypt J Neurol Psychiatr Neurosurg 2021;57:78.
8. Sung CH, Tsuang FY, Shih CC, Chang JL, Liao MH, Yang YW, *et al*. Scalp block is associated with improved recurrence profiles in patients undergoing primary glioma resection surgery. J Neurosurg Anesthesiol 2021;33:239-46.
9. Situ S, Gupta P, Thirunavukkarasu M, Chaudhary G. Unilateral complete ptosis after scalp block: A rare complication of common procedure. Indian J Anaesth 2020;64:1077-8.
10. Vallapu S, Panda NB, Samagh N, Bharti N. Efficacy of dexmedetomidine as an adjuvant to local anesthetic agent in scalp block and scalp infiltration to control postcraniotomy pain: A double-blind randomized trial. J Neurosci Rural Pract 2018;9:73-9.
11. Wajekar AS, Oak SP, Shetty AN, Jain RA. A prospective, comparative, randomised, double blind study on the efficacy of addition of clonidine to 0.25% bupivacaine in scalp block for supratentorial craniotomies. Indian J Anaesth 2016;60:39-43.
12. Mohamed AA, Radwan TA, Mohamed MM, Mohamed HA, Elemady MF, Osman SH, *et al*. Safety and efficacy of addition of hyaluronidase to a mixture of lidocaine and bupivacaine in scalp nerves block in elective craniotomy operations; comparative study. BMC Anesthesiol 2018;18:129.
13. Zetlaoui PJ, Gauthier E, Benhamou D. Ultrasound-guided scalp nerve blocks for neurosurgery: A narrative review. Anaesth Crit Care Pain Med 2020;39:876-82.
14. Harbell MW, Bolton PB, Koyyalamudi V, Seamans DP, Langley NR. Evaluating the anatomic spread of selective nerve scalp blocks using methylene blue: A cadaveric analysis. J Neurosurg Anesthesiol 2021. Doi: 10.1097/ANA.0000000000000826
15. Sato T, Nishiwaki K. Accuracy of landmark scalp blocks performed during asleep-awake-asleep awake craniotomy: A retrospective study. JA Clin Rep 2021;7:8.
16. Simon KS, Rout S, Lionel KR, Joel JJ, Daniel P. Anatomical considerations of cutaneous nerves of scalp for an effective anesthetic blockade for procedures on the scalp. J Neurosci Rural Pract 2022. Doi: 10.25259/JNRP-2022-2-4-R2-(2362)

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