

Bilateral Fascia Lata Flap: An Alternative for Massive Abdominal Wall Defect Repair

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Summary: The abdominal wall represents a unique structure of dermo-myotendinous conformation that is considered a surgical challenge. The musculocutaneous pedicled flap, using tensor fasciae latae muscle (TFL), is a technique of abdominal wall repair, and it is becoming a more frequent reconstructive procedure. It is a well-suited procedure because it provides both a semirigid fascia layer and adequate skin coverage. We present a case of a 61-year-old man with the diagnosis of squamous cell carcinoma of the bladder, clinical stage IV (T4bN1M1), complicated with an ileo-recal-urethrocutaneous fistula. We reconstructed a massive defect of the abdominal wall by rotating bilateral pedicled TFL flaps. The therapeutic plan comprised 2 surgical procedures. The first surgical intervention was intended to obtain and temporarily fix the flap, and to allow the delay phenomenon to occur. Three weeks later, we performed the abdominal wall reconstruction by repositioning the bilateral TFL flaps and placing a dual prolene with regenerated oxidized cellulose mesh. We performed a successful palliative procedure in a terminal oncologic patient. Combined with a massive oncologic procedure (done by the oncologic surgeon), we were able to solve the cutaneous fistula and provided a significant improvement in the quality of life. The patient was discharged with no procedure-related complications. He has remained healthy 18 months after surgery, and there has been no evidence of ventral hernia. Bilateral TFL flaps represent a viable alternative for primary or secondary abdominal wall reconstruction in selected cases. This reconstructive strategy should be considered when plastic and reconstructive surgeon faces large and complex abdominal wall defects, associated with significant lack of skin cover. (*Plast Reconstr Surg Glob Open* 2020;8:e2577; doi: 10.1097/GOX.0000000000002577; Published online 28 February 2020.)

The abdominal wall represents a complex structure of dermo-myotendinous conformation. This configuration provides special stability, support, and elasticity that characterize it as a unique structure. The disruption of these structures represents a frequent challenge for the reconstructive surgeons.

The etiology of the complex defects of the abdominal wall is due to primary or secondary weakness because of previous surgical interventions, oncological resections, or after failed reconstruction. For this reason, the reconstructive procedure requires a broad knowledge of anatomy and physiology, and choosing the appropriate surgical technique for each particular patient.

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The primary objective of the reconstruction of any defect in the abdominal wall should include the restoration of structural support as a dynamic unit (functionalization), prevention of eventration, and to provide a stable coverage, optimizing aesthetic outcome in most cases.

During the last 2 decades, the use of skin grafts or flaps and the placement of a mesh have helped to offer a more comprehensive treatment with lower rates of recurrence. However, while this procedure restores the structural component, sometimes it does not allow the wall to recover its function completely, particularly in complete thickness defects. Therefore, a repair with autologous tissue combined with the placement of mesh could represent a breakthrough in the treatment of complex and massive abdominal defects.

Several types of myocutaneous flaps have been used, including the TFL muscle flap, anterolateral thigh flap, and sartorius muscle flap.¹⁻³ Among these, the TFL flap stands out due to its strong and dense fascia, together with the extensive overlying skin complex and anatomically constant vascular pedicle.

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The objective of this article is to present a case of complex abdominal reconstruction using bilateral subcutaneous TFL flaps with a sublay mesh.

METHODS

A 61-year-old man without any known past medical conditions presented with the diagnosis of squamous cell carcinoma of the bladder, clinical stage IV (T4bN1M1), complicated with an ileum-rectum-urethral-cutaneous fistula (Fig. 1A) that required supralelevator total pelvic exenteration with an en bloc resection. The patient ended with a complex postoperative defect in the abdominal wall measuring 24.5 cm × 21.3 cm (Fig. 1B), compromising the function, coverage, and aesthetics, and significantly affecting his quality of life.

We based our approach on the algorithm published by Patel et al⁴ for the reconstruction of the abdominal wall, classifying our case as a complete bilateral defect located in the middle and lower third with bilateral rectus abdominis muscle absence. We considered the defect to be a complete abdominal wall defect because of the full thickness loss of both superficial and myofascial layers. Based on this specific characteristic, we considered using a bilateral TFL flap, aiming for a functional restoration of the wall.

Based on the “delay phenomenon” to promote neovascularization, thus increasing the percentage of survival of the flap, we performed the reconstruction in 2 separate procedures. The first intervention was intended for the complete elevation and temporary fixation of both flaps. The preoperative markings were as follows: the flap pedicle was found by drawing a line from the anterior superior iliac spine to the lateral condyle of the tibia. It was considered that the vascular pedicle was entering the flap 8–12 cm below the iliac spine through the line that was just marked. Then, the skin island was marked using parallel lines considering as the lower limit a distance of 8 cm above the knee (Fig. 2).

