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Resection of a Ruptured Epidermoid Cyst with Limberg Flap: Case Report

Victor Hugo Solis-Reyna*[1], Alicia Valeria Espinosa-Rosales[2], Dioney Josimar Ucan-Gamboa[3], Raul Alfonso Vidales-Lopez[4]
[1,2,3]Surgical Resident. Clínica Hospital Mérida, ISSSTE. Facultad de Medicina de la Universidad Autónoma de Yucatán.
[4]General Surgeon. Clínica Hospital Mérida, ISSSTE. Universidad Autónoma de Yucatán.

ABSTRACT

Epidermoid cysts, also known as epidermal cysts, keratin cysts, epithelial cysts, or sebaceous cysts (although this term is no longer widely used), are benign lesions frequently seen in clinical practice. These cysts arise from epidermal cells trapped beneath the skin's surface. The most common complication is cyst rupture, which can lead to significant inflammation and even a granulomatous response. This article presents the clinical case of a male patient with a ruptured epidermoid cyst that triggered a granulomatous reaction, treated with surgical excision and reconstruction using a Limberg flap. Proper surgical management is crucial in such cases to prevent long-term complications and ensure optimal healing.

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INTRODUCTION

Epidermoid cysts are benign tumors containing keratin, formed by abnormal proliferation of epidermal cells within the dermis. These lesions are commonly asymptomatic; however, they can become inflamed or even rupture spontaneously, generating a local inflammatory reaction that sometimes leads to granuloma formation due to the release of cyst contents. Despite being generally easy to manage, spontaneous rupture can complicate treatment as complete cyst removal and skin defect repair may be required.[1,2,3]

Epidermoid cysts account for approximately 90% of cutaneous cysts. They are most commonly found in adults between the ages of 30-40, with no clear gender preference. The cysts may have different origins, such as epidermal cell inclusion following trauma, obstruction of hair follicles, or previous surgical procedures. Histologically, they consist of a wall of stratified squamous epithelium surrounding a cavity filled with keratin. Occasionally, these cysts become infected or rupture, complicating their management. [4,5,6]

When an epidermoid cyst ruptures, its contents are released into the surrounding tissue, provoking an acute inflammatory response followed by a chronic reaction mediated by immune system cells. The presence of keratin in the subcutaneous tissue acts as a foreign body, generating a response from multinucleated giant cells, macrophages, and T-lymphocytes, with granuloma formation. Granuloma formation is a natural body response to foreign material; however, it can complicate surgical management and healing. [7,8]

Surgical excision is the treatment of choice. Complete cyst excision, including its capsule, is essential to prevent recurrence. In cases where the cyst has ruptured, generating significant inflammation, wide excision is necessary to remove all inflamed tissue. [9,10]

Depending on the size of the defect resulting from the excision, advanced reconstructive techniques may be required. Local flaps, such as the Limberg flap, are essential tools for closing large defects or defects in areas of high tension. The Limberg flap is a rhomboid transposition flap described in 1946 by Alexander Limberg (1894-1974), widely used for its simplicity, versatility, and ability to evenly distribute surgical wound tension, improving aesthetic and functional outcomes. [11,12]

This article aims to present the surgical management of a complex case of a ruptured epidermoid cyst with granulomatous reaction, treated with wide excision and reconstruction using a Limberg flap. It also reviews the surgical options for managing these complications and discusses the functional and aesthetic outcomes associated with the flap technique. [13,14]

CASE PRESENTATION

The patient is a 55-year-old male with recently diagnosed type 2 diabetes, managed with Metformin 850 mg every 24 hours, without other relevant medical history. He presented with a painful mass in the lumbar region, with a 25-year history of gradual growth over recent weeks, accompanied by erythema, telangiectasia, and localized warmth without additional symptoms. Physical examination revealed a nodular lesion approximately 13 x 7 cm in size, with color changes, telangiectasias, induration, mobility, and no pain upon palpation. The lesion had well-defined borders, with no neurovascular compromise in the lower limb (Fig. 1).

Fig. 1.- Epidermal cyst in the left lumbar region with telangiectasia, local warm and induration.

