

An overview on Sub Multifidus Muscles Block

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Abstract:

Background: Effective perioperative analgesia for lumbar spine surgery and chronic low back pain remains challenging. The sub-multifidus muscle block (SMMB) is a recently described regional anesthetic technique that targets the dorsal rami of spinal nerves beneath the multifidus muscle, aiming to provide focused posterior lumbar analgesia while minimizing motor weakness and systemic opioid requirements.

Keywords: Sub-multifidus muscle block; regional anesthesia; lumbar spine surgery; dorsal rami; postoperative analgesia; low back pain.

Introduction:

The **sub-multifidus (SMF) block** is a regional anesthesia technique employed in pain management to relieve postoperative and chronic spinal pain. This method involves the targeted injection of a local anesthetic into the sub-multifidus plane, located beneath the multifidus muscle adjacent to the vertebral lamina. By specifically addressing the dorsal rami of spinal nerves in this plane, the SMF block aims to disrupt the transmission of pain signals, providing analgesia for various painful conditions **(1)**.

To understand the SMF block technique thoroughly, it is essential to explore the anatomical considerations, procedural steps, clinical indications, and potential benefits and risks associated with its use **(2)**.

Anatomy of the Spine and the Sub-Multifidus Plane

The spine is a complex structure composed of vertebrae, intervertebral discs, spinal nerves, and supporting ligaments. The lamina, forming the posterior arch of a vertebra, protects the spinal canal and the spinal cord within. The multifidus muscle overlies the lamina and contributes to spinal stability. Beneath the multifidus lies the sub-multifidus plane, a confined space targeted during the SMF block **(1)**.

The sub-multifidus plane provides direct access to the **dorsal rami of spinal nerves**, which emerge from the spinal cord and pass through this space, branching to supply the posterior spinal structures. By injecting anesthetic into this plane, clinicians can deliver targeted analgesia to the dorsal rami, effectively interrupting the transmission of pain signals from the spine **(2)**.

Procedural Steps in sub multifidus Block:

The sub multifidus block technique involves a systematic series of steps to ensure accuracy and safety during the administration of the local anesthetic. While specific variations may exist, a general outline of the procedure typically includes the following steps

1. **Patient Positioning:** The patient is positioned appropriately to facilitate access to the targeted vertebra. This positioning ensures comfort for the patient and allows the healthcare provider optimal access to the retrolaminar space.
2. **Skin Preparation:** The skin overlying the targeted vertebra is cleansed and sterilized to minimize the risk of infection. This step is crucial in maintaining aseptic conditions during the procedure.

3. **Landmark Identification:** Anatomical landmarks, such as the spinous processes and the lamina of the vertebra, are identified through palpation or imaging guidance. Accurate identification is essential for the precise placement of the needle.
4. **Needle Insertion:** A specialized needle is inserted through the skin and advanced towards the sub multifidus . The trajectory of the needle is guided by the anatomical landmarks and imaging, ensuring that the tip is appropriately positioned for the injection.
5. **Contrast or Local Anesthetic Injection:** Once the needle is in the desired location, contrast dye or a small test dose of local anesthetic may be injected to confirm accurate placement. This step helps avoid unintended complications and ensures that the medication reaches the intended target.
6. **Main Local Anesthetic Injection:** Following confirmation of correct needle placement, the primary local anesthetic solution is injected into the retrolaminar space. The choice of anesthetic agent and its concentration depends on the specific clinical scenario and the patient's characteristics.
7. **Monitoring and Observation:** The patient is closely monitored following the injection to assess the effectiveness of the retrolaminar block and to identify any potential adverse effects. Vital signs and neurological status may be monitored to ensure patient safety.

