

Propeller flap in patient with Ewing's sarcoma in lower limb: a case report study

Abstract

Propeller flap is a standard procedure for lower limb reconstructing defect. Few cases of propeller flap used in sarcoma induced defect have been reported. Here we report a patient with Ewing's sarcoma who presented with left ankle mass. Following Doxorubicin/ Cisplatin- Neoadjuvant the patient was admitted with swelling and biopsy confirmed poorly differentiated sarcoma. Per FNCLCC grading system for histologic type, MRI and cytogenetics, antitumor treatment of sarcoma was done, and patient underwent combined surgery for tumor resection and propeller flap was done.

Keywords: propeller flap, Ewing's sarcoma, lower limb

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Introduction

Propeller flap is 2 blades of unequal length with the perforator forming the pivot point, when Koshima and Soeda,¹ and Kroll et al.,² described the first applications of such flaps. The use of propeller flap of many defect of varying etiology throughout the lower limb resulted in significant benefit.³ Compared with skin connection of axial flap makes an awkward and unsightly twist at its base, which could risk kinking and stretching the pedicle and potentially cause the flap (dog ear) suffer. In contrast, the cutting of all the soft tissue connection to truly detach the flap gives it much greater freedom to pivot and rotate around its pedicle. This procedure also allows for a more distal reach of the flap. Failure of the flap has been reported in 12-13% of patients, due to necrosis. Propeller flap is thought to cause congestion over the muscle, mainly due to compression. Arterial spasm concurrent with hematoma formation may also increase risk of bleeding.^{3,4} Designing the flap continued until better closure of defect has been achieved. We report a case of propeller flap in sarcoma of lower limb.

Case report

A 24years old, Saudi male came to OPD complaint of left ankle swelling discovered 3months prior and increasing in size by time, with no past medical history of chronic disease. On physical examination, swelling over medial aspect of left ankle and above medial malleolus size 6cm x 8cm. The swelling was mobile (not attached to skin) and firm in consistency with good neurovascular status. Patient was referred from another hospital and was admitted for procedure. Resection with +ve margin and excision biopsy of left ankle was done. Histopathology report showed poorly differentiated sarcoma in left ankle by American Joint Committee (AJCC) classification. Patient discharged next day and advised for referral for orthopedic oncology center. Patient was referred back to our center for definitive management. Case was discussed in the sarcoma multidisciplinary tumor board and decision was to start with chemotherapy. His chemotherapy (Anthracycline based) protocol was started. He received 8 cycles of Doxorubicin/Cisplatin. During follow up MRI

showed residual tumor bed, and the patient admitted for surgery. Patient supine, tourniquet placement on thigh and Foley's catheter was inserted. Left lower limb draping, 3cm wide surgical excision of distal left leg tumor bed including medial cortex of tibial bone involving sheath from the tibialis anterior and excising the Saphenous vein and placing bone wax (Figures 1 & 2). Plastic surgery team joined the theater after the orthopedic team, as 7 x 12cm defect in the lower anterior third of the leg was a result of excision with shaving of anterior cortex of tibia and exposure of bone to cover that area. Design of propeller flap was done based on previously marked perforator with Doppler US. The location of posterior tibial perforator was around 6cm proximal to skin defect. Tourniquet was inflated to 300mm Hg, the flap was raised and 3 perforators were visualized and saved. The musculocutaneous perforators and superficial veins were tied with 4-0 vicryl. The pivot point of the flap was most distal 2 perforators and proximal one ligated. The skin paddle was dissected free and pedicled was skeletonized (Figure 3). The plan of dissection was in sub facial plane. The flap was rotated in 180 degree and inset in the defect in tension free manner. Closure was done in 2 layers; the secondary defect was covered with split-thickness skin graft harvested from posteriolateral aspect of the calf with electrical dermatome. Dressing was done with Aquacel silver on donor site and adapted over graft and flap. Penrose draw under the flap placed. Plaster of Paris back slab to raise foot drop was applied. Patient was extubated smoothly with no complications. The operation was successful and the closure of defect was completed. Patient continues visit-follow-up post operatively for clinical measurement, and showed no failure or necrosis or wound healing problems.

