

Unusual Anterolateral Fascio Cutaneous Tight Flap for Extremity Soft Tissue Reconstruction

Eurico Cleto Ribeiro de Campos¹, Pedro Afonso Kono¹, Elder Dalazoana Filho¹,
Melquisedeque dos Santos¹, Matheus Von Jelita Salina¹, Marcelo Augusto de Souza¹,
Leandro Cavalcante Lipinski¹, Guataçara Salles Junior²

¹Department of General Surgery, Ponta Grossa State University, Ponta Grossa, Brazil

²Plastic Surgery, São Vicente Oncology Hospital, Curitiba, Brazil

Email: euricocr Campos@gmail.com

How to cite this paper: de Campos, E.C.R., Kono, P.A., Filho, E.D., dos Santos, M., Salina, M.V.J., de Souza, M.A., Lipinski, L.C. and Junior, G.S. (2024) Unusual Anterolateral Fascio Cutaneous Tight Flap for Extremity Soft Tissue Reconstruction. *Modern Plastic Surgery*, 14, 108-112.
<https://doi.org/10.4236/mps.2024.144011>

Received: July 11, 2024

Accepted: October 15, 2024

Published: October 18, 2024

Copyright © 2024 by author(s) and Scientific Research Publishing Inc.
This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).
<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Soft tissue sarcoma is rare neoplasms that affect mainly the extremities. Surgery is the mean treatment and the resection results in extensive muscle and skin loss. The anterolateral tight flap is a good option for sarcomas arising in knees, superior third of legs and the medial face of thigh. The anatomy knowledge and the multidisciplinary approach is very important for a successful reconstruction. The authors report a successful case treated with the anterolateral tight flap and a literature review.

Keywords

Soft Tissue Sarcoma, Anterolateral Tight Flap, Reconstruction

1. Introduction

Clear Cell Sarcoma (SCC) corresponds to less than 1% of sarcomas, being a rare and aggressive soft tissue sarcoma (STS). Also called Malignant Soft Part Tissue Melanoma, it causes diagnostic difficulties in relation to primary cutaneous melanoma and sometimes with more extensive cutaneous involvement in relation to other sarcomas [1].

Like all sarcomas, it tends to affect the extremities more and less frequently the trunk and head and neck [2] [3]. Soft tissue sarcomas depending on their size, degree and location can be treated with surgery, chemotherapy, and radiation therapy. The treatments also can be offered in a context before or after surgery, combined or not [2] [3].

The main therapeutic modality continues the surgery through programmed three-dimensional, compartmental, marginal resections, with or without vascular

nerve reconstruction or skin grafts [2] [3]. Sarcomas with extensive cutaneous involvement require local reconstructions, with myocutaneous flaps, fascio cutaneous flaps, free grafts or microsurgical reconstructions [4].

2. Objective

To present a case of clear cell sarcoma operated after neoadjuvant chemotherapy treatment, in which a three-dimensional resection of the tumor was performed and reconstruction with an unusual fascio cutaneous thigh flap. The authors emphasize the importance of anatomy knowledge and the multidisciplinary approach in the soft tissue sarcoma management.

3. Case

STS female patient with the disease affecting the left medial compartment of the thigh. She was treated with neoadjuvant chemotherapy and subsequent medial compartment resection, extended to the skin. Considering that the patient presented to the service with a clear cell sarcoma, a subtype that is associated with the commitment of regional lymph node, a search for sentinel lymph node was made at the left side. With the resection of the adductor muscles and adjacent skin, by local injection, a reconstruction of the was made utilizing an anterior compartment fascio cutaneous flap based on reverse flux of the lateral superior genicular artery, after ligation of the descendent branch of lateral circumflex femoral artery (**Figure 1**).



Figure 1. Antero lateral thigh flap for medial compartment defect.

4. Discussion

STS resections constantly result in cutaneous defects, implicating on more complex reconstructions for the wound closure, impairing the achievement of free surgical margins [5].

In the present case, due to the increased risk of lymphatic dissemination, in addition to resection of the lesion, the patient underwent sentinel lymph node research [6]. Due to the greater involvement of the skin, assessed through physical and complementary examination and the biological knowledge of the lesion that acts as a primary cutaneous melanoma, we opted for the use of an anterolateral

thigh fascio cutaneous flap with irrigation based on the reverse flow of the superior genicular lateral artery after ligation of the descendent branch of circumflex lateral femoral artery [7].

