Laparoscopic Harvesting of Omental Flaps for Breast Reconstruction—A Review of the Literature and Outcome Analysis

Le prélèvement de lambeaux épiploïques par laparoscopie pour la reconstruction mammaire : une analyse des publications et des résultats cliniques

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Abstract

Background: Evidence on the use of omental flaps for breast reconstruction in patients with breast cancer is lacking, and no published reviews report an outcome-based assessment of such flap. This review explores available data and evidence for change in complication rates following the shift toward laparoscopic harvesting. **Methods:** We searched the databases Excerpta Medica database, MEDLINE, and PubMed from inception until December 2015 using search terms “omental flaps” and “breast reconstruction.” Data extracted were patient characteristics, technique used, and outcome measures reported and were then analyzed based on the technique of harvesting. **Results:** Twenty-two articles reporting 651 patients who underwent mastectomies and breast-conserving surgeries were included in this review. Most flaps, 537 (82.5%), were harvested by laparoscopy, and 626 (96.2%) of the flaps were pedicle flaps. The mean age was 47.7 years (standard deviation: 4.29), and mean follow-up was 38.1 months. There were 88 reported complications among 562 patients in 16 reports. The rate of any complication was calculated to be 15.0%, with a higher rate (29.1%) occurring with the open technique in comparison to laparoscopy (12.6%). The commonest complications were postoperative infection and breast firmness each reported in 2.22%. Most authors reported advantages of malleability and excellent aesthetic outcomes and disadvantages in terms of inability to estimate the volume of the flap and variability in size. **Conclusion:** Omentum use is safe and has advantages in breast reconstruction where other options are limited including a natural feeling and minimal donor site morbidity if harvested laparoscopically.

Résumé

Historique : Il y a peu de données probantes sur l'utilisation des lambeaux épiploïques pour la reconstruction mammaire de patientes atteintes d'un cancer du sein et aucune analyse publiée n'en évalue les résultats cliniques. La présente analyse évalue les données et les preuves disponibles sur les changements aux taux de complication après le passage aux prélèvements par laparoscopie. **Méthodologie :** Les auteurs ont procédé à des recherches dans les bases de données Excerpta Medica, MEDLINE et PubMed à compter de leur création jusqu'en décembre 2015 à l'aide des mot-clés *omental flaps* et *breast reconstruction*. Ils ont extrait les caractéristiques des patientes, la technique utilisée et les mesures des résultats cliniques déclarées, puis ont analysé les résultats en fonction de la technique de prélèvement privilégiée. **Résultats :** Les auteurs ont inclus dans la présente analyse 22 articles portant sur 651 patientes qui avaient subi une mastectomie et une chirurgie de conservation mammaire. Ainsi, 537

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lambeaux (82,5 %) avaient été prélevés par laparoscopie, et 626 (96,2 %) étaient des lambeaux pédiculés. Les patientes avaient un âge moyen de 47,7 ans (ÉT 4,29 ans) et avaient été suivies pendant une période moyenne de 38,1 mois. Les auteurs ont relevé 88 complications déclarées chez 562 patientes de 16 études. Le taux de complication s'élevait à 15,0 %, mais était plus important (29,1 %) après la technique ouverte qu'après la laparoscopie (12,6 %). Une infection postopératoire et la fermeté des seins, toutes deux déclarées chez 2,22 % des patientes, étaient les principales complications. La plupart des auteurs soulignaient la malléabilité et l'excellent résultat esthétique comme avantages et l'incapacité d'évaluer le volume du lambeau et la variabilité des dimensions comme désavantages. **Conclusion :** L'utilisation du lambeau épiploïque est sécuritaire et comporte des avantages pour la reconstruction mammaire lorsque les autres possibilités sont limitées, y compris une sensation naturelle et une morbidité minime au siège du donneur lorsque le prélèvement est effectué par laparoscopia.

