

The Thin bilateral and bipediced DIEAP flap for axillary reconstruction in hidradenitis suppurativa

Dünne, bilaterale, freie DIEP-Lappenplastiken zur Rekonstruktion der Axilla bei Hidradenitis suppurativa

Authors

Salvatore D'Arpa¹, Marco Pignatti², Salvatore Vieni³, Mismil Muradov⁴, Phillip Blondeel⁵, Adriana Cordova³

Institutes

- 1 Gent University Hospital, Department of Plastic and Reconstructive Surgery, Gent, Belgium
- 2 Università degli Studi di Palermo, Department of Surgical, Oncological and Oral Sciences (Di.Chir.On.S.), Plastic and Reconstructive Surgery, Palermo, Italy
- 3 Azienda Ospedaliera Universitaria Policlinico di Modena, Chirurgia Plastica, Modena, Italy
- 4 Università degli Studi di Palermo, Department of Surgical, Oncological and Oral Sciences (Di.Chir.On.S.), Plastic and Reconstructive Surgery, Palermo, Italy
- 5 Syzganov National Scientific Center of Surgery, Plastic Surgery, Almaty, Kazakhstan
- 5 Gent University Hospital, Department of Plastic and Reconstructive Surgery, Gent, Belgium

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Corresponding Address

Dr. Salvatore D'Arpa

Gent University Hospital, Department of Plastic and Reconstructive Surgery, Gent, Belgium

Università degli Studi di Palermo, Department of Surgical, Oncological and Oral Sciences (Di.Chir.On.S.), Plastic and Reconstructive Surgery, Palermo, Italy

E-Mail: turidarpa@hotmail.com

ZUSAMMENFASSUNG

Einführung Die Rekonstruktion der Axilla nach Resektion bei fortgeschrittener Hidradenitis suppurativa (Akne inversa) erfolgt in unserer Erfahrung mit gestielten Perforans-Lappenplastiken, die eine funktionelle Rekonstruktion und einen Funktionserhalt der Schulter erlauben. Die Verfügbarkeit der Haut ist um die Axilla durch die Notwendigkeit eines primären Verschlusses der Entnahmestelle begrenzt. In dieser Arbeit werden die Anwendung und die Ergebnisse von bilateralen freien DIEP-Lappenplastiken bei Patienten mit bilateraler und großflächiger Resektion vorgestellt.

Patienten und Methoden Von Oktober 2008 bis Oktober 2018 wurden 39 Patienten mit Hidradenitis suppurativa chirurgisch behandelt. Bei 11 dieser Patienten erfolgte eine bilaterale Rekonstruktion mit bilateraler DIEP-Lappenplastik (22 Lappenplastiken). Bei einem Patienten wurde eine unilaterale Rekonstruktion mithilfe einer doppelt gestielten DIEP-Lappenplastik durchgeführt. Insgesamt wurden 23 Lappenplastiken verwendet. Zwölf Lappenplastiken wurden über der Scarpa-Faszie gehoben, 6 Lappenplastiken wurden nach der Dissektion ausgedünnt. Drei Lappenplastiken wurden in der ersten Phase nicht ausgedünnt. Die durchschnittliche Lappengröße betrug bei den bilateralen Lappenplastiken 14 × 17 cm und beim doppelt gestielten Lappenplastiken 15 × 32 cm.

Ergebnisse Die mittlere Nachbeobachtungszeit lag bei 64 Monaten. Die durchschnittliche Operationsdauer lag bei 324 Minuten. Es wurden keine Lappennekrosen festgestellt. In zwei Fällen kam es zu einer axillären, in einem Fall zu einer abdominalen Wunddehiszenz. Diese wurden alle konservativ behandelt. Bei einem Patienten wurde an beiden Operationsstellen ein Pyoderma gangraenosum beobachtet, das nach Kortisontherapie abheilte. Bei den Lappenplastiken, die während des primären Eingriffs ausgedünnt wurden, war keine Revision erforderlich. Die drei Patienten mit den nicht ausgedünnten Lappen benötigten nach drei Monaten eine Liposuktion zur Ausdünnung. In einem Fall kam es zu einem Krankheitsrezidiv. Dieses war unilateral und wurde chirurgisch behandelt.

