Perspective
Volume 7:1, 2023

Journal of Clinical Anesthesiology: Open Access

ISSN: 2684-6004

The Use of Intraoperative Neuromonitoring to Prevent Peripheral Nerve Injury in Regional Anesthesia

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Introduction

Regional anesthesia is a widely used technique that provides excellent analgesia for a variety of surgical procedures. Although considered safe, regional anesthesia carries the risk of peripheral nerve injury. The use of intraoperative neuromonitoring (IONM) has been proposed as a technique to reduce this risk. This paper aims to review the literature on the use of IONM in regional anesthesia to prevent peripheral nerve injury.

Regional anesthesia has gained popularity as a technique for providing surgical analgesia. Peripheral nerve injury is a rare but devastating complication of regional anesthesia. Intraoperative neuromonitoring (IONM) is a technique that allows continuous monitoring of peripheral nerve function during surgery. The aim of this paper is to review the literature on the use of IONM in regional anesthesia to prevent peripheral nerve injury. Intraoperative neuromonitoring (IONM) is a technique used during surgical procedures to monitor the electrical activity of nerves and muscles in order to detect and prevent nerve damage. In the context of regional anesthesia, IONM can be used to prevent peripheral nerve injury [1-3]. Regional anesthesia involves the injection of local anesthetic drugs near a nerve or group of nerves, which blocks sensation in the area supplied by those nerves. While regional anesthesia is generally considered safe, it is not without risk. One potential complication is nerve injury, which can occur if the needle or catheter used to deliver the local anesthetic damages the nerve or if the local anesthetic causes neurotoxicity.

Description

IONM can help prevent nerve injury during regional anesthesia by monitoring the electrical activity of the nerves and muscles in the area. By detecting changes in this activity, the anesthesiologist can adjust the needle or catheter placement or the dosage of local anesthetic to prevent damage to the nerve. There are several types of IONM techniques that can be used during regional anesthesia, including electromyography (EMG), nerve stimulation, and nerve ultrasound. EMG involves the use of small needles inserted into the muscles near the nerve being monitored to detect changes in electrical activity. Nerve stimulation involves the use of a small electrical current delivered through the needle or catheter to stimulate the nerve and monitor its response. Nerve ultrasound involves using ultrasound imaging to visualize the nerve and surrounding structures in real time and ensure proper needle placement. Overall, the use of IONM during regional anesthesia can help improve patient safety by detecting and preventing nerve injury. However, it should be noted that IONM is not foolproof and may not detect all instances of nerve injury.

Therefore, it is important for anesthesiologists to also rely on their clinical judgment and experience to minimize the risk of complications during regional anesthesia. A literature search was conducted using the databases MEDLINE and PubMed. The search terms used were "intraoperative neuromonitoring", "regional anesthesia", and "peripheral nerve injury". Articles published between 2010 and 2023 were included in the review. Numerous studies have investigated the use of IONM in regional anesthesia to prevent peripheral nerve injury. The majority of these studies have focused on brachial plexus block and femoral nerve block [4,5]. The results of these studies suggest that IONM can help detect nerve injury early and allow for prompt intervention.

Conclusion

Intraoperative neuromonitoring is a valuable tool in preventing peripheral nerve injury during regional anesthesia. The use of IONM can help detect nerve injury early and allow for prompt intervention. Although further research is needed, the available evidence suggests that IONM should be considered in high-risk cases or when nerve damage is a significant concern.

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How to cite this article: Dennis, Frederic. "The Use of Intraoperative Neuromonitoring to Prevent Peripheral Nerve Injury in Regional Anesthesia." *J Clin Anesthesiol* 7 (2023): 160.

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Received: 01 January, 2023, Manuscript No. jcao-23-96940; **Editor Assigned:** 03 January, 2023, Pre QC No. P-96940; **Reviewed:** 14 January, 2023, QC No. Q-96940; **Revised:** 20 January, 2023, Manuscript No. R-96940; **Published:** 27 January, 2023, DOI: 10.37421/2684-6004.2023.7.160