

CASE REPORT

Gastrocnemius Flap and Patellar Tendon Reconstruction in Limb Sparing Surgery of Fibrosarcoma at Proximal Tibia Region: A Case Report

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ABSTRACT

A 45-year-old male presented with a tumor over the anterior aspect of his right knee which had enlarged over the past year. Patient was previously treated by a general surgeon who attempt to excise the tumor with histopathologic findings of a fibrous tumor. The tumor eventually grew back and was then treated by an oncologist who performed marginal excision and radiotherapy. Patient subsequently underwent two cycle of radiotherapy but then quit due to undercompliance. One year later the tumor grew even bigger and patient asked for the tumor to be taken without sacrificing his leg.

Key words: Gastrocnemius flap, patellar tendon, fibrosarcoma, oncology, limb sparing

INTRODUCTION

Soft-tissue tumors about the knee include a wide variety of entities, ranging from synovial cysts to aggressive high-grade sarcomas. The overlap in clinical presentation of these various masses frequently results in misdiagnosis and inappropriate treatment. A poorly planned or executed biopsy has been demonstrated to have an adverse effect on patient prognosis and may lead to unnecessary amputation.¹ The primary goal of treatment is local control of the disease while, if possible, achieving salvage of the limb and its function.²

Low-grade myofibroblastic sarcoma represents a distinct atypical myofibroblastic tumor, often with fibromatosis-like features. It occurs predominantly in adult patients with a slight male dominance. Clinically, local recurrences are common, whereas metastases only occur rarely. Therefore, wide surgical resection of the tumor is important³

CASE REPORT

A 45-year-old male visited a general hospital with a soft tissue tumor of the right anterior knee region. Patient had undergone two surgeries of wide excision, the pathological diagnosis before was fibrous tumor, and the lesion recurred locally. He was referred to our hospital 1,5 year after the initial excision. Physical examination of the right anterior knee region revealed mass at anterior knee region extent to the upper side of the tibial tuberosity. The tumor was soft in consistency, bumpy surface, and mova-

ble, and its longitudinal diameter was 12 cm (Figure 1,2). The range of motion of the knee joint was normal. Plain radiographs showed no abnormality.