Keywords

omentum, breast reconstruction, omental flap, breast cancer, mastectomy

Introduction

History of Omentum Use as a Flap for Reconstruction

The omentum is a Greek word that is used to describe an adipose membrane enclosing the bowels. The description used by Greek and Latin writers, as the "Epiploon," emerges from the Greek root "Epipleo" meaning to float upon (the abdominal viscera). This organ has been described for surgical use in the literature for more than a century. Senn used it to protect intestinal anastomotic leaks in 1888.¹ However, the use of the omentum was limited until Cannaday introduced his technique for lengthening of the flap's pedicle in 1948.² Since then, applications of the omentum have extended to various pathologies, such as radionecrosis in the chest wall, lymphedema, brachial neuritis, vaginal and penile reconstruction, esophagoplasty, and coverage of various defects.³

In breast reconstruction, omental flaps were explored as a potential substitute to other reconstructive options as early as 1963.^{3,4} However, the first case series was not published until 10 years later by Kiricuta⁵ who suggested adding an implant under the omentum to increase replaced volume, which provided an additional vascularized protective layer of tissue over the implant. As a free flap, the omentum had also been first popularized for temporo-parietal defects following neurofibroma excision, which was covered with split-thickness skin graft (STSG) to achieve an adequate contouring and aesthetic results.⁴ Similarly, it has been used in defects following progressive hemi-facial atrophy.⁶ Due to the need for a laparotomy for omental flap harvest and the increased popularity of perforator flaps, its use had been limited until the late 1990s when laparoscopic harvest of omental flap was popularized.^{5,7}

Anatomy

The omentum is a rectangular apron that extends from the greater curvature of the stomach to the transverse colon. On the lateral aspects, it is attached to the spleen and the duodenum on each side. It is very rich in blood supply, lymphatic vessels, mesenchymal tissue, and immunocompetent cells.⁸ Its main blood supply comes from the right and left gastroepiploic vessels. The gastroepiploic arteries anastomose along the greater

curvature of the stomach and give rise to the epiploic (omental) arteries which are all interconnected forming Barkow's marginal artery along the peripheral side of the greater omentum.

Aim

The aim of this review is to explore the current evidence of using omental flaps in breast reconstruction regarding indications, outcomes, and complication profile. Special focus will be given on the evolving trend toward laparoscopic harvest of omental flaps and change in outcome after such a transition.

Materials and Methods

Search Strategy

A systematic review was performed according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. The following databases were searched from database inception to December 2015: Excerpta Medica database, MEDLINE, and PubMed. The search terms used were "omental flaps and breast reconstruction" that were adjusted into a syntax suitable for use in each of the databases. The following inclusion criteria were used: (1) studies of breast reconstruction using pedicle or free omental flaps, (2) adult patients, and (3) English language. The exclusion criteria were (1) omental flaps used in chest wall reconstruction or Poland syndrome, (2) breast reconstruction using combined omentum and other flaps, and (3) case reports. Cross referencing of all included articles was done. The review process was conducted by 2 authors independently, and any disagreement was solved by discussion until reaching consensus. A flowchart of the search strategy is shown in Figure 1.

Data Extraction

The following data were collected from eligible studies: study design, number of patients, mean age, duration of follow-up, cancer recurrence, technical details (flap harvest method and time, pedicle vs free flap, pedicle used, method of flap delivery, weight of flap in grams, delayed pedicle separation, and use of

Figure 1. Flowchart representing results from the Cochrane Library, MEDLINE, and Excerpta Medica database (EMBASE) databases.

implants), length of hospital stay, reconstructive and cosmetic outcome (measured by Harris's criteria),⁹ and complications.

Statistical Analysis

Analysis of data was performed using SPSS v.22 (IBM Corp, Armonk, New York). Data were stratified according to the harvest technique (laparotomy vs laparoscopic). Weighted average analysis was used to report descriptive variables. Statistical significance was not studied to ensure uniformity between populations due to the heterogeneity and temporal variability of the data.

Results

Selected Studies and Indications

Twenty-two studies (including 651 patients) met the inclusion criteria and were included in this review. Detailed description of included studies is summarized in Table 1. The most common indication for breast reconstruction with omental flap was partial lumpectomy defects post breast-conserving surgery. Other indications included skin-sparing mastectomy and

radical mastectomy. Body mass index (BMI) > 35 was considered a contraindication for omental flap due to safety concerns in majority of studies. The mean age of reported patients was found to be 47.7 years (standard deviation [SD]: 4.29) as shown in Table 2.