Schlussfolgerungen Die Rekonstruktion der Axilla mit DIEP-Lappenplastiken ermöglicht die Rekonstruktion großer und bilateraler Defekte in einem einzigen Eingriff mit primärem Verschluss der Entnahmestelle. Wenn die Lappenplastik während der Operation ausgedünnt wird, scheint postoperativ

keine weitere Ausdünnung erforderlich zu sein. Ansonsten sollte der Lappen drei Monate nach dem Ersteingriff durch Liposuktion ausgedünnt werden.

ABSTRACT

Introduction Reconstruction after resection of advanced stage hidradenitis suppurativa is currently performed with pedicled perforator flaps, that allow functional reconstruction and preservation of shoulder function. Skin availability is limited by the possibility of closing the donor site primarily. Bilateral cases need to be treated in two stages, since the operation is carried out in the lateral decubitus. In this manuscript the application of bilateral and bipediced DIEAP flaps to bilateral and extensive cases is presented.

Patients and methods Between October 2008 and October 2018, 39 patients were treated for axillary hidradenitis suppurativa. Of these, 11 patients had bilateral reconstruction with bilateral DIEAP flaps (22 flaps) and one patient had unilateral reconstruction with a bipediced DIEAP flap. 23 flaps were used. Twelve flaps were raised above Scarpa's fascia, 6 flaps were thinned after dissection. Three flaps were not thinned in the

first stage. Average flap size was 14 × 17 cm for the bilateral flaps, while the bipediced flap was 15 × 32 cm.

Results Average operative time was 324 minutes. No flap necrosis was observed. Two patients had wound dehiscences in the axilla and one in the abdomen, all treated conservatively. One patient had a pyoderma gangrenosum at both surgical sites that healed after cortisone therapy. No revisions were needed for the flaps that were thinned during the primary operation. The three patients whose flaps were not thinned needed liposuction after three months for thinning. There was one disease recurrence, unilateral and treated surgically. Mean follow up was 64 months.

Conclusions Axillary reconstruction with the DIEAP flap allows reconstruction of large and bilateral defect in a single operation closing the donor site primarily. If the flap is thinned during the operation, no thinning seems to be needed postoperatively. Otherwise the flap shall be thinned by liposuction three months after the initial procedure. We believe that the benefits of this technique outweigh the added complexity of a microsurgical procedure when bilateral resections are needed, the defects are too wide to close the donor site of a pedicled flap primarily and the lower abdomen is free of disease.

Introduction

Patients with advanced stage hidradenitis suppurativa (Hurley stages II and III), need surgical resection of the affected region in order to remove the infundibular terminal follicles affected by the disease. In the axillary region, this means removing the whole hair bearing skin, often extending beyond its limits based on extension of the disease into the inner arm, lateral thoracic area, and pectoral region. Such resections create wide and deep surgical defects in an area located close to a joint, where scar retraction can restrict movement. For this reason secondary healing and skin grafting as previously reported [1–3], are suboptimal options and a flap is best used in order not to restrict shoulder movements.

Since the disease is systemic, axillary involvement is often bilateral. Axillary reconstruction in these cases is usually performed with pedicled perforator flaps. The use of pedicled skin flaps such as the Thoraco Dorsal Artery Perforator (TDAP) flap [4, 5], the lateral thoracic flap or other skin flaps such as the parascapular flap [6–8], gives good functional results since supple tissue is brought in adequate quantities in order to preserve shoulder function. It has, however, two drawbacks. The first one is that bilateral cases need to be treated in two operations, since the operation is carried out in the lateral decubitus and the patient cannot lie on one flap while the other axilla is being operated [4]. The second one is that wide defects, extending beyond the axilla, require large flaps and, as a consequence, closure under tension causes unsightly scars in the scapular or lateral thoracic regions or even the need to skin graft the donor site [5].

The ideal technique for axillary reconstruction in hidradenitis suppurativa cases shall provide enough tissue to reconstruct large defects, with a thin flap that does not give bulk to the axillary region and allows primary donor site closure with an acceptable scar. If,

comparable results could be obtained in a single stage, that would be an added benefit.

We hypothesized that the Deep Inferior Epigastric Artery Perforator (DIEAP) flap could be a good donor for these cases since it provides large skin flaps still allowing primary donor site closure, with the possibility of harvesting two flaps for the same donor site in bilateral cases. The only drawback is thickness of the lower abdominal subcutaneous tissues, that we speculated could be overcome by flap thinning.

In this article we report on our experience with axillary reconstruction in hidradenitis suppurativa patients using bilateral and bipediced DIEAP flaps.

