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## Radical Resection and Reconstruction for Malignant Posterior Compartment Tumors of calf

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### Abstract

*Wide resection with reconstruction remains a challenge in management of soft tissue sarcoma of posterior compartment of leg. Obtaining adequate surgical margins can result in extensive loss of muscle units resulting in poor function and disability. This technical note illustrates the use of easily available vascular graft material for the reconstruction of large posterior compartment defects of leg.*

### Case History

A 20 year old otherwise healthy male patient noticed a swelling in his left calf in year 2000 at the age of six. Swelling was gradually increasing in size and was not associated with pain or difficulty in walking. There was no history of trauma. Swelling was excised in local facility and was reported as aggressive fibromatosis. No adjuvant treatment was offered. After being well for two year, he noticed a swelling in the same area in 2002 which was re-excised and was reported as Synovial Sarcoma. However, no adjuvant treatment was offered.

Patient was alright and on regular follow up till 2013 when he noticed recurrent swelling at previous surgical site which was associated with pain on walking. He was treated with 3 cycles of chemotherapy (Doxorubicin + Decarbonize +HoloXane with Mesna) with no clinical/radiological response. At this stage, he was referred to our hospital for treatment. Local examination revealed a long surgical scar along posterior calf and popliteal fossa on Left leg. There was a 15x10 cm ill-defined firm swelling involving posterior and postero medial aspect of left leg starting from lower end of popliteal fossa

to about 10 cm proximal to left heel. Patient had a left foot drop and limping gait. Clinically, Dorsiflexion was weak. Dorsalispedis artery was well felt. There was no inguinal lymphadenopathy. MRI of left leg showed a well defined heterogeneously enhancing lesion measuring 15.5 x 5.9 cm and involving both medial and lateral bellies of gastrocnemius, soleus and posterior tibialis muscles. Neurovascular bundle was abutting the lesion with perilesional edema (figure 1,2). HRCT chest did not show any evidence of pulmonary metastasis.

### **Surgical Technique**

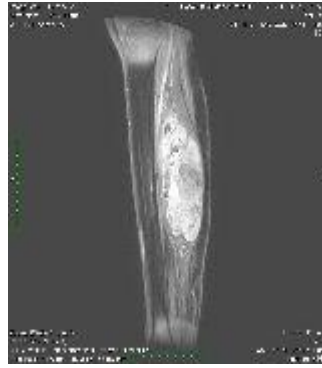
General anesthesia was given and patient was catheterized. Patient was put in prone position. The incision was given encircling the previous surgical scar. Thick cutaneous flaps were raised as fasciocutaneous flap was not possible because of the bulk of tumor. Raphe between medial and lateral gastrocnemius was opened near popliteal fossa and both heads were divided at least 5 cm away from their origin from medial and lateral condyle of femur. Soleus was divided 5-7 cm distal to origin. Flexor digitorum longus was

preserved. Deep and superficial peroneal nerve were safe guarded. Posterior tibial artery was ligated distal to peroneal artery origin which was preserved. Whole of tibialis posterior with both heads of gastrocnemius, soleus and flexor hallucis longus was resected just short of tendo-calcaneus. Hemostasis was achieved. Reconstruction was done by bridging the Achilles tendon with proximal heads of gastrocnemius and soleus muscle with the help of PTFE GORE-TEX vascular graft and was weaved with 5-0 ethibond with peroneus brevis which was partially mobilized. (Figure 3,4). Full tendon transfer of semitendinosus tendons was done and biological reinforcement of Gore-Tex graft was done with mobilized semitendinosus tendon. Knee was immobilized in cast in 10 degree flexion for 6 weeks. Wound healing was satisfactory and patient was allowed non weight bearing mobilization on 3<sup>rd</sup> post operative day. Adjuvant treatment in form of EBRT was started 2 weeks after surgery. Patient could complete his treatment well on time and the functional results at end of eight weeks of surgery were assessed in terms of pain and, functional capacity.

## THE LOWER EXTREMITY FUNCTIONAL SCALE

Sl. No.	Activities	Extreme Difficulty or Unable to perform activity	Quite a bit of difficulty	Moderate difficulty	A little bit of difficulty	No difficulty
1	Any of your usual work, housework, or school activities	0	1	2	3	4
2	Your usual hobbies, recreational or sporting activities	0	1	2	3	4
3	Getting into or out of bath	0	1	2	3	4
4	Walking between rooms	0	1	2	3	4
5	Putting on your shoes or socks	0	1	2	3	4
6	Squatting	0	1	2	3	4
7	Lifting an object, like a bag of groceries from the floor	0	1	2	3	4
8	Performing light activities around your home	0	1	2	3	4
9	Performing heavy activities around your home	0	1	2	3	4
10	Getting into or out of car	0	1	2	3	4
11	Walking 2 blocks	0	1	2	3	4
12	Walking a mile	0	1	2	3	4
13	Going up or down 10 stairs (about 1 flight of stairs)	0	1	2	3	4
14	Standing for 1 hour	0	1	2	3	4
15	Sitting for 1 hour	0	1	2	3	4
16	Running on even ground	0	1	2	3	4
17	Running on uneven ground	0	1	2	3	4
18	Making sharp turns while running fast	0	1	2	3	4
19	Hopping	0	1	2	3	4
20	Rolling over in bed	0	1	2	3	4
	Column Totals:					