Surgical Technique and Results

Breast reconstruction with omental flap was performed as a single stage in 392 (60.2%) cases or a 2-stage delayed reconstruction in 233 (35.8%) cases. Majority of flap harvest was done by laparoscopy in 537 (81.8%) cases, with the remaining being harvested by laparotomy. As seen in Figure 2, the use of laparoscopic harvesting has flourished in the recent decade. Reconstruction as a free omental flap was performed in 25 (3.84%) cases only, majority of which were harvested laparoscopically (88.0%); the majority of the 626 pedicled flaps were harvested by laparoscopy in 515 (82.3%) cases, as well. Right gastroepiploic artery was used as the main pedicle of the flap in 479 (73.6%) cases, while the choice of the vessel ipsilateral to the site of reconstruction was made in 79 (12.1%) of the cases. The mean duration of flap harvesting was 68 minutes (range:

Table 1. Review of Reported Cases of Use of Omental Flaps for Breast Reconstruction.

Authors	Year	Size (N)	Settings	Harvesting	Flap	Flap Delivery Incision (Size)	Harvested Vessel	Stages
Kiricuta et al ¹⁰	1973	10	MM	Laparotomy	Pedicled	Tunnel	Mixed	Mixed
Abbes ¹¹	1977	7	MM + AC	Laparotomy	Pedicled	Skin Incision	Right	I
Bostwick et al ¹²	1978	2	RM	Laparotomy	Pedicled	Tunnel	Mixed	I
McColl ¹³	1979	2	SCM	Laparotomy	Pedicled	Tunnel	Mixed	I
Phillips ¹⁴	1982	18	RM	Laparotomy	Pedicled	Tunnel	Ipsilateral	I
Erol and Spira ¹⁵	1990	21	RM	Laparotomy	Pedicled	Tunnel	Ipsilateral	2
van Garderen et al ¹⁶	1991	16	Br Ca	Laparotomy	Pedicled	Tunnel	Mixed	Mixed
Nemsadze et al ¹⁷	1998	9	SCM	Laparotomy	Pedicled	Tunnel	Mixed	2
Cothier-Savey et al ¹⁸	2001	10	SCM	Laparoscopy	Pedicled	Tunnel	Right	I
Hultman et al ²⁴	2001	3	BR	Laparotomy	Pedicled	Mixed	Mixed	2
Jimenez et al ⁸	2002	3	SSM	Mixed	Free	Pfannenstiel (4 cm)	Right	I
Zaha et al ⁷	2006	44	NSM, BCS	Laparoscopy	Mixed	Tunnel/Right LQ (4 cm)	Right	I
Góes et al ³³	2006	32	RM	Laparoscopy	Pedicled	Tunnel + Midline (5-6 cm)	Right	I
Zaha et al ²¹	2010	24	BCS (IMBC)	Laparoscopy	Pedicled	Tunnel	Right	I
Zaha et al ²²	2010	96	NSM, BCS	Laparoscopy	Pedicled	Tunnel/Right LQ (4 cm)	Right	I
Costa et al ²⁰	2011	5	Br Ca	Laparoscopy	Pedicled	Tunnel	Right	I
Zaha et al ²⁷	2012	10	BCS	Laparoscopy	Free	Right LQ (4 cm)	Right	I
Góes et al ³⁵	2013	200	SSM	Laparoscopy	Pedicled	Tunnel + Midline (5-6 cm)	Right	2
Khater ²⁹	2013	24	SSM (Obese)	Laparotomy	Pedicled	Tunnel	Right	I
Zhang et al ²⁵	2014	40	EAQ + EAL	Laparoscopy	Pedicled	Tunnel	Ipsilateral	I
Zaha ²⁶	2014	51	Br Ca (Medial)	Laparoscopy	Pedicled	Tunnel	Mixed	I
Guan et al ²³	2015	25	BCS	Laparoscopy	Pedicled	Tunnel	Right	I

Abbreviations: AC, axillary clearance; BCS, breast conserving surgery; BR, breast reconstruction (not otherwise specified); Br Ca, breast cancer (not otherwise specified); EAQ + EAL, endoscopically assisted quadrantectomy and lymphadenectomy; IMBC, infero-medial breast carcinoma; MM, modified mastectomy; NR, not reported; RM, radical mastectomy; SCM, subcutaneous mastectomy; SSM/NSM, skin/nipple-sparing mastectomy.

Table 2. Summary of the Analysis of Data From Reported Cases of Use of the Omentum in Breast Reconstruction.