Patients and methods

Between October 2008 and October 2018, 39 patients affected by Hurley Stage II-III axillary hidradenitis suppurativa were treated by the same surgeon (SDA). All patients were referred by the Hidradenitis suppurativa multidisciplinary team after failure of medical therapy. The patient are followed up lifelong.

Indications for a DIEAP flap reconstruction were:

1. Bilateral disease;
2. Flap needed too wide to close the donor site primarily/Refusal of thoracic scar;
3. Skin redundancy in the abdomen;
4. Absence of lower abdominal, pubic or groin disease;

Twelve patients met these criteria. Bilateral DIEAP flaps were used in 11 cases. A bipediced DIEAP flap was used in one case for a unilateral defect in the right axilla that was too large to be reconstructed with a pedicled flap. The other side was reconstructed with a ped-

► **Table 1** Patients data

| Patient | Age | Sex | Smoker | Length (cm) | Weight (kg) | Axilla | Recipient vessels |
|---------|-----|-----|--------|-------------|-------------|-----------|---------------------|
| 1 | 19 | F | 0 | 176 | 68 | bilateral | Serratus Branch |
| 2 | 37 | M | 1 | 178 | 90 | right | Serratus Branch |
| 3 | 35 | F | 1 | 167 | 52 | bilateral | Serratus Branch |
| 4 | 38 | F | 1 | 167 | 62 | bilateral | Circumflex scapular |
| 5 | 22 | F | 1 | 173 | 70 | bilateral | Serratus Branch |
| 6 | 32 | F | 0 | 162 | 54 | bilateral | Circumflex scapular |
| 7 | 29 | F | 0 | 162 | 47 | bilateral | Serratus Branch |
| 8 | 44 | M | 0 | 173 | 86 | bilateral | Serratus Branch |
| 9 | 41 | F | 1 | 158 | 62 | bilateral | Serratus Branch |
| 10 | 36 | F | 1 | 162 | 48 | bilateral | Circumflex scapular |
| 11 | 31 | F | 1 | 155 | 51 | bilateral | Circumflex scapular |
| 12 | 30 | F | 0 | 171 | 59 | bilateral | Circumflex scapular |

icled TDAP in a previous operation in this case. There was a wound dehiscence due to closure under tension for a smaller defect covered with an 11 cm wide flap. The left perforator was anastomosed to the lateral branch of the right Deep Inferior Epigastric Artery (DIEA), end-to-end, in this case. This means that a total of 23 flaps were transferred in 12 patients. Average flap size was 14 × 17cm for the bilateral flaps, while the bipediced flap was 15 × 32cm. All bilateral flaps were based on one perforator, only the bipediced flap was based on two. In no case was SIEV (Superficial Inferior Epigastric Vein) anastomosis necessary. The recipient vessels were the Serratus branch in 7 patients (13 flaps) and the circumflex scapular vessels in 5 cases (10flaps). All patients underwent preoperative CT angiography (CTA) to locate and select the best perforator. Flap perfusion is routinely checked 20 minutes after the end of flap harvest with ICG (IndoCyanine Green angiography).

Patients data can be found in ► **Table 1**. There were 10 females and 2 males. Mean age was 33 years old. Seven patients were smokers, who all quit six months before surgery. Data on operative time, ischemia time, revisions, necrosis, hospital stay, complications, recurrences, secondary procedures were collected on an excel data sheet. Thinning was defined as primary when the flap was raised above Scarpa's fascia (6 patients, 12 flaps), secondary when the flap was thinned after harvest (3 patients, 6 flaps), tertiary when performed three months after the operation by means of liposuction (3 patients, 5 flaps).

Surgical Technique

The surgical technique for primary and secondary thinning will be briefly described below.

Primary thinning. The flap is raised above Scarpa's fascia in these cases. As described for the Antero Lateral Thigh (ALT), Superficial Circumflex Iliac Artery Perforator (SCIAP), TDAP and Gluteal Artery Perforator (GAP) flaps [9, 10], the DIEAP flap can be raised in a supra-Scarpa's plane as well.

