

## Reconstruction of Femoral vein with two saphenous veins after resection of Recurrent Desmoid: ANoble operative technique

Dr Vinay Kumar<sup>1</sup>, Dr Neelesh Shrivastava<sup>1</sup>, Dr Sonveer Singh Gautam<sup>1</sup>, Dr Yogesh Niwaria<sup>2</sup>

<sup>1</sup>Department of Surgical Oncology, AIIMS, Bhopal, India

<sup>2</sup>Department of Cardiothoracic and Vascular Surgery, AIIMS, Bhopal, India

### Correspondence Author:

Dr Vinay Kumar

Associate Professor, Department of Surgical Oncology, All India Institute of Medical Sciences,  
Bhopal, MP, India

[drsharma.vinay@gmail.com](mailto:drsharma.vinay@gmail.com)

### Abstract

Extra abdominal desmoid tumor shows a locally infiltrative and destructive growth pattern despite being benign. Recurrence is common due to highly irregular shape and finger like projections of the tumour. Initial treatment plan is surgical and to achieve R0 resection with broader peripheral and deeper margin, resection and reconstruction of vascular structure in the nearby vicinity is sometimes required. Multiple methods exist to reconstruct the vascular supply. In this article we describe a noble research technique of femoral vein reconstruction by autologous graft (saphenous vein) after complete excision of femoral vein and other deeper margin to achieve the R0 resection for the limb salvage. This newer technique utilises the patient own long saphenous vein conduit and cut into two separate conduit and reconstruct the vascular return to match the diameter and blood flow of the femoral vein. There is no comparative literature available to compare the technique the new femoral saphenous femoral system is equally effective for the optimal vascularisation of the venous system without the need of leaving foreign body inside patient body and incurring any cost to the patients and preventing the patient from lifelong anticoagulation.

**Keywords:** Recurrent desmoid, Femoral vein autologous graft

### Introduction

Desmoid tumors comprise of 0.03% of all tumors and less than 3% of soft tissue sarcomas [4]. Most of them belong to benign category and have high tendency of local site invasion, this is the reason that they have high chance of local recurrence even after surgical resection. The ideal treatment for desmoid tumor is surgery with negative surgical margins [5]. Limb salvage is the treatment of choice for extremities sarcomas [1]. Multiple speciality involvement and multiple surgical speciality co-ordination are required for limb salvage. If the sarcoma supposed to be near the great vessels or involving it, but R0 resection is possible, it can be resected with vessel reconstruction with graft or analogous vein. Limb salvage is also recommended if the salvaged limb has a superior function when compared to a prosthetic limb [1]. Historically The

amputation rate was up to 47% in extremity soft tissue sarcomas, with advancement of the neoadjuvant chemotherapy and radiation the limb salvage become possible and amputation rate decrease up to 4% [7]. The need for venous reconstruction is debated in soft tissue sarcoma resection because the ligatures do not directly interfere with limb preservation, and the patency rates are sometimes unsatisfactory [7]. We describe a newer technique of vascular reconstruction by patient own autologous graft and establishing a femoral saphenous femoral vascular system in a recurrent case of desmoid tumor (fig I and II)



Figure-1 size mass at the anterior aspect of left thigh



Figure -II

The tumor was excised with a negative surgical margin [Figure-3], during resection of the mass on deep plane the femoral vessels was involved by the tumor and

resection of the femoral vessel done for achieving the three-dimensional negative margin.



Figure -III – Primary site after complete resection

#### **Surgical technique for femoral vein reconstruction –**

After excision of tumour, the femoral vein stumps were found too far to be mobilized for an end-end anastomosis. The choice of reconstruction of femoral vein was a prosthetic fabric vascular conduit or autologous conduit. The advantage of prosthetic conduit was its ready availability in preferred sizes and length but has the morbidity associated risk of thrombosis in a low flow venous circulation and life-long anticoagulation to keep it patent. Hence, it was preferred to reconstruct the femoral vein by autologous saphenous vein conduit. The main disadvantage with using saphenous vein conduit was size mismatch of femoral vein and saphenous vein (8mm versus 5 mm respectively in this case). To

minimize complications associated with size mismatch and the reduced venous return thereon, we used a novel technique of using two autologous saphenous vein interposition conduits to reconstruct the femoral vein. The great saphenous vein was harvested from opposite thigh of the patient to get a larger diameter saphenous vein. Before anastomosis, patient was heparinized with 5000 units of unfractionated heparin. The proximal and distal stump of the femoral vein was ligated. Two appropriate length conduits were fashioned from the harvested vein. The ends of the saphenous vein were anastomosed with proximal and distal stump of femoral vein in end-side fashion using

7-0 polypropelene sutures, continuous suture (Femoral-After completion of anastomosis, invasive pressures were taken in the femoral vein proximal and distal to

Saphenous-Femoral) technique the anastomosis. No flow gradient was noted suggesting non-obstructed flow across the anastomosis.