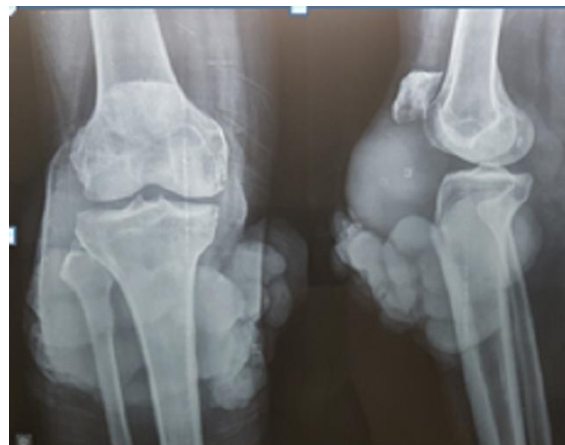


Figure 1: X-ray of right knee joint



Figure 2: Exterior appearance of knee joint

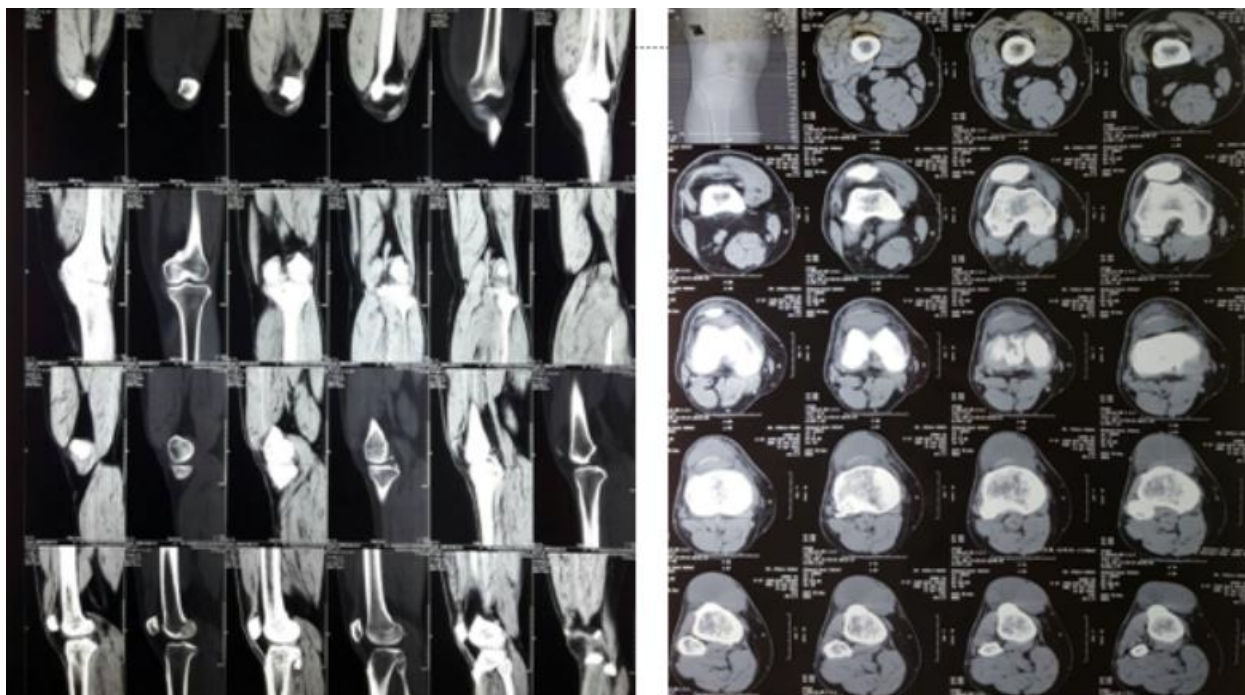


Figure 3: CT scan of right knee joint



Figure 4: Excised tumour

Computed tomography (CT) scan of right knee showed soft tissue mass with density 25-54HU, without calcification, at anterosuperior aspect of tibia dextra, adjacent to the patellar tendon (Figure 3). We established a 2 cm skin margin from the tumor area, and performed wide resection of the tissues surrounding the tumor, including almost the full length of the patellar tendon.

After anteromedial incision, wide tumor resection was performed, resection of knee capsule, patellar tendon, and portions of the muscles attaching to the circumference of the tibia (Figure-4).

Medial gastrocnemius flap

Between the two proximal heads of the muscle, the pedicle to the medial gastroc is identified and traced under the muscle. The nerve branch to the medial gastroc is also identified. The very proximal aspect of the muscle, proximal to the pedicle is then encircled with a finger, scissors or hemostat. The origin of the muscle can then be divided. In a similar fashion, the distal muscle is dissected free, splitting the muscle from the lateral gastroc. Neurovascular structures were exposed and assessed. Care was taken to expose and preserve the medial sural artery, because this is the main branch supplying the medial head of the gastrocnemius muscle. The muscle was then transposed, being rotated anteriorly over the defect and sutured to the remaining muscles depending on the extent of the tumor surgery⁴.

Patellar tendon reconstruction

Pes anserinus was harvested. Drill bit was passed through the central part of the patella to make a tunnel. Graft was passed through the tunnel, multiple interrupted non-absorbable sutures were placed through the lower half of the graft (Figure 5). The appropriate graft length and tension were determined as follows. The skin defect was covered by split-thickness skin graft⁵ (Figure 6). Operation was performed with surgical time 4 hours 55 minutes. Most distal resections were found on postoperative histological examination to have negative margins.



Figure 5: Patellar tendon reconstruction

Postoperative Care and Follow-up

After the wound heal, patient underwent cycle of radiotherapy. One month after surgery, patient underwent another operation to remove the external fixation. There are range of motion limitation of the knee after surgery, and at 1 year follow up, the patient can weight bearing and walk without device assistance. (Figure-6)



Figure 6: External look after surgery

DISCUSSION

Patient insisted on maintaining the functional use of his lower limb. Therefore, a more radical excision

and soft tissue procedure is needed to decreased the chance of recurrence while at the same time help achieve the patient's expectations. A wide excision was performed and the patellar tendon was reconstructed followed by medial gastrocnemius flap and skin grafting. A joint spanning external fixation was placed to help achieve a functional position and stiffness of the joint.

Although limb-sparing surgery has recently become more and more firmly established as a treatment for malignant tumors around the knee, it is still subject to some debate because the complication rates reported—vascular complications, problems with inadequate soft-tissue coverage and, especially, complications of the tumor surgery (arthroplasty, reconstructive surgery) itself—have often been high⁶

Transposition of the gastrocnemius muscle, and muscle transposition in general, has to provide soft-tissue coverage and coverage of the endoprosthesis or reconstructions by filling the dead space left by the tumor resection. The transposed muscle has to support the vascularity of the skin flaps and should be able to prevent wound skin necrosis and wound dehiscence, thus providing for quick healing and earlier rehabilitation and mobilization.⁷

The medial head of the gastrocnemius muscle, which is the part mostly used, meets all criteria for a successful muscle flap. We prefer the medial to the lateral gastrocnemius head because, as experience shows, the muscular portion has a larger volume and is mostly longer.

The medial head of the gastrocnemius muscle can be prepared quickly during the same surgical session as the tumor resection and the reconstructive surgery, saving important time for postoperative care. Preparation of the muscle is safe and easy because it is vascularized by a single vascular pedicle⁸

Former studies evaluated the tendon insertion at the pes anserinus as highly vascularized structure. The perfusion of the area is effected through the network of arterial anastomoses around the joint (anatomical term: Rete arteriosum genus) and, in particular, the inferior medial genicular artery (IMGA). Out of the currently available literature, the following hypothesis was formed: An operation technique with vascularized ACL grafts could accelerate the postoperative remodeling process and could therefore lead to an earlier regain of stability and a faster rehabilitation.⁹

Although surgery alone is feasible for carefully selected cases of soft tissue sarcoma (STS) of the proximal lower extremity, the standard of care for treatment of primary STS continues to be wide excision with radiotherapy before or after surgery. In the 1990s, two large randomized controlled trials established the utility of postoperative radiotherapy

for STS of the extremity. Both studies found significant decreases in local recurrence, but no difference in other endpoints like overall survival or freedom from distant disease.¹⁰ We continue to follow up on patient, especially for functional outcome, recurrence of the tumor, and also late effect of postoperative radiotherapy.

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