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Surgical Technique for Muscle Biopsy[☆]

Técnica quirúrgica de la biopsia muscular

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Received 7 April 2020; accepted 2 May 2020

Introduction

Muscle biopsy is a useful technique for diagnosing neuromuscular and metabolic diseases, although it also has applications in the field of preclinical investigation and sports medicine.¹ In some diseases, the technique is required for a firm diagnosis; examples include some hereditary diseases (muscular dystrophy) and acquired myopathies (inflammatory or drug-induced processes).² Such biopsies can help to differentiate between neurogenic and myogenic origin and to provide information about whether the course is chronic or acute as well as about progression and stage of the disease.² There are studies that point to its clinical utility for obtaining diagnosis or changing diagnosis in 43% to 47% of cases.³ Both percutaneous techniques, for example, with Bergström needles or Well-Blakesley conchotome¹ and open techniques have been reported.

An open muscle biopsy of the right anterior tibial muscle is described in a 53-year-old patient in follow-up by the neurology department for suspected muscular dystrophy.

Description of the Surgical Technique

Surgical aseptic conditions are required for a muscle biopsy. With the patient in supine decubitus, povidone iodide solution was applied to create antiseptic conditions and mepivacaine 2% was used as a local anesthetic, without adrenaline, both on the skin and superficial fascia, but without infiltrating the muscle, to avoid sample contamination. A linear incision of 5 cm was made in the skin, following the longitudinal axis of the muscle fibers, and the subcutaneous cell tissue was dissected with the help of Farabeuf separators until the fascia were reached. Once the muscle had been exposed, 2 reference points were made to facilitate sampling without losing anatomical reference. After resection of the muscle fragment of interest, careful hemostasis was performed with an electric scalpel and the muscle defect was sutured to prevent the bruising. Subsequently, the muscle fascia was sutured with resorbable thread to prevent the formation of muscle hernias. After layered closure of the surgical wound, the defect was covered with compression bandage that was kept in place for the first 24 hours. The sample obtained was preserved in a sterile recipient wrapped in gauze moistened with saline solution and frozen immediately to avoid enzymatic degradation. Prophylactic antibiotics were not needed as the patient was not immunodepressed and had no comorbidities. The wound healing progressed satisfactorily, without infection and with full recovery at 60 days after the intervention.

[☆] Please cite this article as: Villegas-Romero I, Ortiz-Prieto A, Navarro-Navarro I, Linares-Barrios M. Técnica quirúrgica de la biopsia muscular. *Actas Dermosifiliogr.* 2021;112:368–369.

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Indications/Contraindications

The indication of muscle biopsy in dermatology departments is mainly for the study of neuromuscular and metabolic diseases following referral from other nonsurgical specialties.

The rationale for choosing open biopsy instead of percutaneous biopsy is that a larger sample size is needed for a more exhaustive study by the pathologist and that the area of interest can be selected by direct visualization.²

Normally, the quadriceps or biceps are chosen in cases with proximal muscular involvement and the deltoids when mitochondrial disease is suspected, thus avoiding taking a sample from muscles too affected by the disease.^{2,3} In our case, the right anterior tibial muscle was chosen because atrophic changes had been detected in prior magnetic resonance study.

Complications

Muscle biopsy in any of its variants is a safe procedure with few complications. The most frequently reported early-onset complications are mild discomfort during muscle resection, although bleeding, bruising, muscle hernia, dehiscence, and wound infection can also occur.² In the long term, complications include scarring, which is more extensive with open biopsies, and paranesthesia in the area due to damage to sensitive nerves. In the case of percutaneous biopsy, it is not necessary to refrain from practicing sports.¹ Pre- or post-operative treatment with antibiotics is not usually necessary as the operation is performed in a clean area; however, it should be considered when there is a high risk of infection, such as in immunodepressed patients.⁴

Conclusions

Open muscle biopsy is a technique with low complexity and few complications that enables muscle tissue to be obtained from a previously selected site. It is of use for the diagnosis of different diseases and is one of the services that dermatology can offer to other specialties.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.ad.2020.05.009>.

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