The skin is incised to the level of the Scarpa's fascia. The SIEVs are identified and preserved and raised with the flap. We believe

that the superficial veins are the limit for elevation of large thin flaps and shall be included in the flap, at least for large flaps. Peripherally, once adequate traction is applied on the skin, the plane between the fat lobules can be clearly seen. Dissection is performed with 4.5x loupe magnification using a needle electrode in the cutting mode. This way all perforators can be clearly and directly visualized and all small vessels cauterized to proceed in a safe and bloodless plane. Once a large perforator is identified, it is followed to the level of the deep fascia, isolated circumferentially from the fat, taking care not to damage its branches in order to evaluate its calibre at the exit from the deep fascia. At this point, the deep fascia is exposed by opening the fat layer on top of it and dissection proceeds like in a conventional DIEAP flap. In bilateral flaps the perforator is subsequently approached through the midline incision that divides the two flaps. If the flap is one large bipediced flap, once both pedicles have been isolated this way, one of them is divided and dissection is carried out past the midline on the supra-Scarpa's plane until the other perforator is reached.

Secondary thinning. Once the flap pedicle is cut, the flap is put upside down on the table. A 3 cm circle is drawn around the perforator to identify the potential branching area of the perforator which is not thinned. The fat is then removed from the flap on a plane superficial to Scarpa's fascia throughout the whole flap.

Tertiary thinning. At least three months after the first operation the flap is aggressively thinned by liposuction. If any skin excess is present, it won't be removed at this stage in order not to risk necrosis, but rather postponed at least three weeks after. No skin resection was necessary in this series.

Results

Results are summarized in ► **Table 2**. Average operative time was 324 minutes, average ischemia time was 50 minutes. There were no revisions for microvascular problems, no flap necroses, no immediate postoperative complications. Mean hospital stay was 4 days. Four patients had complications: 2 had a dehiscence in the axilla, one in the abdomen, one had a pyoderma gangrenosum in

► **Table 2** Results. Thinning is included in the results to give an idea of the secondary operations needed

| Patient | Ischemia time (minutes) | operating time (min) | Hospital stay (days) | Flap Size (cm) | Revision/flap necrosis | dehiscence axilla | dehiscence abdomen | Other complications | Recurrence | Primary thinning | Secondary thinning | Tertiary thinning |
|---------|-------------------------|----------------------|----------------------|----------------|------------------------|-------------------|--------------------|---------------------|------------|------------------|--------------------|-------------------|
| 1 | 58 R, 56 L | 450 | 4 | 13×16 | 0 | 0 | 0 | pyoderma | 0 | 0 | 1 | 0 |
| 2 | 46 R, 46 L | 466 | 5 | 15×32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 3 | 48 R, 45 L | 519 | 4 | 13×17 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 4 | 55 R, 42 L | 485 | 4 | 15×18 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 5 | 44 R, 48 L | 496 | 4 | 16×19 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 6 | 53 R, 53 L | 438 | 3 | 14×17 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 7 | 45 R, 42 L | 325 | 4 | 13×14 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 8 | 64 R, 38 L | 510 | 4 | 13×17 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 9 | 58 R, 61 L | 439 | 5 | 16×19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 10 | 51 R, 43 L | 592 | 4 | 12×15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 11 | 57 R, 45 L | 425 | 4 | 13×16 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 12 | ? | 465 | 4 | 14×19 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

both axillae and in the abdomen. The dehiscences were treated conservatively with local wound care. The pyoderma was treated as described previously and was promptly recognized due to the typical pattern with involvement of all surgical sites [11]. There was one recurrence after 2 years, unilateral and treated surgically. The three remaining patients whose flaps (5 flaps) were not thinned during the operation, needed tertiary thinning three months after the initial procedures. Follow-up ranged between 30 and 120 months (mean 64).

Discussion

Based on this series, the DIEAP flap seems a reliable option for axillary reconstruction in selected cases of hidradenitis suppurativa. In bilateral cases, it allows simultaneous harvest of two flaps from the same donor site, while another surgical team is performing resection and harvesting the recipient vessels. All is done in the supine position and the donor site is closed primarily. In very large unilateral cases, a free bipediced DIEAP flap allows reconstruction with a large flap still maintaining the ability to close the donor site primarily. Although men may have less abdominal laxity, the two male patients treated did not experience any particular donor site problems and flaps of adequate dimensions could be harvested (15×32 cm in patient #2 and 2 flaps of 13×17 cm in patient #8). It is worth of notice that, in general, perforator dissection is a little more demanding in male patients.

The DIEAP flap has many unique features that make it a very versatile perforator flap. First of all it allows harvest of very large skin flaps while closing the donor site primarily. In this series, average flap width was 14 cm. With other perforator flaps such as the ALT or the TDAP flap, donor sites wider than 10–12 cm are either closed under high tension, resulting in widened or hypertrophic scars, or need skin grafting.