A simple and contrast-enhanced computed tomography (CT) scan of the left lumbar region and lower limb was performed to characterize the clinically observed lesion. The simple phase showed a well-defined, oval-shaped lesion located in the subcutaneous tissue of the left lumbar region, with heterogeneous density, predominantly hypodense, with areas suggestive of cystic content and no evidence of calcifications. Slight thickening of adjacent fascial planes was observed, suggestive of local inflammatory reaction. There were no signs of deep muscle invasion or bone involvement. In the contrast phase, the lesion showed peripheral contrast uptake, with irregular enhancement of the edges, suggesting chronic inflammation or capsular fibrosis. There was no contrast enhancement within the lesion, confirming its cystic nature. Additionally, changes suggestive of cyst rupture were observed, with diffusion of contents into the subcutaneous space and signs of granulomatous reaction characterized by surrounding inflammatory tissue and slight subcutaneous fat edema. No other significant alterations were found (Fig. 2).

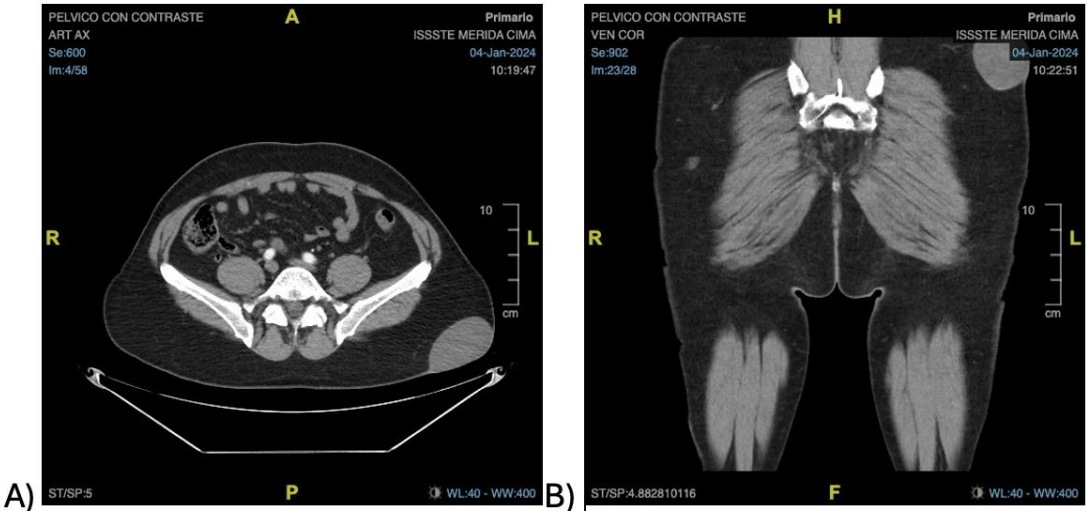

Fig. 2.- Contrast-enhanced CT findings. A well-defined, oval-shaped lesion with peripheral contrast uptake and irregular enhancement of the edges (suggesting chronic inflammation or capsular fibrosis) located in the subcutaneous tissue of the left lumbar region. A) Axial section view. B) Coronal section view.

The CT findings were consistent with a ruptured epidermoid cyst, accompanied by chronic and granulomatous inflammatory reaction. The extent of the inflammatory process suggested the need for wide surgical excision.

Total tumor resection was planned under neuroaxial block anesthesia, with marking of the Limberg flap area (Fig. 3)

Fig. 3.- Surgical site marking with Limberg flap.

Following asepsis and antisepsis, an elliptical incision was made around the mass, extending to the margins of apparently healthy skin, dissecting through tissue layers down to the underlying fascia, and leaving approximately 2 cm of free macroscopic borders. Complete excision of the cyst, including the surrounding inflamed tissue, was performed to ensure removal of all foreign material and minimize the risk of recurrence (Fig. 4).