Discussion

Propeller flap is the novel method used in closure of tumor resection defect in the ankle. Recently, it has also been used in upper limb and abdomen. It is effective, and its main complications include restricted arc of rotation or poor cosmetic result. A less common complication is reported in 4% of cases.³ However, flap failure is associated with necrosis. In patient with sarcoma, peritumor edema is an important

complication. Similar case reported for anterior lateral thigh flap underwent wide-resection soft tissue sarcoma without skin grafting.⁵ Also, reported cases of tumors resection then covered by propeller flap.⁶ However, skin graft could contribute to color discrimination. Usually shearing or trauma to graft site are the risks. Tightening of skin may increase susceptibility to vascular compromise and partial flap loss.

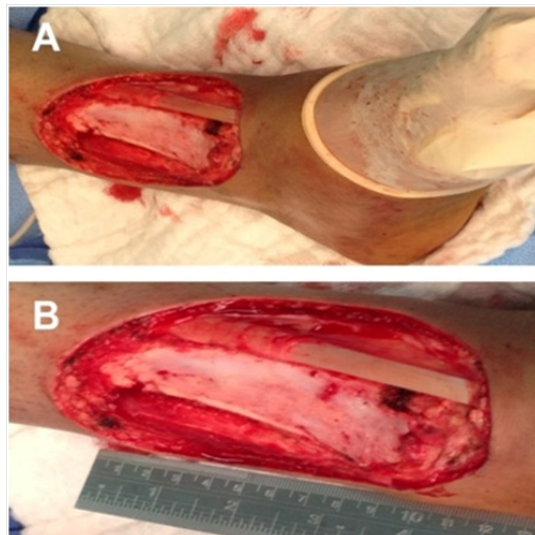


Figure 1 Sarcoma tissue removed from left ankle of patient. Panel A and B with 2 different magnifications.

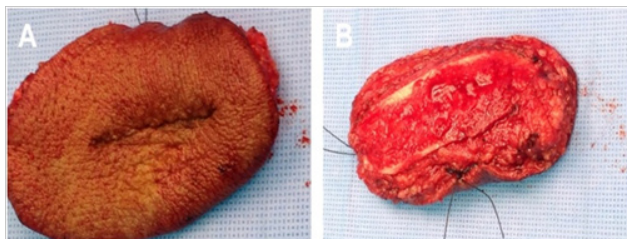


Figure 2 The Anterior (A) and posterior. (B) view of the removed Soft tissue sarcoma.

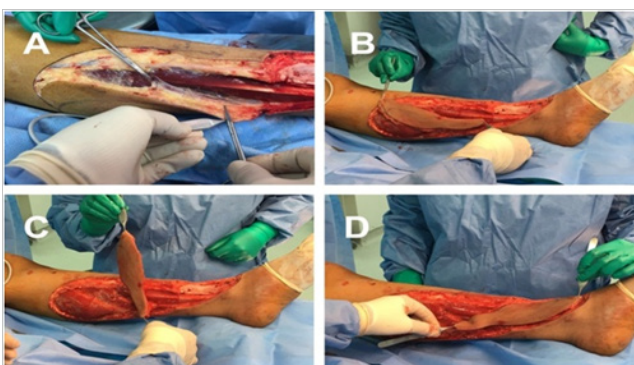


Figure 3 A) Forming the flap with two arms of unequal length for more resilience and tension free.
B) after the flap and the perforator completely dissected.
C) the flap is rotated to cover the defect.
D) The width of the flap is equal to width of the defect with 0.5 cm added.

Infections is less likely,⁷ the literature reveals many reported instances of infections associated with chemotherapy -induced

febrile neutropnia , as well as one report of sarcoma.⁸ In some other studies, skin graft is recommended only when residual defect closure not achievable. Although our patient had sarcoma, given the rapidly progressive nature of disease after surgery, flap was applied and followed by post-operative protocol for viability. It's been reported that patients with poorly differentiated sarcoma, had an increased chance of survival.⁹ However, to confirm radiological and clinical findings, cytogenetics and chemotherapy was started after 2 weeks of the operation, the patient improved, and flap continued to heal without signs of congestion (Figure 4).



Figure 4A The opposite arm of the propeller flap is used to aid closure of the secondary defect with skin graft.

Figure 4B Picture taken at one month post-surgery.

Conclusion

Patient having sarcoma could be reconstructed after resection by propeller flap and skin graft with high outcomes and specifically for lower limb the physician must be cognizant of possible complications that may occur during surgery.

Acknowledgments

None.

Conflicts of interest

Authors declare there are no conflicts of interest.

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