Propeller Flap Reconstruction in Post Oncological Thigh Defect: “The Move in Flap”

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Abstract Reconstruction of soft tissue defects of the limb after tumor resection is challenging question for oncosurgeons. The management differs from reconstruction of post traumatic defects due to the complexity of the primary surgery and subsequent radiation. The conventional propeller flap is based on a perforator which is located close to the defect; but in present case the perforator was located far away from the defect. So we describe it as “Move in flap” as the flap rotated a large volume of soft tissue lying between the defect and the perforator. We present a case of post oncological thigh defect with reconstruction using a propeller flap based on distal anteromedial perforator.

Keywords Propeller flap · Perforator flap · Distal anteromedial thigh perforator · Thigh defect

Introduction

Limb salvage after surgical excision of soft tissue tumor is standardized treatment. Reconstruction of soft tissue defects of the limb after tumor resection is challenging question for oncosurgeons. The distal anteromedial thigh perforators are used the soft tissue reconstruction of knee and upper leg defects because of their consistency in location, size and

numbers [1]. The distal anteromedial thigh perforators can be used as recipient vessels for free flaps or as a source for propeller flaps.

The conventional propeller flap is based on a perforator which is located close to the defect; but in present case the perforator was located far away from the defect. So we describe it as “Move in flap” as the flap rotated a large volume of soft tissue lying between the defect and the perforator.

We present a case of post oncological thigh defect with reconstruction using a propeller flap based on distal anteromedial perforator.

Case Report

A 58 years old gentleman was treated for recurrent soft tissue sarcoma over right thigh. Surgical excision was performed and brachytherapy (interstitial radiation) was administered. Immediate post operative period was uneventful but there was wound gaping after two cycles of brachytherapy. The patient was referred for the management of wound breakdown and soft tissue defect over the anterolateral aspect of the right thigh (Fig. 1). On examination, there was a 10×12cms soft tissue defect over anterolateral aspect of the right thigh with healed proximal scar. The defect was having healthy granulation tissue so the patient was counseled for debridement of the wound and immediately flap cover.

Surgical planning was performed to cover the defect with propeller flap based on perforators in the adductor canal region. The proximal margin of the wound was opened and extended and good set of perforators were identified (Fig. 2). The perforators were found to be appropriate in terms of size and volume, further separation of perforators was performed

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Fig. 1 Soft tissue defect over the anterolateral aspect of the right thigh following soft tissue sarcoma resection surgery. Point A indicates the scar resulting from post-radiation effect and Point B shows the adjacent marking of the perforator signal

till the source vessel. A large fascio cutaneous flap [12×15 cm] was designed keeping the previous surgical scar as the lateral limit (Fig. 3).

The flap was mobilized by 120° in anti clockwise rotation to cover the defect. Laxity of medial thigh tissue and mobilization of the flap donor site margins enabled for primary closure of the primary and secondary defect. During post operative period there was wound dehiscence at the proximal aspect of the flap and thigh junction; which healed conservatively. The patient was treated with external beam radiotherapy after four weeks of flap surgery. Patient is on regular follow-up and there are no signs of distal and local recurrence in two years follow-up duration.

Fig. 2 The proximal margin of the wound and good set of perforators identified. The distal medial thigh perforator [indicated with the artery forceps]

Fig. 3 A large fascio cutaneous flap [12 x 15 cm] with post operative image of the flap. The point A with scar marks has moved from the lateral aspect of the thigh to the medial side indicating the arc of rotation

Discussion

The treatment of soft tissue defects of the limb after tumor resection and radiotherapy is difficult due to wide surgical margins and radiotherapy. The management principles are different in reconstruction of post traumatic and post oncological defects. The lower leg and peri-patellar region is a poor source of flaps and reconstruction of soft tissue defects in this region requires proper surgical planning [1].

The propeller flaps is a local island fasciocutaneous flap based on a single dissected perforator. The use of propeller flaps to cover one lateral side of a limb from other lateral side has been described by Bajantri et al. [2]. This was known as “Throw over flaps” as they have to cross an area of normal tissue before reaching the defect. These flaps have revolutionized the concepts of reconstruction in areas of limited resources for free tissue transfer, doubtful vascularity of the region to be reconstructed and poor general condition of the patient [3]. The propeller flaps can be used to cover defects in other anatomical regions of the body. The perforator flaps are used in defects around knee joint due to availability of plenty of source vessels i.e., adductor canal perforators on the medial side and various branches of the lateral circumflex femoral system on the anterior and lateral aspect [4, 5].

The propeller distal antero medial thigh perforator flap was used in present case for the reconstruction of peripatellar and thigh defects.

We describe it as “Move in flap” as the flap rotated a large volume of soft tissue lying between the defect and the perforator.

The conventional propeller flap is based on a perforator which is located close to the defect; but in present case the perforator was located far away from the defect. The lateral margin of the flap was limited to the previous surgical scar.

The gastrocnemius muscle flaps or superiorly based fasciocutaneous flaps can cover the knee and infra patellar

regions, they cannot reach the supra patellar or inferior thigh regions. So to cover the defects in thigh region the inferiorly pedicled or reverse flow antero lateral thigh flaps and propeller flaps based on various divisions of the lateral and descending branches of the lateral circumflex femoral system and adductor canal perforators can be used .

The treatment with primary closure and skin grafting over soft tissue defect was not feasible because the surgical site was irradiated region and patient required further radiotherapy treatment.

The surgical defect and adjoining area were treated with brachytherapy and good doppler signals were not available to design a conventional propeller flap. So inferiorly pedicled antero lateral thigh flap or flaps based on other branches of the lateral circumflex femoral system in this region were not considered. The options that were available were either a propeller flap from lower medial thigh perforator or free tissue transfer with anastomosis to recipient vessels in the medial thigh region.

Conclusion

The use of ‘moving in’ a large volume of tissue based on the propeller concept between the defect and a far away perforator

a defect on one side of the thigh can be covered by a perforator from the opposite side of thigh . This provides a good reconstruction method with an modification of the propeller flap concept.

Conflict of Interest None

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