PJPS
PAKISTAN JOURNAL OF PLASTIC SURGERY
ISSN #: 2307-213X
Volume 10, Issue 02, October 2022

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Research Article

Role of Quilting Sutures in Reducing Seroma Formation in Latissimus Dorsi Flap Donor Site: A Randomized Controlled Trial

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Abstract |

Background: The Latissimus Dorsi Flap is a commonly used flap for breast and upper limb reconstruction. One drawback of this flap is donor site seroma formation. The objective of this study is to evaluate the role of quilting sutures in prevention of seroma formation over donor area after latissimus dorsi flap.

Methodology: This is a randomized controlled trial conducted at Jinnah burn and reconstructive surgery Centre, Lahore over a duration of 4 years from June 2016 to June 2020. The sample size was 78 patients who were all planned to undergo free latissimus dorsi flap reconstruction. The patients were randomized by the lottery method into two groups of 39 patients each: group A (quilting) patients had their donor sites closed with quilting sutures, whereas and group B (control) patients had their donor sites closed without quilting sutures. Drains were placed in all patients and output was monitored until removal. Results were evaluated by comparing seroma formation, drain output in 48 hours, and drain removal time.

Results: Overall 19 patients (24.3%) developed seroma. Quilting technique reduced the incidence as only 2 patients (2.5%) developed seroma, in comparison with non-quilting group in which 17 patients (21.7 %) developed this complication. Quilting group was also associated with decreased total drain output and early drain removal.

Conclusion: As compared to traditional method of primary closure of latissimus dorsi flap donor area, quilting suture technique proved to be more effective in preventing post-operative seroma formation.

Received | 27-01-2022: **Accepted** | 27-08-2022

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Keywords | Seroma formation, Latissimus dorsi flap, Quilting sutures

Introduction

The latissimus dorsi myocutaneous flap (LD flap) is one of the most common flaps used surgical for breast and upper limb reconstruction.[1] The LD flap has many benefits including an easy approach, predictable blood supply and adequate size.[2] One drawback of this flap is donor site seroma formation, the incidence of which is reported from 29% to 71%. .This increases patient discomfort and prolongs hospital stay. The aetiology of seroma formation is complicated and multifactorial. Dead space formation during respiration, excessive use of coagulation, release of inflammatory mediators while dissection and disruption of lymphatics are prominent causes of seroma formation.[4,5]

Preventive measures and treatment protocols for this particular problem have been documented in multiple times in the literature. Established seromas are usually treated with repeated aspirations, steroid injections, or placement of drainage tubes.[6] Traditionally to counter this problem drains are placed in donor area, but it increases patient discomfort and its prolonged use provides a source for secondary infection which increases overall morbidity.[7] Some newer intraoperative methods

to prevent seroma formation includeendoscopic harvest, fibrin glue, and placement of quilting sutures.[6]

Quilting is a mechanical method of dead space closure which has recently emerged as an effective means of preventing seroma. In this technique, chest wall is approximated with skin flap by means of multiple lines of sutures which ultimately leads to reduction in dead space. Although it is time consuming, it has shown decreased seroma formation in latissimus dorsi surgery, abdominoplasty and breast reconstruction.[8-11] The aim of this study was to evaluate the role of quilting sutures in alleviating seroma formation.

Methodology

This was a randomized controlled trial, conducted at Jinnah Burn and Reconstructive Surgical Centre, Lahore from June 2016 to June 2020. A sample size of 78 subject (39 in each group) was calculated from win-pepi ver: 11.15 with 95 % confidence interval, 80% power of study, ratio of sample size B:A of 1, assu-ming overall incidence of seroma in Group A (Quilting) of .76 and in group B (Control) of .49 to detect a difference of 200 (from study of Shin et al).[11]

Inclusion criteria were patients aged 15 years or older, of either gender requiring reconstruction with latissimus dorsi flap without skin paddle. Patients with septic wounds, uncontrolled diabetes mellitus, or history of bleeding disorder were excluded. Informed consent was taken from patient after explanation of procedure and study objectives. All patients and hospital staff were blinded for the study duration.

Randomization was done by using the lottery method. The operating surgeon was blinded preoperatively, but un-blinded intraoperatively. Before skin closure, the attending surgeon was provided an envelope containing a number corresponding to one of the two arms of the trial. In Group A (quilting) patients, donor site closure was done with quilting sutures. Horizontal rows of vicryl were positioned 4-5 cm apart, reducing dead space between skin flap and chest wall. Two redivac drains were placed and primary skin closure was done as shown in Figure 1. The control group had their donor site incision closed primarily in two layers using sutures (2-0 vicryl, Prolene 3-0).

Outcome measures were as follows:

1) Seroma formation: demonstrable fluid collection at donor site, clinically examined by a doctor, and confirmed with drainage using aseptic technique
2) Daily and total drain output in first 72 hours
3) Day or removal of last drain: defined as the day of removal of second drain. Criterion for removal was output less than 300ml/24 hours

Data was entered and analysed in SPSS ver: 21.0. Frequency and percentages were calculated for nominal variables like gender, complications. Mean and standard deviation were calculated for numerical variables like age, drain output and drain removal time. Complication rate among groups was also assessed and recorded on subsequent visit or admission.