Factor	Total (Denominator)	Reported, n (%)	Open, n (%)	Laparoscopic, n (%)
Patients	651 patients	651 (100)	114 (17.5)	537 (82.5)
Mean patient age, years (SD)	333 patients	47.7 (4.29)	49.0 (1.42)	47.4 (4.62)
Type of flap	651 patients	651		
Free flaps		25 (3.84)	3 (12.0)	22 (88.0)
Pedicled flaps		626 (96.2)	111 (17.7)	515 (82.3)
Cosmetic outcome ¹⁵	149 patients	149	NR	149
Excellent		79 (53.0)	NR	79 (53.0)
Good		52 (34.9)	NR	52 (34.9)
Fair		13 (8.72)	NR	13 (8.72)
Poor		5 (3.35)	NR	5 (3.35)
Mean hospital stay, days (SD)	468 patients	4.86 (2.88)	2.0 (0.00)	4.98 (2.87)
Mean follow-up, months (SD)	291 patients	38.1 (20.0)	26.2 (21.2)	40.0 (19.1)

Abbreviations: NR, not reported; SD, standard deviation.

60-120 minutes). Implants were used to augment the volume of the omental flap in 7 studies. However, detailed description of the precise indication of those implants was not provided clearly among majority of these studies, and hence, no valuable data were extracted. Only 5 (149 cases) studies reported the cosmetic outcomes using the Harris's 4-point system or a similar system. Excellent results were reported in 53.0% of those cases and good in 34.9%, with the remaining results being fair and poor. Mean hospital stay was 4.86 days (± 2.88). Mean follow-up was 38.1 (20.0) months. Mean hospital stay was 2 days for patients who underwent a laparotomy for flap extraction, whereas those who had a laparoscopic flap harvesting stayed for an average of 4.98 (2.87) days.

Complications

Table 3 summarizes the complications reported in 16 studies (586 patients). The overall rate of complications was 15.0%. However, more complications were noted in the laparotomy group (29.1%) versus the laparoscopy group (12.6%). The most common complications were temporary postoperative breast firmness (2.22%) and wound infection (2.22%) occurring mostly at the donor site. Other complications include small volume of omentum (11 cases; 1.88%); hematoma/bleeding (1.88%), with only 1 case requiring surgical intervention; partial flap necrosis (10 cases; 1.71%), and complete flap loss (4 cases; 0.68%). Other complications are reported in Table 3. An open technique

Figure 2. Distribution of cases utilizing the Omentum in breast reconstruction as reported in 22 articles by year of report.

Table 3. Summary of the Analysis of Data From 88 Reported Complications Among 586 Patients in 16 Reports Following the Use of the Omentum in Breast Reconstruction.

Complication	Total (Denominator)	Reported, n (%)	Open, n (%)	Laparoscopic, n (%)
Total patients	651	651	114	537
Patients included in the analysis	586	586 (90.0)	86 (75.4)	500 (93.1)
Any complication	586	88 (15.0)	25 (29.1)	63 (12.6)
Infection (any)	586	13 (2.22)	2 (2.33)	11 (2.20)
Breast firmness		13 (2.22)	3 (3.48)	10 (2.00)
Hematoma/bleeding		11 (1.88)	3 (3.48)	8 (1.60)
Small volume of flap		11 (1.88)	3 (3.48)	8 (1.60)
Partial flap necrosis		10 (1.71)	3 (3.48)	7 (1.40)
Gastrointestinal complication		7 (1.19)	1 (1.16)	6 (1.20)
Fat necrosis		5 (0.85)	0 (0.00)	5 (1.00)
Complete flap necrosis		4 (0.68)	4 (4.65)	0 (0.00)
Pedicle vascular injury		4 (0.68)	0 (0.00)	4 (0.80)
Hernia (any)		3 (0.51)	1 (1.16)	2 (0.40)
Delayed wound healing		3 (0.51)	3 (3.49)	0 (0.00)
Pedicle site swelling		2 (0.34)	2 (2.32)	0 (0.00)
Laparoscopic-related injury		2 (0.34)	0 (0.00)	2 (0.40)

was associated with a higher level of bleeding/hematoma, flap necrosis, delayed wound healing, and pedicle site swelling. Laparoscopic operations, however, were found to result in relatively more pedicle vascular injuries, fat lumpy necrosis, feeling of epigastric pain, and associated laparoscopic injuries.

Advantages and Disadvantages

Table 4 summarizes the reported advantages and disadvantages of omentum flap use in breast reconstruction, as noted

by the authors of included studies. The main themes of advantages and disadvantages were related to harvesting technique, properties of the flap, and outcomes. Most reported disadvantages were the ability to estimate volume and interpatient variability in size.

