Pediatric Anesthesia and Critical Care Journal 2025;13(2):89-91
doi:10.14587/paccj.2025.15

PACCJ

Mesotherapy: ultrasound-guided approach to improve and effectiveness in pediatric and adult patients

M. Ciuffreda[1], S. Sorrenti[1,2], L. Brugiaferri[2], E. Pisello[1], N. Zagaria[3], C. Piangatelli[1], D. Galante[4]

[1]Anesthesia, Resuscitation, Intensive Care and Pain Management Unit, AST Ancona, Fabriano, Italy
[2]Anesthesia, Resuscitation, Intensive Care and Pain Management, Università Politecnica delle Marche, Ancona, Italy
[3]Anesthesia, Resuscitation, Intensive Care, Hospital Veneziale, Isernia, Italy
[4]Anesthesia, Resuscitation, Intensive Care and Pain Management Unit, Cerignola (Foggia), Italy

Corresponding author: M. Ciuffreda, Medical executive in Anaesthesia, Resuscitation, Intensive Care and Pain Management Unit, AST Ancona, Fabriano, Italy. Email: ciuffredamat@libero.it

Keypoints

Antalgic Mesotherapy is an outpatient treatment with numerous indications. The ultrasound-guided approach helps optimize the treatment by increasing safety and effectiveness while reducing the incidence of adverse events.

Abstract

Antalgic Mesotherapy is typically performed as an outpatient treatment and has numerous clinical indications. It is currently used in various medical fields. Although it is considered easier to perform compared to other, more invasive infiltrative techniques, it is not without risks and post-treatment complications. Due to its apparent simplicity, mesotherapy is often overused, sometimes at the expense of clinical safety and effectiveness. The use of ultrasound in this technique allows for optimization of the treatment.

Keywords

Ultrasound-guided mesotherapy, antalgic mesotherapy, ultrasound-guided infiltrations, ultrasound-guided regional intradermal therapy.

Introduction

Antalgic Mesotherapy is an outpatient treatment with numerous indications. Among the most common are: tendinitis, tendinopathies, bursitis, localized pain, low back pain, post-traumatic conditions (sprains, contusions), tension-type headaches, muscle pain, and more. The procedure involves intradermal injection of medications and therapeutic substances using very fine, short needles (4 to 6 mm). Adverse events are often mild and temporary, but should not be ignored or underestimated. The most common include: bruising, hematomas, itching, wheals, allergic reactions (to the drug), skin changes, local pain, swelling, and erythema. In pain management, a variety of drugs may be used, either individually or in combination, such as local anesthetics, NSAIDs, steroids, muscle relaxants, and ozone. Currently, mesotherapy remains a highly empirical technique, often overused and applied outside of appropriate clinical indications.

Case report

Ultrasound-guided mesotherapy was used to treat 10 adolescents aged between 14 and 16 years (5 males and 5 females) and 10 adults (6 males and 4 females). All patients required antalgic treatment via mesotherapy for muscle-related pain in the thoracolumbar region. After obtaining informed consent, the procedure was carried out as follows:

1. Patient positioning
2. Thorough disinfection of the treatment area, ensuring no skin lesions were present
3. Creation of a sterile field
4. Initial ultrasound assessment using a linear probe to evaluate skin layers, identify any critical anatomical structures, and locate the dermal layer (Fig. 1)
5. Performance of mesotherapy using a 4 mm single needle under ultrasound guidance (a high-frequency linear probe with a sterile probe cover was used) with an Out-of-Plane approach (Fig. 2)

Different pharmacological agents were chosen based on each patient's clinical condition and specific needs, including: non-particulate steroids (dexamethasone), local anesthetics (lidocaine), and ozone.