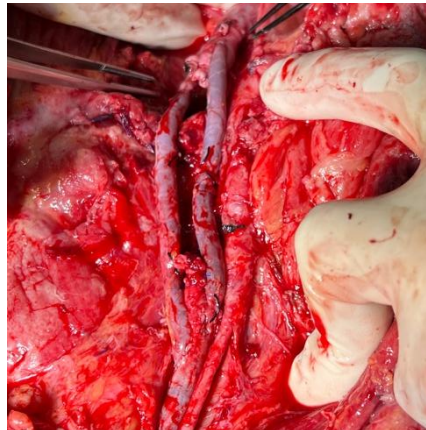


Figure -IV – reconstruction of femoral vein with two saphenous veins

#### Discussion -

Soft tissue sarcoma involving the major vessels is a surgical challenge. The lower extremity, especially the proximal region (e.g., proximal thigh), is a region where the resection of a comparatively small section of a muscle, the femoral nerve, or the lymphatics can result in significant functional impairment of the leg distal to the operated area [2]. Emerging of oncovascular surgery is a key to unlocking this issue. It shows acceptable long-term functional results after the resection of involved vessels followed by autologous or allograft reconstruction. Arterial resection followed by reconstruction is well documented in various studies for maintaining the vascular integrity of the salvaged limb. One meta-analysis elaborated on arterial reconstruction in soft tissue sarcoma with a limb salvage rate of up to 89.8% after arterial reconstruction [3]. However, after resection of the vein, whether reconstruction is needed or not is still not evaluated well [1]. Homsey et al., in their study, show that femoral

veins which were resected for getting negative margins were mostly reconstructed by allograft. In contrast, the vein as an autograft was used limitedly. In our case report, we resected the femoral vein in view of complete encasement by the tumor, and resected end was reconstructed with two saphenous veins. The reason for the two saphenous veins Femoral-saphenous Femoral procedure (FSF) was the size discrepancy of the proximal and distal stump and to avoid allograft for reconstruction. The primary issue with a major vessel reconstruction is the patency rate of the reconstructed vessels. Song TK et al., in their study, demonstrate that the arterial reconstruction had a lower patency rate than the venous patency rate after reconstruction (58% versus 78%) [6]. In our case, venous reconstruction was done with a saphenous vein to maintain the patency of the anastomotic site. It was supported by the study of Song TK et al., where they used a saphenous vein as a primary autogenous graft for venous reconstruction.

#### Conclusion –

While technically demanding, the Femoral Saphenous Femoral procedure (FSF) can be utilised for in situ reconstruction technique for patients with femoral venous excision after achieving R0 margin in multiple soft tissue sarcoma cases involving femoral vein excision leading to limb conservation. Optimal patient outcomes require proper patient selection and

adherence to meticulous surgical technique. An appropriate risk-stratified comparative randomised studies will be required to determine the optimal outcome of this noble technique of reconstruction of the femoral vein.

#### References:

1. Akgül T, Sormaz İC, Aksoy M, Uçar A, Özger H, Eralp L. Results and functional outcomes of en-bloc resection and vascular reconstruction in extremity musculoskeletal tumors. *Acta OrthopTraumatolTurc.* 2018 Nov;52(6):409-414. doi: 10.1016/j.aott.2018.08.004. Epub 2018 Sep 28. PMID: 30274704; PMCID: PMC6318543.
2. Homsy, P., Kantonen, I., Salo, J., Albäck, A., & Tukiainen, E. (2022). Reconstruction of the superficial femoral vessels with muscle flap coverage for soft tissue sarcomas of the proximal thigh. *Microsurgery*, 42 ( 6), 568–576. <https://doi.org/10.1002/micr.30932>
3. Fujiki M, Kimura T, Takushima A. Limb-salvage surgery with vascular reconstruction after lower extremity sarcoma resection: A systematic review and meta-analysis. *Microsurgery.* 2020 Mar;40(3):404-413. doi: 10.1002/micr.30553. Epub 2020 Jan 6. PMID: 31903669.
4. Omar A. Santiago Báez, Atenas A. Martínez Bernal, Pedro E. Ruiz Medina, Jaime A. Aponte Ortiz, Victor N. Ortiz Justiniano, Surgical management of recurrent desmoid tumor in a young male, *Journal of Pediatric Surgery Case Reports*, Volume 82, 2022, 102302, ISSN 2213-5766, <https://doi.org/10.1016/j.epsc.2022.102302>.
5. Buitendijk, S., van de Ven, C.P., Dumans, T.G., den Hollander, J.C., Nowak, P.J., Tissing, W.J., Pieters, R. and van den Heuvel-Eibrink, M.M. (2005), Pediatric aggressive fibromatosis. *Cancer*, 104: 1090-1099. <https://doi.org/10.1002/cncr.21275>
6. Song TK, Harris EJ, Raghavan S, Norton JA. Major Blood Vessel Reconstruction During Sarcoma Surgery. *Arch Surg.* 2009;144(9):817–822. doi:10.1001/archsurg.2009.149
7. Nishinari K, Krutman M, Junior SA, Pignataro BS, Yazbek G, Bomfim GA, Teivelis MP, Wolosker N. Surgical outcomes of vascular reconstruction in soft tissue sarcomas of the lower extremities. *Journal of Vascular Surgery.* 2015 Jul 1;62(1):143-9.
8. Sbaraglia M, Bellan E, Dei Tos AP. The 2020 WHO Classification of Soft Tissue Tumours: news and perspectives. *Pathologica.* 2021 Apr;113(2):70-84. doi: 10.32074/1591-951X-213. Epub 2020 Nov 3. PMID: 33179614; PMCID: PMC8167394.
9. Riedel RF, Agulnik M. Evolving strategies for management of desmoid tumor. *Cancer.* 2022 Aug 15;128(16):3027-3040. doi: 10.1002/cncr.34332. Epub 2022 Jun 7. PMID: 35670122; PMCID: PMC9546183