Discussion

In 1983, Millard said “There is not now and probably never will be one method that is the best for all cases of breast

Table 4. Summary of Advantages and Disadvantages of the Use of the Omentum in Breast Reconstruction as Reported in 22 Articles.^{a,b}

Statement	Reported, n (%)
Articles	22 (100)
Harvesting technique	
ü Laparoscopy minimizes donor site morbidity	11 (50.0)
ü Laparoscopy has equivalent operative time—no need to repair donor site	9 (40.9)
ü Laparoscopy minimizes incisions and resulting scars	8 (36.4)
ü Psychological aspect of not feeling that some part of the body is lost	5 (22.7)
û Laparotomy associated with several complications (reduced with laparoscopy) ⁹	6 (27.3)
û Laparotomy required for harvesting the flap (reduced with laparoscopy) ⁹	6 (27.3)
û Learning and skills required for laparoscopic technique	1 (4.55)
Properties of the flap	
ü Malleable flap that can be shaped to fit defects	12 (54.6)
ü Protective function of implanted omentum against infection and cancer	8 (36.4)
ü No change in size from time of implantation	8 (36.4)
ü Availability of the flap in all patients	7 (31.8)
ü No foreign body or prosthetics are required	7 (31.8)
ü Ability to harvest a long pedicle	6 (27.3)
ü No muscle lost or harvested	5 (22.7)
û Volume estimation of the omentum not possible preoperatively	10 (45.5)
û Variability in size of the omentum from patient to patient	9 (40.9)
Obtained outcome:	
ü Good aesthetics, consistency similar to that of normal breasts	15 (68.2)
ü Results are natural in appearance as the normal breast	12 (54.6)

^aü = Statement signifies an advantage.

^bû = Statement signifies a disadvantage.

reconstruction, in spite of the fact that some surgeons will use one method to the exclusion of all others.^{28(p783)} This fluently speaks for the variety of methods available for breast reconstruction and the diversity of techniques, each with its advantages. The aim of this review is to provide a review of the available evidence for the application of omental flaps in breast reconstruction and to report its related complications. Certain circumstances may make this flap a more versatile option as a donor flap as opposed to other autologous flaps, such as an athletic patients who does not have enough body fat and cannot afford losing muscular tissue for reconstruction.¹² Like autologous flaps, this flap serves well for patients who might refuse the insertion of prosthetic materials in their bodies.¹⁵ An ideal candidate would be a young patient with an early-stage breast cancer and small-moderate size breasts.¹⁷ By inspecting Table 1, it is evident that the use of omental flaps is compatible following a wide range of excisional procedures, from modified radical mastectomies to skin-sparing mastectomies.^{14,29} Zaha has described using this flap for partial reconstruction in cases with lesions in the medial quadrants, where it would have otherwise been difficult to reconstruct.^{21,26} In another report by Zhang et al, it has been combined with endoscopic quadrantectomy and lymphadenectomy.²⁵

Small breast defects post lumpectomies can be corrected by means of local tissue rearrangement or fat grafts. Fat infiltration in bigger defects require multiple sessions that will increase the cost and require more surgical time. These patients only lose breast volume, not skin; thus, the omentum is an excellent flap for reconstruction. Despite the other authors' conservative approach in excluding cases with BMIs

>30 to 35, Khater has demonstrated the harvesting of the omentum with mini-laparotomies in this patient cohort is safe, despite an increase in operative time and hospital stay.²⁹ Our review of the literature concluded agreement on other advantageous properties in terms of its malleability to any shape, its protective immune function, and its availability in all patients. The omentum's rich blood supply supports healing, and its immunogenic properties prevent infections.³⁰ This blood supply also allows for this flap to accept a mesh and an overlying STSG.^{11,25}

