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PEDICLE TRAM FLAP REVISITED IN BREAST RECONSTRUCTION

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ABSTRACT

Background: **Breast reconstruction is part of continuum of care for patients who undergo mastectomy. The reconstruction options are either autologous or implant based. With the advent of free flaps in breast reconstruction, pedicle flaps such as pedicle Transverse rectus abdominis muscle flap (p TRAM) have slowly been relegated to the periphery. However in many countries there is limited capacity to carry out microsurgical breast reconstruction. We share our experience of patients managed with pedicle Tram flap in such countries.**

Objective: **To determine the outcome of patients managed with pedicle Tram flap.**

Design: **This was a prospective audit of patients who had mastectomy and reconstructed with pedicle Tram flap in various hospitals in Nairobi, Kenya between January 2015 and December 2022. Variables analyzed were the length of surgery, hospital stay, surgical related complications, and patient's satisfaction.**

Results: **A total of 25 patients had reconstruction with pedicle tram flap from January 2015 to Dec 2022. The mean age for the patient's was45.6 years. The average operating time was 4hours 15 minutes with an average hospital stay of 5.5 days. One patient had partial flap necrosis and one patient had post-surgical wound sepsis. Abdominal hernia was noted in one patients after one year of follow up. Overall patient's satisfaction was more than 80 percent of the patients.**

Conclusion: **Pedicle Tram flap still has a role in the treatment of breast reconstruction. The procedure is less demanding and is associated with good outcomes. It is therefore ideal in centers with limited expertise in free flap based reconstruction.**

INTRODUCTION

Comprehensive Management of cancer of the breast entails a whole spectrum of care encompassing surgical excision , radiotherapy , chemotherapy and eventually breast reconstruction .While there are many options in surgical reconstruction pTram flap still remains one of the options in the management more so in centers where free flaps are not available (1-3). Since its inception by Hampftrampf more than forty years ago p Tram flap has remained one of the armamantorum in the reconstruction of the breast (1). Its hold on the grip has however been eroded with newer techniques such as deep inferior epigastric artery perforator flap (DIEP) , profunda artery perforator flap PAPF , Lumbar artery perforator flap , (LAPF) and implant based reconstruction giving an impression that it probably gives suboptimal outcomes in breast reconstructions. Though implant based reconstruction have been on upward trend

in countries such as the USA there unavailability in low to middle income countries has stagnated there usage (4).

While these newer techniques may give better functional and aesthetic outcomes, they are not routinely available in many countries. They are also expensive and demand close perioperative monitoring that may not be feasible in many centers living one with no option but to consider alternative methods of reconstruction. We share our experience and outcomes with p Tram flaps for breast reconstruction among our patient cohorts.

MATERIALS AND METHODS

This was a prospective audit of patients with cancer of the breast reconstructed with p TRAM flap between Jan 2015 and Dec 2022. A thorough medical history was taken and physical examination done to assess whether patients were fit for reconstruction with p TRAM flaps. Patients who had abdominal hernias or subcostal surgical incisions were offered other reconstructive options. Patients who had a positive history of smoking or significant obesity were offered two staged reconstruction.

Operatively ipsilateral p TRAM flap was raised and periumbilical tissues from zone 1 and 2 used for reconstruction while zone 3 and 4 discarded as described by Hamptramf et *al* (1). The flap was then tunneled under a subcutaneous tunnel and advanced into the breast defect where it was secured with sutures .The resulting abdominal muscle defect was repaired with a prolene mesh. A drain was inserted in the abdominal wound and wounds closed in layers. Post operatively patients were followed up for at least one year .Nipple reconstruction was done for patients who desired for it at least six months later.

Variables analyzed included length of surgery, hospital stay, post-operative complications and patient's satisfaction. Patients satisfactions was done at one year of follow up and was graded as 1. Not satisfied 2. Fairly satisfied 3. Satisfied 4 highly satisfied.

Ethical Consideration

Ethic approval for the study was gotten from the local ethics and review committee. Consent to participate in the study was also sort from all patients.

RESULTS

A total of 25 patients with cancer of the breast managed by mastectomy were reconstructed with p TRAM flap. The mean age for the patients was 45.6 years with an age range of 29 to 57 years. Twenty patients had immediate one staged reconstruction while five patients had two staged reconstruction with the first stage being ligation of the deep inferior epigastric artery and the second stage raising and insertion of the flap (Figures 1 and 2)

Figure 1A: pt with right post-mastectomy defect

Figure 1B: Patient in figure 1 A successfully reconstructed with pedicle tram

Figure 2: Patient with left breast mastectomy reconstructed with two stage pedicle Tram flap

Table 1: Demographic data for the patient and the reconstruction options offered .