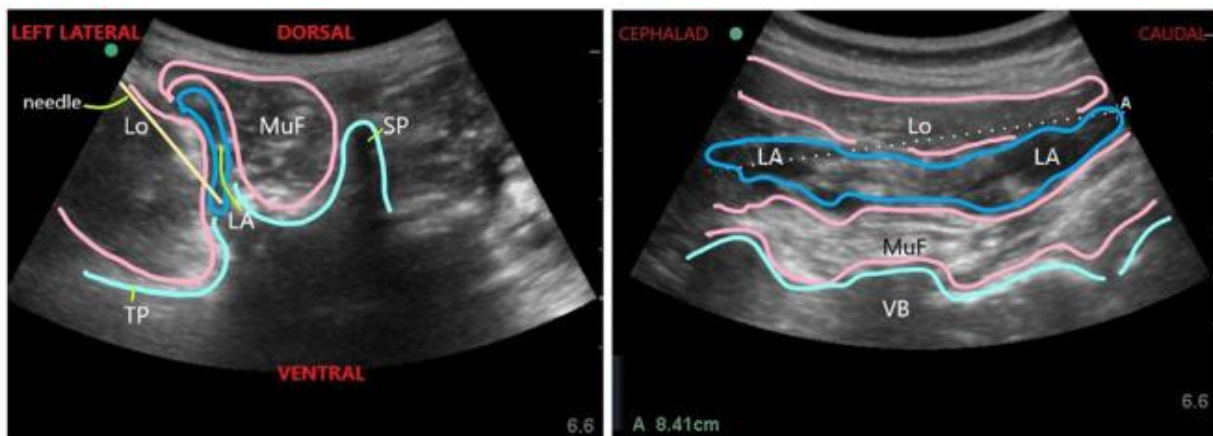


Fig. (1): sub multifidus ms block

Clinical Applications of Sub multifidus Block:

The Sub multifidus block technique finds application in the management of various chronic pain conditions associated with the spine. Understanding the specific clinical scenarios where this technique can be beneficial is crucial for its appropriate utilization.

1. **Facet Joint Pain:** Facet joints are small joints located between adjacent vertebrae, contributing to the spine's stability and mobility. When these joints become a source of pain, often due to degeneration or inflammation, a retrolaminar block can be employed to provide targeted pain relief.
2. **Radicular Pain:** Radicular pain, commonly known as sciatica, results from the compression or irritation of spinal nerve roots. By targeting the dorsal rami responsible for transmitting sensory signals from these nerves, the retrolaminar block can attenuate radicular pain.
3. **Chronic Low Back Pain:** Chronic low back pain, which may have various etiologies, can be challenging to manage. The Sub multifidus block offers a targeted approach to address the specific nerves contributing to the pain, potentially providing sustained relief for patients with persistent symptoms.
4. **Postoperative Pain Management:** In certain surgical procedures involving the spine or adjacent structures, postoperative pain can be a significant concern. The Sub multifidus block may be

considered as part of a multimodal pain management strategy to enhance analgesia and reduce the reliance on systemic medications

Benefits of Sub multifidus Block Technique (3):

1. **Targeted Pain Relief:** The primary advantage of the Sub multifidus block technique lies in its ability to provide targeted pain relief. By delivering the local anesthetic precisely to the dorsal rami of spinal nerves, healthcare providers can address the source of pain with a high degree of specificity.
2. **Reduced Systemic Medication Requirements:** Compared to systemic pain medications, which may be associated with side effects and limited efficacy, the Sub multifidus block can offer localized analgesia. This targeted approach has the potential to reduce the overall need for systemic medications and their associated adverse effects.
3. **Minimized Motor Block:** The Sub multifidus block is designed to primarily affect sensory nerve transmission, minimizing the risk of motor block. This characteristic is particularly advantageous in scenarios where preserving motor function is crucial.
4. **Outpatient Procedure:** In many cases, the Sub multifidus block can be performed as an outpatient procedure. This contributes to the efficiency of pain management strategies, allowing patients to return home on the same day with appropriate post-procedural instructions.

Risks and Considerations:

While the Sub multifidus block technique offers several advantages, it is essential to acknowledge potential risks and considerations associated with its implementation.

1. **Infection:** Despite meticulous skin preparation, there is always a risk of infection associated with any invasive procedure. Healthcare providers must adhere to aseptic techniques to minimize this risk.
2. **Bleeding:** The presence of blood vessels in the vicinity of Sub multifidus space poses a risk of bleeding during needle insertion. Careful monitoring and proper technique help mitigate this risk.
3. **Neurological Complications:** While the Sub multifidus block is designed to primarily affect sensory nerves, inadvertent contact with motor nerves or the spinal cord can lead to neurological complications. Providers must exercise precision during needle placement.
4. **Allergic Reactions:** Although rare, allergic reactions to local anesthetics can occur. Healthcare providers should be prepared to manage such reactions promptly.

Incomplete Pain Relief: The efficacy of Sub multifidus block may vary among individuals, and some patients may experience incomplete pain relief. This variability underscores the importance of a thorough pre-procedural assessment and consideration of alternative or complementary treatment modalities.

References:

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