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CASE REPORT

Intractable malleolar bursitis treated with lateral calcaneal artery adipofascial flap

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Summary Infections of the malleolar bursa, which is an adventitious bursa, rarely progress to intractable infectious bursitis. We present two cases of intractable malleolar bursitis. We performed successful transplantation of the lateral calcaneal artery adipofascial flap that resulted in healing of the bursitis. We discuss classification of bursae, treatments for bursitis and characteristics of the lateral calcaneal artery adipofascial flap.

Although malleolar bursitis often responds to nonoperative treatment, surgical resection is required when infection occurs.[1] Rarely, it becomes intractable in compromised patients with abnormal sensation or circulatory disturbance in the legs. We present two cases of patients with intractable malleolar bursitis not healed with surgical resection of the bursa and direct wound closure alone, but each were treated successfully with a lateral calcaneal artery adipofascial flap.

Case reports

Case 1

A 64-year-old man, who worked at a local forestry office where the wearing of boots was required, had experienced local heat and redness over the left lateral malleolus. After clinical diagnosis of lateral malleolar bursitis was made at another hospital, he had undergone resection of the bursa and direct suturing at that institution. Histologic examination of the bursa showed synovial-like cells in the lining of the cyst. The wound had become disrupted and infected, and a second excision of the bursa and wound closure by transplantation of a bipedicle flap had been performed. Because the wound had broken open again, he was referred to our hospital. A culture of the wound discharge was positive for *Staphylococcus aureus* and *Streptococcus agalactiae*.

The lateral calcaneal artery was identified by Doppler flowmeter, and the skin was marked accordingly for transplantation of an adipofascial flap (Fig. 1(A)). Debridement of the bursa resulted in 3×3 cm soft tissue defect under the skin. We

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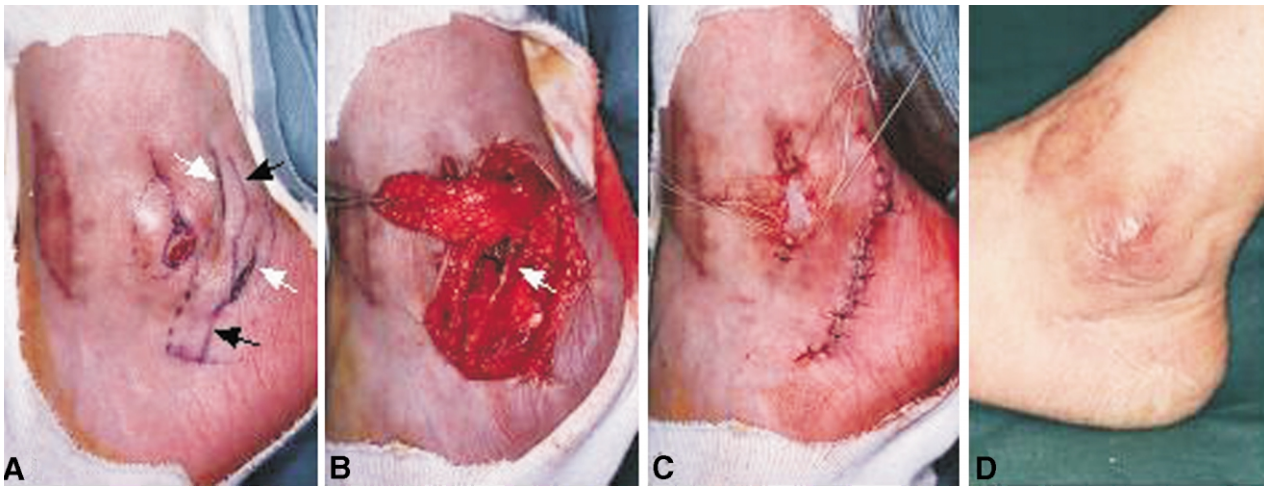

Fig. 1 Case 1 (A) The broken line on this photograph of the lateral malleolus indicates the subcutaneous fistula. The solid lines below the lateral malleolus indicate the lateral calcaneal artery (white arrows) and the incision line (black arrows). The skin graft for the bipedicle flap is observed anterior to the lesion. (B) The adipofascial flap is elevated and transferred to the defect. The arrow indicates the preserved sural nerve. (C) A small skin graft is performed on the flap. The donor site is closed directly. (D) Result 15 months postoperatively.

elevated a lateral calcaneal adipofascial flap which was 3 × 6 cm in size and transplanted it through a subcutaneous tunnel to fill the defect (Fig. 1(B)). We could separate the sural nerve from the adipofascial flap at the donor site. The skin defect left by the debridement of the bursa was covered by a small full-thickness skin graft (Fig. 1(C)). There was no hypesthetic area on the donor site after the operation. After healing, the reconstructed and donor sites were stable, and the patient tolerated the daily wearing of boots well (Fig. 1(D)).