Age	Years
mean	45.6
Median	40.5
Range	29-57
Treatment Options	
One stage reconstruction	20
Two staged procedure	5

The mean operative time was 4 hours and 20 minutes with a range of 2 hours and 45 minutes to 4 hours for the immediate reconstructive group while for the two staged procedure for the first stage the mean operative time was 45 minutes with the second surgery 3 hours and 40 minutes.

The overall complication rates were about 12 percent with partial flap necrosis noted in one patient (Figure3).

Figure 3: Patient with partial flap necrosis after reconstruction with Pedicle Tram flap

Table 2: Complication encountered

Complications	Frequency
Partial flap necrosis	1
Abdominal wound dehiscence	1
Abdominal hernia	1
Total	3

Thirteen patients (52%) were highly satisfied with 9 (36%) patients satisfied and one patient not happy with the outcome.

Table 3: Patients satisfaction after the procedure

Patients satisfaction	frequency	Percentage
Highly satisfied	13	52
Satisfied	8	32
Fairly satisfied	3	12
Not satisfied	1	4
Total	25	100

DISCUSSION

Breast reconstruction is considered part of standard of care for patients with cancer of the breast. It has not only been shown to improve the willingness and desire for patients to go through the entire treatment spectrum but has also been associated with good quality of life. The reconstructive options have broadly been classified into either autologous or implant based. While implant based reconstruction are less time consuming and cheaper there availability is limited to developed countries. Autologous reconstruction on the other hand have the advantage of using patients on tissue hence could be practiced anywhere as so long as one has the necessary surgical expertise. Options for autologous reconstruction include free or pedicle flaps with pedicle tram flap being one of the most commonly used (2).

The popularity of p TRAM flap has generally decreased over the years due to the apparently higher complication rates with DIEP flap now being one of the most commonly used flap in breast reconstruction (4-5). Prakasit et *al* reported 34 percent complication rates in patient who had undergone breast reconstruction with p TRAM flaps .Majority of the complications were fat necrosis followed by abdominal hernias in about 12 percent of the cases. (5) These complications were more common in elderly and obese patients. Patrick Garvey *et al* in another study comparing complications in p TRAM flap and DIEP flaps noted abdominal hernias to be significantly more common in patients who had had p TRAM flaps (6). Pedicle TRAM flaps had also higher incidence of fat necrosis of up to 58.5 % compared to 17.7 percent for those with DIEP flaps (6). Woonhyeok Jeany *et al* in a meta-analysis study however found out that the only significant difference between p TRAM and DIEP flap was on the abdominal herniation (7). There was no difference in flap loss or partial flap necrosis between this two groups of patients.

Our series on the other hand reported relatively low complication rates with an overall complication rates of about 12 percent. Abdominal hernia and fat necrosis similar to partial flap necrosis were noted in one patient a piece. This low complications could be attributed to a young patient population as the mean age for our patient was only 44 years with majority below 50 years of age. Other factors that could have reduced complications in our patient's cohort was the low BMI as well as a negative history of smoking. Further, patients with high risk of complications such as obese were being subjected to two staged reconstructive procedure.

Patient's satisfaction in our study was comparable to other studies with more than 80 percent of the patient being satisfied with the outcome of their reconstruction. Veronique et al reported high patient satisfaction irrespective of the reconstructive technique employed (8). Another study by Sungkar A *et al* showed that patients satisfaction with autologous reconstruction was much better than implant based reconstructions at 2 years of follow up .(9) However there was no difference between the satisfaction rate between free tram and pedicle tram flaps . Yueh *et al* in a study comparing satisfaction rate between pedicle tram and diep flap found a satisfaction rate of 77 % in pedicle TRAM flaps and 80 % in Diep flaps .(3) After logistic regression analysis he however fund out that there was no difference in the patients satisfaction rate among the two groups of patients . Leyngold *et al* in study comparing outcomes of p Tram and free DIEP flap found out that the overall outcome were comparable though Pedicle Tram flap had more abdominal herniation. He however concludes that**:** In a carefully selected patient and circumstances where microsurgery is suboptimal, unipedicled TRAM flap can be a safe and a viable option with satisfactory outcomes. It should thus continue to remain as part of core plastic surgery training and armamentarium of plastic surgeons in autologous breast reconstruction. (10)

In conclusion, pedicle Tram flap offers a viable option in breast reconstruction more so in a setup where free flaps are not available. With proper patients selection and meticulous surgical technique good patient satisfaction rates comparable to other modalities of treatment can be attained. Patients with higher risk of flap necrosis such as smokers or obese patients should be offered two staged reconstruction.

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