Kiricuta and Popescu first described harvesting omental flaps through a laparotomy that was associated with several complications and disadvantages.¹⁰ These included operative time, donor site morbidity, and the resultant scars. Several modifications have been applied to this technique to address such issues, including the use of a transverse incision¹³ and the use of mini-laparotomies.²⁹ Since then, the number of cases has been gradually inclining. However, as seen in Figure 2, it was not until earlier in the millennium that the introduction of laparoscopy as a technique for harvesting the flap and that the number of cases started to flourish.⁵ The advantages of laparoscopy stem from minimizing the effects of dissection on the donor site, the incisions visible to the patients and their scars, a decreased operative time, and associated complications.^{8,16,18,22} This is evident with higher rates of bleeding/hematoma, flap necrosis, delayed wound healing, and pedicle site swelling associated with laparotomies as seen in Table 3. Despite this, some authors have described the technique to be skill demanding and to require extensive learning.¹⁸ For instance, laparoscopic harvesting was also found to result in

relatively more pedicle vascular injuries, fat necrosis, and logically, associated laparoscopic injuries, which expresses the degree of technical demand of this technique. Interestingly, postoperative mean hospital stay was higher with laparoscopic harvesting. This could be attributed to laparoscopic procedures being more often single staged concurrently with the mastectomy, despite what is known that laparoscopy decreases hospital stay.¹⁸

After harvesting the flap, pulling the flap from the abdomen to the desired breast was achieved by 2 main methods: (1) tunneling next to the xyphoid process or a subcutaneous tunnel when a pedicled flap is used and (2) a lower right quadrant/Pfannenstiel incision when a free flap is used. It could be a suggestion to tunnel the free flap exactly similar to the way of pulling the pedicled flap and then closing the white line incision to prevent hernias. In this way, the extra 4-cm incision will be eliminated, and the abdomen will only have port-site scars. Interestingly enough, there were only 3 (0.51%) cases of hernias reported. This puts the omental flap in between transverse rectus abdominis muscle and deep inferior epigastric perforator flaps which have rates between 3.9% and 7% and 0% and 1.8%, respectively.^{31,32} To utilize the entire omentum, a free flap is desired to avoid losing a portion of the omentum in the tunnel. Therefore, the use of free flaps is recommended in instances where a size match is required. When such data were reported, the use of implants was noted in 6 cases only, most all of which were pedicle omental flaps, which supports the fact of volume loss intraabdominally and in the tunnel with pedicle flaps. The pooled data show that only 25 (3.84%) of the cases were harvested as free flaps but showed that they were more likely to be harvested laparoscopically. The thoracodorsal and perforators from internal mammary arteries are good recipients for medial and lateral breast defects, respectively.

Several methods have been described to monitor flap viability, intraoperatively through laser Doppler flowmetry¹⁹ or postoperatively by exposing a small part of the flap through the skin.⁸ Two advantages were identified for the use of this flap in terms of outcome, mainly its superior aesthetics in terms of consistency and natural appearance in comparison to other modalities of reconstruction.^{12,13,24} The final aesthetic outcome should be assessed after 6 months,²⁹ after which modifications to the contralateral breast can be assumed to approach symmetry.¹⁴ Five articles,^{21,25,26,27,23} all reporting laparoscopic harvesting, were found to use a standard classification for cosmetic outcomes as reported by Harris et al or a similar system.^{9,23} The system is composed of 4 points for assessment as excellent (nearly identical to untreated breast), good (slightly different than untreated breast), fair (clearly different from untreated but not seriously distorted), and poor (treated breast seriously distorted). Almost 90% of the cases showed excellent to good outcomes, which supports the cosmetic superiority of such a flap.

Although some studies didn't report any change in size, others reported an increase in size of free flaps up to 6 months postoperatively, which was attributed to the temporary ischemia.²⁰ Omentum was sampled before and after the

transposition of free flaps; CD31 marker was used to measure angiogenesis, and there was an increase in the number of vessels noted in the second sample suggesting neo-angiogenesis. Adipocyte size was noted to be statistically significantly ($P < .001$) larger in the second sample. This might alarm the surgeon to expect such change in size while being vigilant for recurrence, as well as to under correct, rather than over correct the breast to achieve symmetry. The authors also discussed variability in the size of the flap from patient to patient and the inability of estimating the volume of the flap, both of which can hinder effective operative planning. Góes et al suggested the need for developing tools to estimate the volume of the omentum preoperatively, but a search didn't preclude a current method that can effectively predict the size of the omentum.³³ The use of magnetic resonance imaging and computed tomography scans can allow for estimation of visceral body fat, among other modalities, but cannot accurately estimate omental volume.³⁴

Conclusion

The use of the omentum is safe and has many advantages in breast reconstruction including a natural feeling and appearance of the breast and has minimal donor site morbidity when harvested laparoscopically. It is suggested to be an excellent option in certain cases where the other flaps are inaccessible or to meet particular patients' preference.

Authors' Note

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