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Opinion Article

Intravenous Regional Anesthesia: Effective Anesthesia for Limb Surgeries and Pain Management

Zhang Lu*

Department of Anesthesiology, Zhejiang Hospital, Zhejiang, China

DESCRIPTION

Headaches Intravenous Regional Anesthesia (IVRA), commonly known as the Bier block, it is a technique used for providing anesthesia to a specific part of the body, most frequently the upper or lower extremities. It is particularly effective for short surgical procedures and is valued for its simplicity, effectiveness, and cost-efficiency.

Mechanism of action

The effectiveness of IVRA is located in its ability to deliver a high concentration of local anesthetic directly to the target area while minimizing systemic absorption. The procedure begins with the exsanguination of the limb, typically using an Esmarch bandage to push blood out of the extremity. An tourniquet is applied approximately to the limb to prevent the anesthetic from entering the systemic circulation. Once the tourniquet is secured, a local anesthetic, such as lidocaine or prilocaine, is injected into a vein in the isolated limb. The anesthetic diffuses into the surrounding tissues, including nerves and blood vessels, leading to a loss of sensation and motor function in the limb. The tourniquet is essential for the effectiveness of IVRA. It prevents the anesthetic from spreading beyond the limb, ensuring that the anesthesia is localized. The duration of the anesthetic effect is directly related to the time the tourniquet remains inflated. Once the tourniquet is deflated, the anesthetic is released into the systemic circulation and it is extremely metabolize, usually with no prolonged effects.

Indications for intravenous regional anesthesia

IVRA is primarily used for procedures involving the outer limbs, such as the hands, wrists, forearms, feet and ankles. Some common indications include:

Orthopedic procedures: IVRA is frequently used for the reduction of fractures, joint dislocations and minor orthopedic surgeries such as carpal tunnel release, Dupuytren's contracture release and tendon repairs.

Plastic and reconstructive surgery: It is also employed in plastic surgery for procedures such as skin grafting, excision of soft tissue masses and minor hand surgeries.

Wound care and debridement: IVRA can be used for the debridement of wounds or ulcers, particularly in some cases where the patient cannot tolerate general anesthesia or where the procedure is limited in scope.

Pain management: In certain cases, IVRA is used for pain management in conditions such as Complex Regional Pain Syndrome (CRPS), where it can provide temporary relief of symptoms.

Procedure and techniques

The IVRA procedure involves several significant procedures, which must be carefully followed to ensure patient safety and the effectiveness of the anesthesia. Before the procedure, the patient's medical history is reviewed to identify any contraindications to IVRA, such as a history of severe cardiovascular disease, severe vascular insufficiency in the limb, or allergies to local anesthetics. The patient is positioned comfortably, and the limb is elevated to develop venous drainage. An Esmarch bandage or similar device is used to exsanguinate the limb, effectively pushing blood out of the extremity.

A tourniquet has been secured on the limb to differentiate it from the systemic circulation. The tourniquet pressure must be higher than the systolic blood pressure to prevent blood flow into and out of the limb. Dual tourniquets are sometimes used, especially for procedures expected to last longer than 30 minutes, to reduce the risk of tourniquet pain by alternating the pressure between the two. After the tourniquet has been placed, a local anaesthetic, such as lidocaine or prilocaine, is delivered directly into the limb. The quantity and concentration of anaesthetic can be affected by the size of the limb and the procedure that is utilized. The anesthetic spreads throughout the tissues, including nerves, muscles and blood vessels, leading to a rapid onset of anesthesia, usually within 5 to 10 minutes.

Correspondence to: Zhang Lu, Department of Anesthesiology, Zhejiang Hospital, Zhejiang, China, E-mail: zhan.l@gmail.com

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