The anterolateral thigh flaps are the most appropriated for reconstruction of thigh defects because they allow reconstruction at sites presenting important tissue loss, associated with a long vascular pedicle and ensuring more amplitude on the defect's coverage. The pedicle can reach up to 16 cm, assuring the surgical team the ability to reconstruct large defects and free of tension. In this case, two teams can work simultaneously on the tumor resection and obtaining tissue for the adequate reconstruction [8] [9].

The fasciocutaneous flaps permits a proper local reconstruction, proportional and adjusted to the surgical defect generated, as well as enabling different orientations, to guarantee a precise positioning at the resection site. The selected reconstruction will depend on the clinical status of the patient, the multidisciplinary approach, and the ability of patient to perform the postoperative rehabilitation [8] [9].

Pan *et al.* [10] better describe the anterolateral thigh flap supply. This flap has been used more frequently for reconstruction of the knee, upper third of the leg and skin defects of medial face of thigh. The flap has blood supply from cutaneous branches or musculocutaneous perforators with origin at lateral circumflex femoral system. The best size of the flap is 7.0 × 16.0 cm, avoiding major risk of necrosis. For the authors, the main advantages of this flap include a long pedicle length, enough tissue vascularization, the flap can be associated to the fascia lata muscle for tendon reconstruction and favorable donor-site selection, without sacrifice of major vessels or muscles [10].

There are a few articles in literature reporting the approach of STS surgical wound closure with local reconstruction or the employment of fascio cutaneous anterolateral thigh flaps. This procedure, when achievable, must be done at the same time of the main surgical procedure, considering that immediate reconstructions result in greater functional recovery, a low number of surgical procedures, a more rapid return to work activities, avoiding fibrosis, with possible local anatomic distortion and possible radiotherapy effect, when indicated as adjuvant treatment [11] [12]. The recurrence rate after a major sarcoma resection and reconstruction depends on tumor biology and surgical specimen margins, even though sarcomas tend to recur at other anatomic sites, as lung and liver and less frequently at local site.

Elswick *et al.* [4] have shown that in 159 thigh sarcoma patients that have been operated, the most frequently used form of reconstruction was the based on local or regional pediculated muscular flaps, as well as the fascio cutaneous flaps. In 4% of the cases, free microsurgical flaps were utilized.

The anterolateral thigh flap must not be used when large resections are expected with skin defects superior to 16.0 cm and mainly when the amputation of the limb is considered as the principal surgical modality, in consequence of a large soft tissue loss and consequent functional impotence of the limb. In this situation free

microsurgical flaps are more indicated [13].

The advantages for anterolateral thigh flap are: 1) long pedicle, large caliber, and enough blood supply; 2) large size and range of arc rotation; 3) the thickness of the flap is thinner than that of the muscle cutaneous flap; and 4) small morbidity of the donor area [14]. Among the inconveniences described are the risk of venous congestion due to long retrograde flow and arterial impairment due to compression or kinking of the pedicle [14]. Aesthetic sequela of donor area also happens.

After the surgical procedure, the limb is kept extended and with reduced mobility. There must be daily assessment for the possibilities of infection, necrosis, hematoma and dehiscence.