After 3 weeks of delay, the rotation of both flaps was performed. Dual prolene/regenerated oxidized cellulose mesh was placed deep in the flap and fixed by nonabsorbable

interrupted suture (Fig. 3). The right TFL flap was rotated toward the lower portion of the abdominal defect and the contralateral flap to the upper portion, with subfascial suction drains placed. Finally, we sutured both flaps with absorbable and nonabsorbable suture (polyglactin 910 and prolene) in interrupted stitches. The donor zone closure was performed by using a meshed partial thickness thigh skin graft (Fig. 4).

The patient was discharged with no complications related to the reconstruction, emphasizing the importance of using the “delay phenomenon” in our flaps. In the follow-up 1.5 years after the surgery, there was no distal or marginal necrosis, with an adequate cover and no evidence of ventral hernia recurrence.

DISCUSSION

The TFL has proven to be a safe and versatile flap. Its first description dates back to 1934 by Wangenstein,⁵ an American surgeon, who used a pedicle flap without an overlying cutaneous island for recurrent abdominal hernias, standing out for a rich vascularization and scarce morbidity in the donor area. Subsequently, multiple cases were published for reconstruction of defects adjacent and distant to the donor zone as a free flap, such as Hill et al⁶ and Nahai et al.⁷ Likewise, techniques with minimally invasive approaches have been described, initially described by Kimura.⁸

The flap can be used as a free flap or as a pedicled one. The latter is more frequently used due to its single dominant vessel (Mathes and Nahai type 1) which provides multiple perforating branches, thus characterizing an abundant vasculature. This configuration offers an optimal condition for the reconstruction and covering of the receptor area in any region of the body, such as face, neck, breast, abdominal wall, inguinal region, perineum, and extremities,^{9–12} taking special importance in the lower third of the abdominal wall, because they share diverse structural characteristics, such as a thin skin cover and strong, dense fascia.^{4,13–15}

Multiple variants have been developed regarding the handling of the flap, which include perforating type,

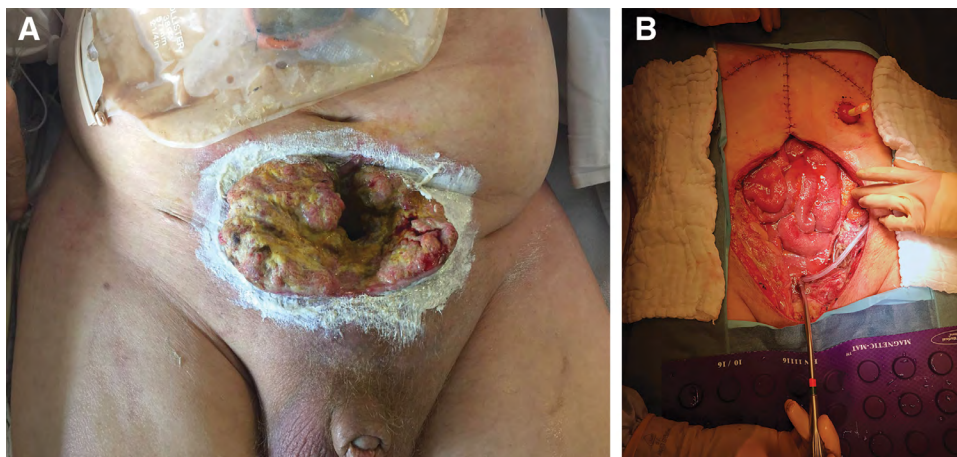


Fig. 1. Patient before and after the supralelevator total pelvic exenteration with an en bloc resection. A, Squamous cell carcinoma bladder complicated with ileum-rectum-cutaneous fistula. B, Postoperative complete wall defect.



Fig. 2. TFL flap grafting with temporary fixation.

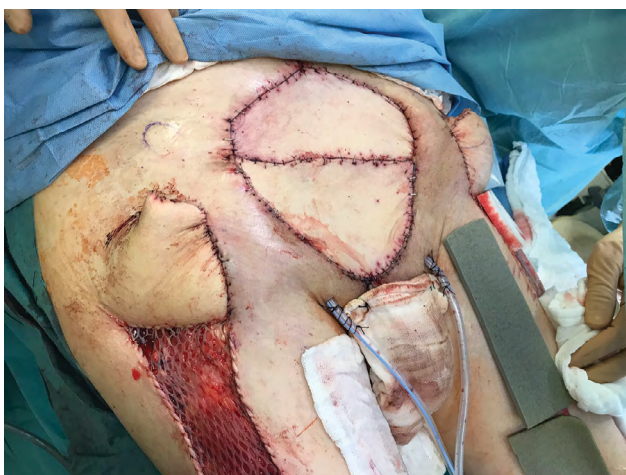


Fig. 3. Complete dissected bilateral TFL flap and fixation of the dual prolene mesh in sublay area.

advance in V-Y, functional muscle, chimeric, subcutaneous, and even combination among them or with other flaps (*rectus femoris* muscle), as published by Saito et al¹⁶ and Hayami et al.¹⁷ It was found in our case that the subcutaneous type allows to preserve the distal cutaneous island of the thigh, and the intermediate cutaneous region between both segments, presenting optimal results with a low complication rate in selected cases.