Second, it is a very versatile donor site: the abundance of constant pedicles allows harvest of bipediced flaps and multiple flaps [12–14]. No SIEA (Superficial Inferior Epigastric Artery) flaps have been used in this series.

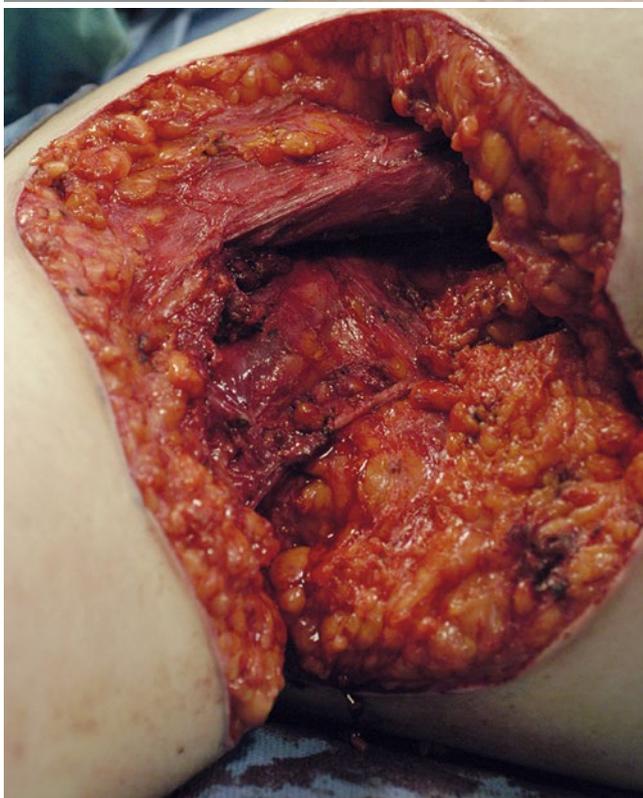
Although other donor sites such as the thigh allow harvest of two flaps from the same donor site [15], the lower abdominal skin has several constant pedicles that allow harvest of multiple flaps [16] while still maintaining the ability to close the donor site primarily without tension.

Third, it can be thinned out to overcome its main drawback: thickness. Thinning immediately after harvest of DIEAP flaps has already been described by Koshima [17]. Primary thinning is possible as well, like in other perforator flaps (Hong and Kim). Primary thinning has the advantage of leaving the fat in the abdomen behind, which is believed to improve donor site healing and reduce the risk for seroma formation [18].

In this series 23 flaps in 12 patients were harvested. Bilateral reconstructions could be carried out in one stage and an extensive defect, extending beyond the axilla in the inner arm and lateral thoracic area, could be reconstructed with a single, bipediced DIEAP flap still closing the donor site primarily.

No flap related complications were observed. The wound healing problems and recurrences observed are not infrequent with this disease and can be observed with any other technique.

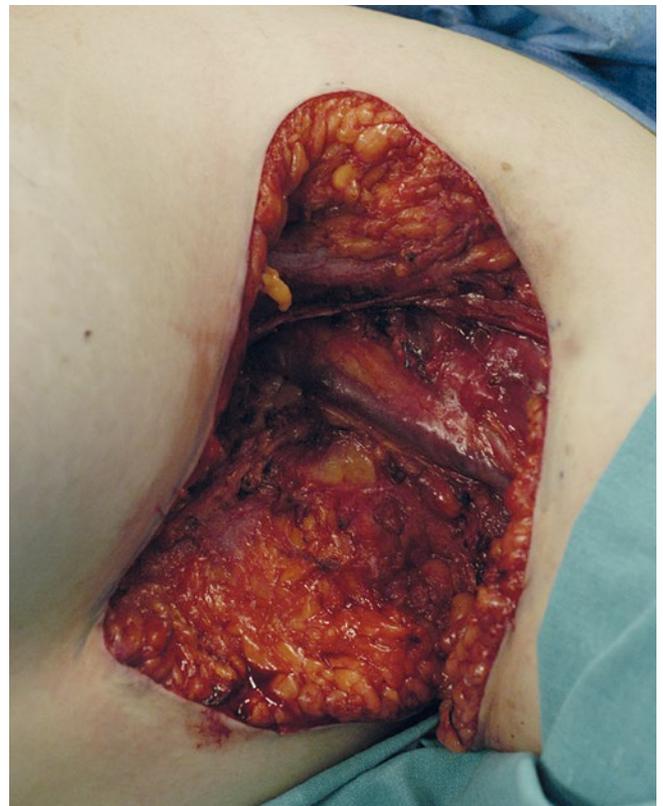
Treatment of advanced stage (Hurley II and III) hidradenitis suppurativa is surgical. It involves wide excision, with radical removal of all affected skin. Several methods can be available for reconstruction, from secondary healing, to vacuum assisted closure (VAC), to skin grafts and various type of flaps [1–3, 6–8]. The best outcomes are obtained with perforator flaps that avoid scar contraction and functional impairment often related with the use of secondary healing techniques or skin grafting [19, 20]. For this reason we do not use any VAC or secondary healing before reconstruction in an attempt at decreasing bacterial contamination. Bacteria are