5. Conclusion

The anterolateral fascio cutaneous flap of thigh is a safe and excellent option for STS reconstruction of inferior extremity. The STS surgery must be done by a multidisciplinary approach looking for a free surgical margin and a satisfactory extremity motor function. If it is possible, all the reconstructions must be done at the same time of the main procedure assuring that is done without fibrosis and less anatomic distortion.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Falconieri, G., Bacchi, C.E. and Luzar, B. (2012) Cutaneous Clear Cell Sarcoma: Report of Three Cases of a Potentially Underestimated Mimicker of Spindle Cell Melanoma. *The American Journal of Dermatopathology*, **34**, 619-625. <https://doi.org/10.1097/dad.0b013e3182473190>
- [2] Rosenberg, S.A., Tepper, J., Glatstein, E., Costa, J., Baker, A., Brennam, M., *et al.* (1982) The Treatment of Soft-Tissue Sarcomas of the Extremities: Prospective Randomized Evaluations of (1) Limb-Sparing Surgery Plus Radiation Therapy Compared with Compared with Amputation and (2) the Role of Adjuvant Chemotherapy. *Annals of Surgery*, **196**, 305-315. <https://doi.org/10.1097/0000658-198209000-00009>
- [3] Endo, M. and Lin, P.P. (2018) Surgical Margins in the Management of Extremity Soft Tissue Sarcoma. *Chinese Clinical Oncology*, **7**, 37-37. <https://doi.org/10.21037/cco.2018.08.10>
- [4] Elswick, S.M., Wu, P., Arkhavan, A.A., Molinar, V.E., Mohan, A.T., Sim, F.H., *et al.* (2019) A Reconstructive Algorithm after Thigh Soft Tissue Sarcoma Resection Including Predictors of Free Flap Reconstruction. *Journal of Plastic, Reconstructive & Aesthetic Surgery*, **72**, 1304-1315. <https://doi.org/10.1016/j.bjps.2019.04.016>
- [5] Siegel, G.W., Kuzon Jr., W.M., Hasen, J.M. and Biermann, J.S. (2016) Staged Soft Tissue Reconstruction Following Sarcoma Excision with Anticipated Large Cutaneous Defects: An Oncologically Safe Alternative. *Iowa Orthopedic Journal*, **36**, 104-108.
- [6] van Akkooi, A.C.J., Verhoef, C., van Geel, A.N., Kliffen, M., Eggermont, A.M.M. and de Wilt, J.H.W. (2006) Sentinel Node Biopsy for Clear Cell Sarcoma. *European Journal of Surgical Oncology (EJSO)*, **32**, 996-999.

- <https://doi.org/10.1016/j.ejso.2006.03.044>
- [7] Salles-Junior, G.S., Freitas, R.D.S., Novais, J.R., Maschio, A.G., Paula, D.R., Mascante, R.F.R., *et al.* (2018) Reverse Anterolateral Thigh Flap: A Reconstruction Option for the Lower Limbs. *Revista Brasileira de Cirurgia Plástica (RBCP)-Brazilian Journal of Plastic Surgery*, **33**, 493-500. <https://doi.org/10.5935/2177-1235.2018rbcp0170>
- [8] Radtke, C., Panzica, M., Dastagir, K., Krettek, C. and Vogt, P.M. (2016) Soft Tissue Coverage of the Lower Limb Following Oncological Surgery. *Frontiers in Oncology*, **5**. <https://doi.org/10.3389/fonc.2015.00303>
- [9] Barner-Rasmussen, I., Popov, P., Böhling, T., Tarkkanen, M., Sampo, M. and Tukiainen, E. (2009) Microvascular Reconstruction after Resection of Soft Tissue Sarcoma of the Leg. *British Journal of Surgery*, **96**, 482-489. <https://doi.org/10.1002/bjs.6581>
- [10] Pan, S., Yu, J., Shieh, S., Lee, J., Huang, B. and Chiu, H. (2004) Distally Based Anterolateral Thigh Flap: An Anatomic and Clinical Study. *Plastic and Reconstructive Surgery*, **114**, 1768-1775. <https://doi.org/10.1097/01.prs.0000142416.91524.4c>
- [11] Weschenfelder, W., Gast-Froehlich, S., Spiegel, C., Vogt, M. and Hofmann, G.O. (2020) Factors Influencing Quality of Life, Function, Reintegration and Participation after Musculoskeletal Tumour Operations. *BMC Cancer*, **20**, Article No. 351. <https://doi.org/10.1186/s12885-020-06837-x>
- [12] de Campos, E.C.R., Júnior, M.G.A., Sanches, D., Winheski, M.R., Leal, R.M., Poroski, R., *et al.* (2020) The Importance of the Multidisciplinary Approach to Surgical Treatment of Extremity Soft-Tissue Sarcomas. *Journal of Cancer Therapy*, **11**, 772-784. <https://doi.org/10.4236/jct.2020.1112067>
- [13] Krauss, S., Goertz, O., Pakosch-Nowak, D., Daigeler, A., Harati, K., Lehnhardt, M., *et al.* (2021) Microvascular Tissue Transfer after the Resection of Soft Tissue Sarcomas. *Journal of Plastic, Reconstructive & Aesthetic Surgery*, **74**, 995-1003. <https://doi.org/10.1016/j.bjps.2020.11.013>
- [14] Zhou, G., Zhang, Q. and Chen, G. (2005) The Earlier Clinic Experience of the Reverse-Flow Anterolateral Thigh Island Flap. *British Journal of Plastic Surgery*, **58**, 160-164. <https://doi.org/10.1016/j.bjps.2004.10.011>