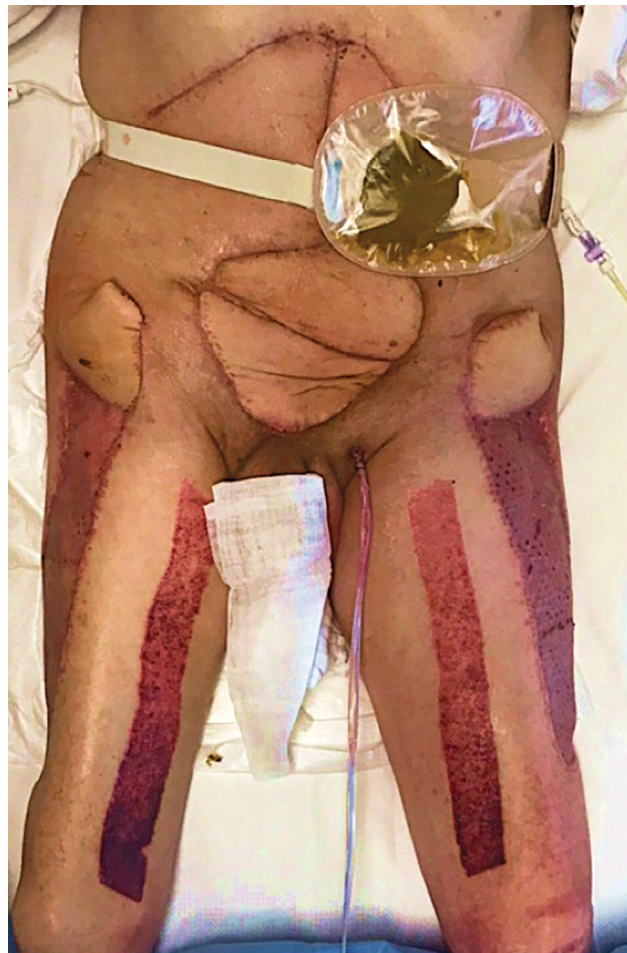


Fig. 4. Results at 1.5 years after the surgery.

The TLF flap is not free of postoperative complications; despite its having a constant vascular pedicle, distal necrosis and in some cases marginal necrosis have been reported.⁴⁻¹⁶ Some of the other complications related to the flap are fascial dehiscence, infection, seroma, and hematoma in the donor site, as published by de Vries Reilingh et al.¹⁸ Gosain et al recommend starting the dissection of the flap no less than 8 cm distal from the lateral edge of the knee, to reduce some of the necrosis complications.¹⁹ There were no immediate postoperative complications in our case. Literature established that necrosis can be expected in 5%–50%, with the chance of being able to reduce the risk of necrosis by the delay phenomenon that was used.

In the long term, Tiengo et al²⁰ published a recurrence rate of abdominal hernia after a TFL flap reconstruction of 15%–17%, similar to that reported in the literature. Recently, Tang et al²¹ and Song et al²² have recommended the reinforcement of the flap with sublay mesh (synthetic or biological), remarkably lowering recurrence up to 12%. In our case, we opted to use a synthetic sublay mesh. We believe that future publications with longer follow-ups may provide a more meaningful analysis of recurrence rates.

CONCLUSIONS

It is crucial to know the multiple ways of performing a reconstruction of the abdominal wall, taking into account those surgically less aggressive according to the patient's health status. In those stable patients with good health status and functionally independent, the TFL flaps represent a versatile and viable alternative for the reconstruction of primary or secondary defects of the abdominal wall in selected cases.

The use of TFL flap represents a reconstructive strategy that should be considered when the reconstructive surgeon faces large full thickness defects located in the lower third of the abdominal wall, significantly improving the patient's quality of life. The flap planning and harvesting must be done thoroughly, complying at all times with the mentioned details, especially the use of sublay mesh and delay phenomenon, to reduce the high complication rates.

However, these conclusions are of a limited nature. This publication should stimulate more extensive prospective studies in the future, through case series with a larger population and randomized controlled trials.

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