► **Fig. 1** Left. Preoperative view of the right axilla of a 19 year old girl (Case 1, ► **Table 1** and ► **Table 2**) affected by axillary hidradenitis suppurativa, Hurley Stage III. The disease presents with nodules, fistulae and retractile scars, it extends beyond the axilla in the inner arm and beyond the anterior and posterior axillary lines. Right. Surgical defect after radical excision, deep to the axillary lymphnodes that were partially involved by the disease. The surgical defect measured 16 × 16cm.

removed by radically resecting the affected tissue and carrying the operation on healthy tissue.

The TDAP flap is considered the gold standard for axillary reconstruction after hidradenitis suppurativa, since it allows effective re-



► **Fig. 2** Left. Preoperative view of the left axilla of the 19 year old girl shown in ► **Fig. 1**, affected by hidradenitis suppurativa, Hurley Stage III. The disease presents with nodules and fistulae that involve the inner arm and extend well beyond the anterior axillary line. Right. Surgical defect after radical excision, deep to the axillary lymphnodes that were partially involved by the disease. The surgical defect measured 14 × 16cm.

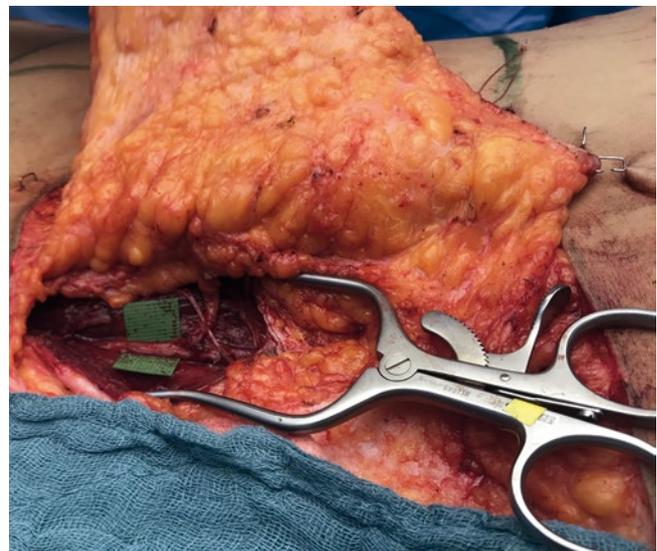
construction, with like with like skin, a pedicled flap without the need for microsurgery and excellent functional outcomes [4, 5].

Based on our experience and on the current literature [1–8, 19–21], our algorithm for reconstruction of axillary defects following hidradenitis suppurativa treatment is:

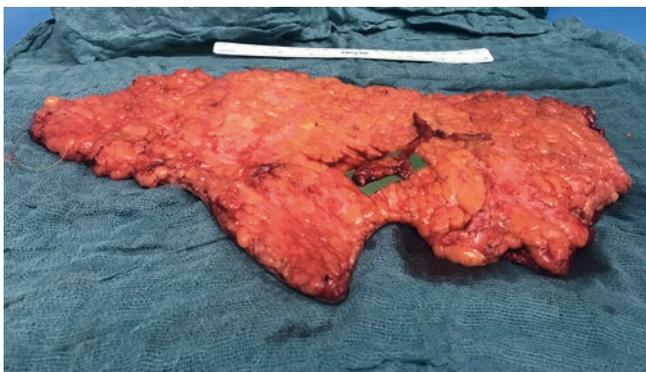
- Unilateral cases:
 - Enough laxity to close the donor site of a pedicled flap primarily: pedicled flap (TDAP is our first choice);
 - Not enough laxity to close the donor site of a pedicled flap primarily: free flap (the choice is based on available donor sites and on patient’s and surgeon’s preferences);



► **Fig. 3** Intraoperative view of left flap harvest showing the plane of dissection. A needle tip cautery is used. Vertical traction on the flap allows clear visualization of the Suprascarpa's plane. Please note the amount of fat that is left behind, that is likely responsible, as postulated by Saldanha [18] for faster healing, since the fat adheres more and glides less than deep fascia.