Case 2

A 79-year-old woman, who suffered from diabetes mellitus, spinal canal stenosis, and bilateral gonarthrosis, had experienced swelling without pain in the left lateral malleolus. Her legs were hypesthetic, and she reported that her left lateral malleolus was usually rubbed on carpet or *tatami* matting during physical movement because of her bilateral gonarthrosis. A clinical diagnosis of lateral malleolar bursitis had been made at another hospital, but the wound had not responded to conservative treatment. She had undergone resection of the bursa and direct suturing. Because her wound had broken open, she was referred to us. *Staphylococcus aureus* was cultured from the wound discharge. An adipofascial flap measuring 2.5 × 6 cm was elevated and transferred through a subcutaneous tunnel to fill the soft tissue defect. We did not need to use a skin graft to close the wound because the skin defect was not wide. Her postoperative course was uneventful. The primary defect and the flap donor site have been healed now for 2 years.

Discussion

Bursae are closed sacs lined by a synovial-like membrane and contain synovial fluid. They relieve friction between bones and tendons, between bones and skin, or between tendons and ligaments. There are more than 78 bursae on each side of the body.[2] Some of the major bursae include the olecranon, subacromial, posterior shoulder, iliopsoas, trochanteric, ischial, prepatellar, superficial and deep infrapatellar, gastrocnemius, anserine, retrocalcaneal and metatarsophalangeal, but many of the others are unnamed.[3] Bursae are often classified according to their location or by the time at which they are formed. They can first be divided into the superficial type (in the subcutaneous tissue) and the deep type[3] and secondly, into the constant type and the formed type.[4] Constant bursae are present at birth and comprise the major bursae mentioned above. The formed bursae are acquired later in life after the occurrence of repeated pressure over bony projections, and these are called adventitious bursae. Because there are normally no bursae around the malleolar region, malleolar bursitis is caused by adventitious bursa.[1] Immoderate pressure on the malleolar area from ill-fitted boots in case one and from repeated rubbing of this area on the floor in case two were thought to be the respective causes of bursae formation in these two patients.

Generally, bursitis is classified as aseptic or septic.[3-5] Most cases are of the aseptic type. Aspiration from the bursae and injection with corticosteroids have been proposed as the treatment for the aseptic bursitis.[4] However, antibiotic therapy, bursal drainage or surgical debridement are required to treat septic deep bursitis.[3-5] Malleolar bursitis is most often healed by conservative therapy. Brown et al.[1] succeeded in healing infectious malleolar bursitis by complete resection of the bursae and simple suturing. However, the bursitis in the present cases could not be healed until an adipofascial flap was transplanted. We believe that filling of the subcutaneous space left by tissue debridement with soft and pliable tissue with adequate blood supply is necessary to heal intractable infectious bursitis.

Use of the lateral calcaneal artery skin flap for heel reconstruction has been reported since 1981.[6-8] The flap is nourished by the lateral calcaneal artery, which is a terminal branch of the peroneal artery, is drained by the lesser saphenous vein, and is innervated by the sural nerve. Because this fasciocutaneous flap is moved as a transposition flap from the area below the lateral malleolus, a skin graft is usually needed for closure of the donor defect, and a 'dog-ear' or kinking of the pedicle may occur. Bulkiness and occurrence of the dog-ear have been noted as late complications of fasciocutaneous flaps.[9] It is reported that all complications with the lateral calcaneal artery skin flap have occurred at the donor site and include delayed healing, hyperkeratosis and hypesthesia.[8]

In 1996, use of the lateral calcaneal artery adipofascial flap was reported for small defects on the ankle by Lin et al.[10] The advantages of this type of adipofascial flap are that it preserves the sural nerve and does not require skin grafting of the donor site. Usually, adipofascial flaps are suitable for soft tissue reconstruction on the extremities where a thin flap is desirable, there is no excess skin around the lesion, and a skin graft is not acceptable for aesthetic purposes.[11] The lateral calcaneal artery adipofascial flap is limited in size but can fill the defect that usually occurs with malleolar bursitis. Moreover, because it is soft and pliable, it is suitable for use in filling the subcutaneous space left by debridement. In the present patients, we can confirm the usefulness of the lateral calcaneal artery adipofascial flap in the cure of intractable malleolar bursitis and in the minimal donor site morbidity that it offers.

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