- Real-time assessment of the spread of the active substance (Fig. 3)
- Application of a sterile dressing

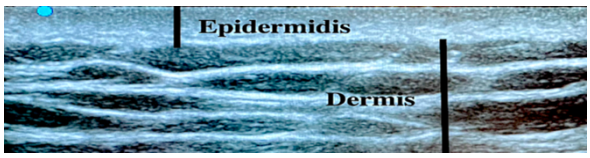

Figure 1. Enlargement of ultrasound image with visualization of the skin layers

Figure 2. "Out of Plane" approach with high-frequency linear probe

Figure 3. Real-time assessment of the spread of the drug selected for the procedure, in this case ozone

Discussion

Due to its ease of execution, mesotherapy has become a widely used and often overutilized technique across various medical specialties, frequently even in off-label contexts.

The traditional technique of mesotherapy (without ultrasound guidance) is highly empirical, as it does not allow for precise control of needle placement within the skin layers or proper visualization of drug distribution.

Factors such as the angle of the needle and/or syringe, anatomical variations (e.g., bony prominences, folds, depressions), skin abnormalities (e.g., hyperkeratosis, thin areas), and excessive adipose tissue can all contribute to incorrect intradermal placement. These limitations may underlie the variable or suboptimal clinical effectiveness often observed with the conventional approach.

While multi-injector devices (with 3 or 5 needles arranged in a line) were more commonly used in the past, single-needle injections are now preferred. The single needle allows better adaptation to different skin surfaces and body regions. Multi-injector systems may fail to ensure uniform needle depth, leading to inconsistent drug distribution across injection points.

Ultrasound imaging has become increasingly widespread in fields such as anesthesia, intensive care, and pain management. Its use significantly enhances procedural safety and carries important medico-legal implications. Applying ultrasound guidance to mesotherapy allows for a more optimized technique, improving both effectiveness and safety.

With ultrasound, the skin layers and critical structures (such as blood vessels) can be directly visualized, and the spread of the active substance can be monitored in real time.

This enables confirmation of accurate intradermal drug administration and may significantly reduce the incidence of adverse events.

The technique is suitable for both adult and pediatric patients. All standard pharmacological agents used in mesotherapy can be administered safely under ultrasound guidance, and it can be applied to any anatomical region. It does not require advanced ultrasound skills, does not significantly increase procedure time, and can be easily implemented in any clinic equipped with an ultrasound device.

The learning curve for this technique is very short.

Conclusion

Mesotherapy is an effective antalgic technique with a low risk profile, and these risks can be further minimized when performed under ultrasound guidance. Therefore, the approach we propose—although not yet thoroughly investigated in the literature—may represent an important innovation, offering significant advancements in terms of both safety and effectiveness.

References and suggested readings

1. Paolucci T, Bellomo RG, Centra MA, Giannandrea N, Pezzi L, Saggini R. Mesotherapy in the treatment of musculoskeletal pain in rehabilitation: the state of the art. Journal of Pain Research. 2019;12:2391–2401.
2. Faetani L, Ghizzoni D, Ammendolia A, Costantino C. Safety and efficacy of mesotherapy in musculoskeletal disorders: A systematic review of randomized controlled trials with meta-analysis. Journal of Rehabilitation Medicine. 2021 Apr 27;53(4).
3. Mammuccari M, Gatti A, Maggiori S, Sabato AF. Role of mesotherapy in musculoskeletal pain: opinions from the Italian Society of Mesotherapy. Evidence-Based Complementary and Alternative Medicine. 2012;2012:436959.
4. Tseveendorj N, Sindel D, Arman S, Sen EI. Efficacy of mesotherapy for pain, function and quality of life in patients with mild and moderate knee osteoarthritis: A randomized controlled trial. J Musculoskelet Neuronal Interact. 2023 Mar 1;23(1):52–60.
5. Koszela K, Mammuccari M, Słupiński M, Woldańska-Okońska M. The role of mesotherapy in chronic back pain syndrome: what do we know? Rheumatol Int. 2025 Aug 22;45(9):206.
6. Mammucari M, Maggiori E, Russo D, Giorgio C, Ronconi G, Ferrara PE, et al. Mesotherapy: From historical notes to scientific evidence and future prospects. ScientificWorldJournal. 2020 May 1;2020:3542848.