► **Fig. 4** Close-up view of the left DIEAP after completion of pedicle dissection. Note that, cranially to the perforator, the flap is thicker. After visualization of the pedicle, its branching pattern in the subcutaneous tissue is observed (that can be anticipated based on the preop angioCT). There was a branch going cranially below scarpa's fascia in this case, that has been included together between the fat superficial to it. Dissection around the perforator has to be adjusted to each perforator's anatomy. The green contrast is placed underneath the DIEA and veins. The motor nerve crossing it is visible, intact, on top of the pedicle just distal to the perforator. Dissection is carried out further distal to the perforator for 2 cm, in order to provide a stump for eventual venous supercharging, shall this be needed.



► **Fig. 5** Left flap on table. Upside down. The suture is placed on the lateral corner (left hand side of the picture). Note the homogeneous thinness on the flap and the thickening cranial to the perforator shown in ► **Fig. 4**. Please also note the long stump cranial to the perforator as explained in ► **Fig. 4**.



► **Fig. 6** Right flap on table. Please note the thinness of the flap and, again, the additional thickness around the perforators that follows its branching pattern, as explained in ► **Fig. 4**.

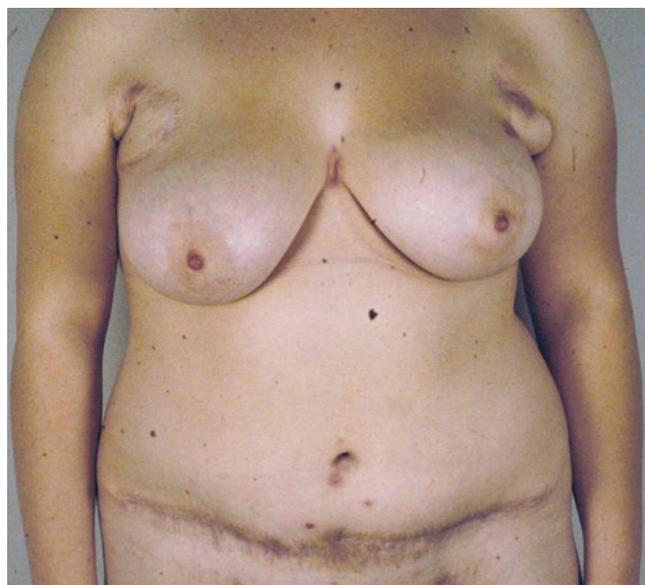
- Bilateral cases:
 - Enough laxity to close the donor site of a pedicled flap primarily: pedicled flap (TDAP is our first choice);
 - Not enough laxity to close the donor site of a pedicled flap primarily, or desire to perform/undergo a single procedure and availability of the abdominal donor site: free bilateral DIEAP;
 - Not enough laxity to close the donor site of a pedicled flap primarily, abdominal donor site unavailable: free flap

(the choice between uni or bilateral and of the donor site is based on available donor sites and on patient's and surgeon's preferences).

Relative drawbacks of the TDAP flap are that the donor site scar can widen or become hypertrophic when wide (> 12 cm) flaps are needed [5], and that bilateral cases shall be staged in two operations since the patient cannot lie on one flap while being operated in the lateral decubitus for the contralateral axilla [4].



► **Fig. 7** 2 years postoperative frontal view of the axillae with arms abducted. Note the widened scars around the flaps: this patient had a postoperative pyoderma that eventually healed after cortisone therapy.



► **Fig. 8** Wide Frontal view with arms abducted. The disease is still present in the presternal area and in the groin and labia majora, but it is under control with medical therapy. Please note the excess flap in the left axilla, due to a skin excess. Since the flap is thin and it is just a skin fold, the patient has no functional discomfort and has refused revision. The breast asymmetry was present preoperatively.