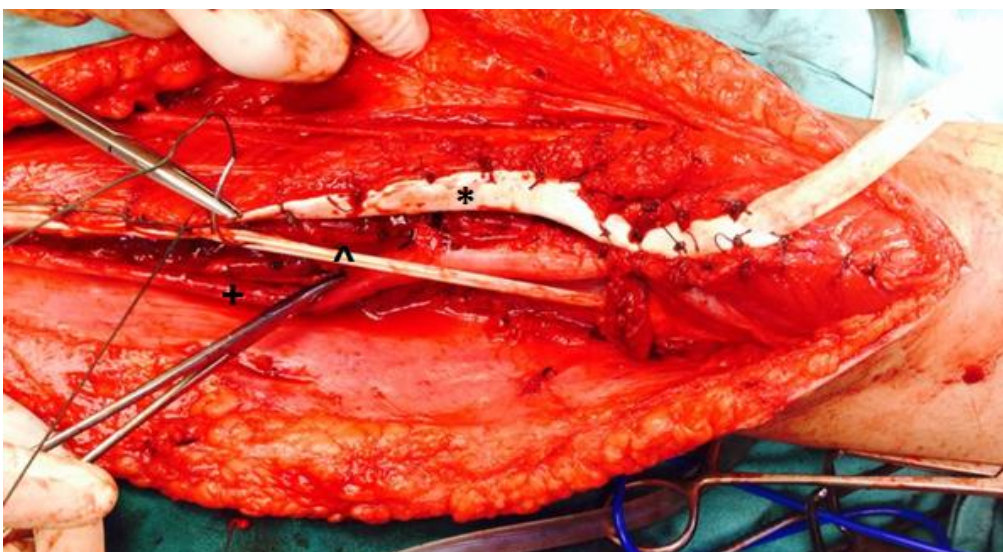
Minimum Level of detectable change (90% confidence): 9 Points



**figure 1** CoronalMRI of leg showing Tumor involving the posterior compartment muscles



**Figure2** Axial view MRI of leg showing a large tumor involving medial and lateral gastrocnemius, soleus and tibialis posterior muscle. Neurovascular bundle being stretched over the tumor



**Figure 3** Intra-operative photograph. Structures marked, \*PTFE-Gore-Tex graft, ^tendon of semi-tendinosus,+ posterior tibial artery



**Figure 4;** post-operative results Foot in plantar Flexion



**Figure 5;** Post-operative results Foot in Dorsiflexion



**Figure 6** Standing on even ground

### Discussion

Conservation surgery with or without adjuvant therapy is the treatment of choice for extremity sarcomas [1, 2]. As soft tissue sarcoma is very aggressive in most of the cases with high rates of local recurrences, a wide margin of normal soft tissue is often required. Tumors of posterior leg managed with wide local excision leaves patient with many functional disabilities particularly when triceps surae complex needs to be sacrificed. Triceps surae complex consists of two heads of gastrocnemius and soleus tendon which joins to form Achilles tendon, which is the primary plantar flexor of ankle and foot. Integrity of Achilles tendon is essential to maintain the balance required in daily activities and to participate in most sports activities. Failure to reconstruct Achilles tendon leads to abnormal or compensatory gait pattern with adaptive changes in knee, hips, pelvis and spine [3]. Several

methods of reconstruction have been described to reconstruct rupture of Achilles tendon like V-Y tendinous augmentation and local tendon transfer [4]. But these are unsuitable to bridge the massive defect created by large resection of a malignant tumor. Moreover some of the methods need sacrifice of healthy tendons.

Restoration of continuity of Achilles tendon with a synthetic material is relatively a new concept and there are few case reports available attempting bridging the triceps surae complex with polytetrafluoroethylene or Gore-Tex vascular graft with satisfactory functional outcome [5]. Gore-Tex has been introduced in cardiovascular surgery for several decades and because of its strength it is used in abdominal aortic aneurysm repair [6]. Its extended use to cover large defect following sarcoma surgery, thus preventing paradoxical movement in chest and to cover large abdominal defect, further proves its strength to use in

musculoskeletal system<sup>[6]</sup>. It's a readily available material and biological re-enforcement gives it more strength and helps in growth of fibrous tissue. Postoperative recovery is no different from that of biological graft. The functional outcome is satisfactory with early mobilization and physiotherapy. Adjuvant radiotherapy could be started at a reasonable interval. At 12 weeks interval, there is stable gain of flexion at ankle with satisfactory performance of activities such as walking, stair climbing, standing for long period, and squatting. Long term outcome needs follow-up in regular interval with detailed functional assessment.

## References

1. S.A. Rosenberg , J. Tepper,E. Glatstein et al.(1982): The treatment of soft tissue sarcomas of extremities. Prospective randomized evaluations of (1) limb – sparing surgery plus radiation therapy compared with amputation and (2) the role of adjuvant chemotherapy- *Annals of Surgery*, vol. 196, no 3, 305 -315.
2. J. T. Parson. R.A. Zlotecki. K.A. Reddy. T.P. Mitchell. R.B. Marcus Jr.and M.T.

Scarborough.(2001): The role of radiotherapy and limb conserving surger-yin the management of soft tissue sarcomas in adults. *Hematology / Oncology Clinics of North America*, vol. 15 , no. 2, 377-388

3. Kissel CG.Blacklidge DK. Crowley DI. (1994): Repair of neglected Achilles tendon ruptures: procedures and functional results- *J foot and ankle surgery*. Vol.33, 46-52..
4. Abraham E.PankovichAM .(1975): Neglected rupture of the Achilles tendon :treatment by a V-Y tendinous flap- *J Bone Joint surgery Am* ,vol.57,253-255.
5. Chia–chun. Timey J.Tamir Pritsch. Jacob Bickels. Martin M. Malwar (2007): Radical resection and segmental Gore-Tex Graft reconstruction for malignant soleus muscle tumor- *Orthopedics*, vol. 30, 1.
6. Piotrowisk JJ.McCroskey BL. Rutherford RB(1989):Selection of graft currently available for repair of abdominal aortic aneurysm-*Surg Clin North Am* ,vol. 69;827-836.