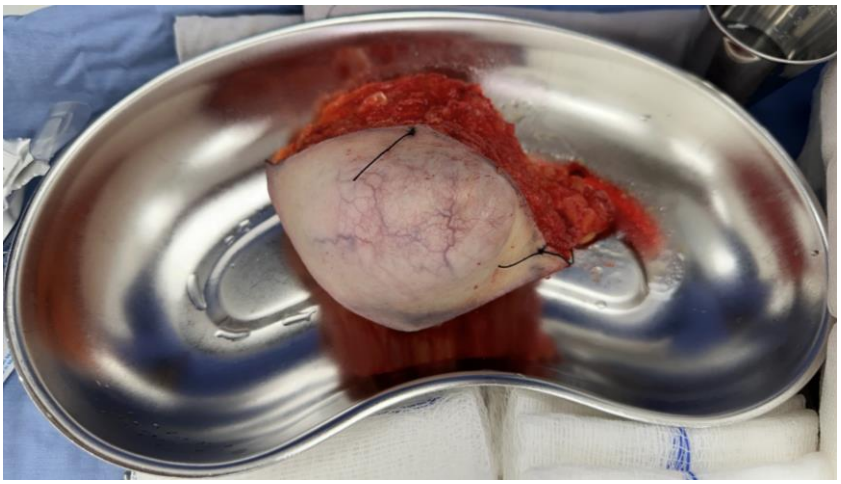

Fig. 4.- Surgical piece including entire cystic and surrounding inflamed soft tissue.

A rhomboid flap was designed with surrounding lateral skin, which was mobilized to cover the defect. The skin was closed in three layers with absorbable sutures (Vicryl 1 and 3-0) in the subcutaneous tissue and non-absorbable sutures (Nylon 2-0) in the skin (Fig. 5). A Drenovac drain was placed to prevent seroma formation and preserve vascular pedicle circulation.

Fig.5.- Rotated rhomboid flap. The skin defect has been closed.

The patient had a satisfactory immediate postoperative course, with adequate pain control and no early complications. The drain was removed on the third postoperative day, and the patient was discharged on the fourth day with outpatient follow-up (Fig. 6).

Fig. 6.- Surgical wound on fourth postoperative day. No local complications occurred.

At follow-up visits at 2 and 4 weeks, adequate healing was observed with no signs of infection or cyst recurrence, and the patient reported complete pain relief (Fig. 7).

Fig. 7.- Surgical wound on fourth postoperative week. Stitches have been removed, the edges are in epithelialization, residual scab is observed in the middle third.

Final histopathology reported: Ruptured epidermoid cyst with foreign body granulomatous reaction. Margins negative for lesion. Benign. The patient was discharged from the surgery service.

DISCUSSION

Rupture of epidermoid cysts is a common complication, especially when they reach significant sizes or are exposed to repeated trauma. Upon rupture, the keratinous content is released into the surrounding tissues, triggering an intense inflammatory response. This reaction may manifest acutely or, as in our case, chronically, with granuloma formation around the foreign material. Keratin acts as an irritant that macrophages cannot easily degrade, leading to granuloma formation. [2,15, 16]

Management of ruptured epidermoid cysts must be aggressive, as simple drainage will not be sufficient to prevent recurrence. Wide excision of the ruptured cyst and surrounding inflamed tissue is essential to remove all keratinous material and formed granulomas. In this case, complete surgical resection of all inflamed tissue was performed, preventing recurrence. [1,17, 18]

The Limberg flap is an excellent option for reconstructing moderate to large skin defects in areas such as the lumbar region, where skin elasticity is limited. This technique provides adequate defect coverage, with even distribution of wound tension, facilitating rapid healing and minimizing the risk of dehiscence. Additionally, the flap uses a well-vascularized pedicle, improving healing and reducing the risk of flap necrosis. [11, 19, 20, 21]

In our case, the use of the Limberg flap allowed for effective reconstruction of the post-resection defect, with excellent aesthetic and functional results. No short- or medium-term complications were observed, and the patient reported a quick and satisfactory recovery. [14, 22]

CONCLUSION

Rupture of epidermoid cysts with granulomatous reaction is a complication that requires extensive surgical intervention to prevent recurrence and adequately control inflammation. Wide resection of the ruptured cyst and reconstruction with local flaps, such as the Limberg flap, are key strategies in managing these cases. The Limberg flap stands out for its simplicity, versatility, and ability to provide adequate coverage in areas with high skin tension, such as the lumbar region.

This case illustrates the effectiveness of wide resection combined with the use of the Limberg flap in resolving complications from ruptured epidermoid cysts, achieving optimal healing and favorable aesthetic and functional outcomes for the patient.

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