The technique described in this article can overcome these drawbacks in selected cases. Since the disease is systemic, multiple sites are often involved. When advanced stages disease (Hurley II and III) is present in both axillae and a bilateral operation shall be performed, a bilateral DIEAP is an option if there is enough laxity in the abdomen and the lower abdomen, pubic area and groin are free from disease, since the abdominal tissue might be a donor site for groin and pubic reconstruction [21]. This technique shall also be offered as an alternative if a patient prefers a lower abdominal scar over two dorsal/thoracic scars. Although bilateral DIEAP flaps axillary reconstruction involves a microsurgical operations, there are several benefits that outweigh the added complexity in these selected cases. The operation can all be carried out in the supine position with the arms abducted 90 degrees. Two teams can work simultaneously and work best on contralateral sides (i. e. left axilla, right abdomen), in order not to interfere with each other. The Abdomen is then closed while microsurgical anastomosis for the second flap is being performed. Average operative time with this approach was 324 minutes, which can be acceptable compared to the average 210 reported for a unilateral TDAP [4]. Complication rates are low: the DIEAP flap is a very reliable flap and so are recipient vessels from the subscapular system. The donor site is always closed primarily and the scar does neither widen nor become hypertrophic. Large flaps, up to 15×32cm, can be consistently closed primarily. Despite radiation exposure, we believe the the benefits of a preoperative CTA outweigh the risks of the radiations involved and CTA is a standard procedure before any DIEAP flap at our institution. Donor site scar position and length have not been measured since they vary based on the position of the perforator, on the width of the flap and on its length.

A very large unilateral defect was also reconstructed with a DIEAP flap in this series. It was a patient who already had a contralateral reconstruction with a large TDAP with a donor site wound dehiscence due to excess tension requiring prolonged wound care, and an unsightly resulting scar. In this case the contralateral defect (even wider than the first one) was reconstructed with a large bipediced DIEAP (15×32 cm). We have extensive experience with TDAP flaps as well and large flaps are always difficult to close primarily.

Besides the added complexity, one of the drawbacks of the DIEAP flap in this application is excess thickness when compared to a TDAP flap. In this series, the five unthinned flaps all required tertiary thinning performed by means of liposuction three months after the operation, thus still requiring two operations for a bilateral reconstruction. When primary or secondary thinning was performed, no reoperations for thinning have been required in this series, making this a true one stage technique. In this series, we haven't observed partial or total necroses in thinned flaps. We believe that preserving the superficial veins makes thinning safer in large flaps, although we have no data to prove this.

Relative drawbacks of the lower abdomen as a donor site are the potential for bulging or hernias if the abdominal wall is damaged and the increased complexity of the operation requiring a microsurgical procedure.

Suprascarpa's harvest of perforator flaps is an established technique [9, 10]. Although it has –to the best of our knowledge – never been reported for a DIEAP flap before, we find it even easier than a TDAP, ALT or SGAP since the vertical fibrous septa are looser and less numerous, the lobules larger and the perforators constantly of large calibre, thus easy to visualize. The use of angio CT scan allows to visualize perforator course in the subcutaneous tissue preoperatively, providing useful information for dissection.

This study has some weaknesses. It is a retrospective case series with relatively small numbers a mixed population and also mixed techniques (12 flaps were thinned primarily, 6 secondarily, 5 Tertiarily). No comparison with other techniques has been reported. However, it is a single surgeon's experience with a long follow-up and consistent results. We believe it can be a useful addition to the reconstructive surgeon's armamentarium for treatment of hidradenitis suppurativa. The safety and reproducibility of bilateral and bipediced DIEAP flaps has been demonstrated in the past by sev-

eral authors, and the same holds true for thin flaps [9, 10, 12–17]. Thus this is just another application of a well established technique.

CONCLUSIONS

Bilateral cases of Hurley stages I and II hidradenitis suppurativa might be treated in a single stage with thin bilateral DIEAP flaps. The abdominal donor site consistently allows harvest of large flaps while closing the donor site primarily with a linear scar. A Single, bipediced flap can be used in case of large defects. The added complexity of a microsurgical operation is, in our opinion, outweighed by the ability of performing a single operation or, in unilateral cases, by the ability of closing the donor site primarily. This is indeed no standard procedure for all patients. Plastic surgery is about choosing the best option for a specific patient from a wide spectrum of procedures and benefits and drawbacks shall be accurately weighed.

Conflict of interest

The authors declare that they have no conflict of interest.

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