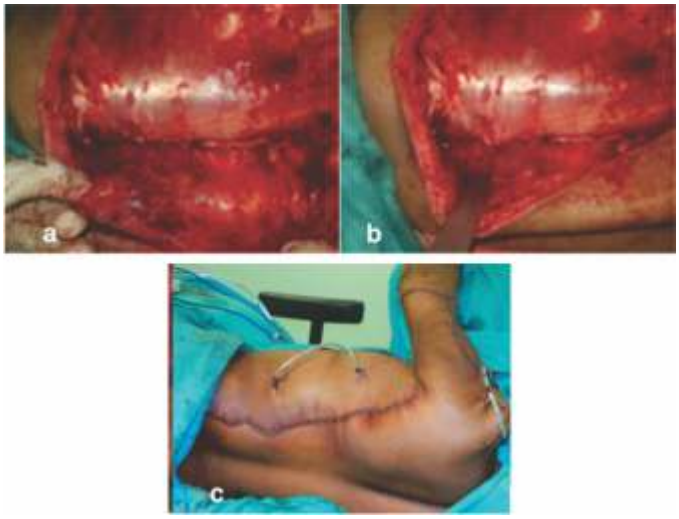

Figure 1. *(a).(b)Donor site showing quilting sutures. (c). Closure of donor site with drains in-placed*

Results

Mean age of the patients was 38.5 years. Majority of the patients were males. Details of the demographic and clinical characteristics of the patients is shown in table 1. There were no significant diffe-rences between the two groups in this regard.

Table 1: *Comparison of demographic data and clinical characteristics between the two groups*

	Overall	Group A (Quilting)	Group B (Control)	P-value
Mean age (years)	38.5	36.7	40.5	0.118
Gender (n/%)				
Male	60(80.8%)	31	29	0.389
Female	18(19.2%)	08	10	
Flap area (cm^2)				
Maximum	200	200	194	0.072
Minimum	105	109	105	0.182
Etiology (n/%)				
Trauma	58(74.3)	28(71.7)	30(76.9)	
Burn	08(10.2)	03(7.6)	05(12.8)	0.228
cancer	12(15.3)	08(20.5)	04(10.2)	

Total incidence of seromawas 24.3% (19 patients). Out of these, 17 patients (89%) belonged to non-quilting group. The mean day of drain removal was less in quilting group (2.7 days) as compared to control group (4.0 days). The total drain output in first 72 hours was significantly lower in quilting group (143 ml) as compared to non-quilting/control group (240 ml). All of the above differences in the two groups were statistically significant. The findings regarding outcome measures are detailed in table 2. A total of 5 patients (6.4 %) needed hospital admission due to complications (Table 3). There was no significant difference in complication rates between the two groups.

Table 2: *Comparison of outcome measures between the two groups*

Outcome	Group A (Quilting)	Group B (Control)	P-value
Seroma (n/%)	2 (5.1)	17 (43.6)	<0.001
Drain output (ml)			
Day 1	82	107	<0.05
Day 2	43	82	
Day3	17	51	
72-hour Total	143	240	
Day of removal of all drains (mean)	2.7	4.0	<0.05

Table 3: *Comparison of complications between the two groups*

Complications	Group A (Quilting)	Group B (Control)	P value
Haematoma	1 (2.5%)	2(5.1%)	0.32
Flap Necrosis	2 (5.1%)	2 (5.1%)	1.00
Readmission	2 (5.1%)	3 (7.6%)	0.81
Infection	1 (2.5%)	1 (2.5%)	1.00

Discussion

Although not a life threatening condition, seroma remains the most common impediment regarding donor site. Multiple modalities have been developed to counter this problem. This randomized controlled study evaluated the role of quilting in prevention of seroma. Quilting sutures over flap divides the dead space in multiple pockets reducing the overall drain output and seroma risk as evident by our study. Many studies have also shown same results, as reported by Sajid et al[9] on 440 participants, and by Daltrey et al.[8] However in both case series, there was an overall high seroma incidence which the authors attributed to the fact that extended latissimus dorsi flap was harvested in all cases instead of traditional one. In these studies, there was no co-relation between complication rate and use of quilting sutures, as we also determined in the present study.

Lee and Mun,[13] conducted a study in which they used fibrin sealant in combination with quilting sutures to close donor site and reported overall decrease incidence of seroma formation. Another study reported by Shin et al. showed, incidence of seroma of 42.9 percent in group which combined quilting technique with fibrin sealant and 76.0 percent in group which only used fibrin sealant.[11] Again, incidence of seroma reported in this study is quite higher than those recorded here, but at the same time combining techniques got better results. The combination has a dual effect, with closure provided by quilting technique and fibrin sealant addressing the production of serous fluid.

Another study emphasized the use of biodegradable polymers, polyglycolic acid (PGA) and concluded its usefulness in decreasing donor site seroma ($p<0.01$)[16]. The use of sclerosing agent abnobaviscum for treatment of refractory seromas has also been documented[17].

As far as complications are concerned, after seroma formation, an uncommon complication is ischemic necrosis. Due to the reliable vascular thoracodorsal pedicle and straightforward dissection, chances of flap necrosis are low even in diabetics or smokers[18]. We found hematoma in 2.5% cases followed by flap necrosis in 5.1% cases, which is similar to what is described in the literature.[19,20]

Conclusion

The use of quilting sutures considerably reduces the incidence of seroma production. In future, further studies should be considered regarding combinations of various modalities to reduce the risk of seroma formation.

Conflict of Interest *None*

Funding Source *None*

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Research Article

Frequency of Venous Complication in Free Flaps After Head and Neck Cancer Reconstruction

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Abstract |

Background: With the advancement in clinical techniques, free flap surgery for head and neck defects has gained popularity as a refined microvascular surgical technique that comes with numerous challenges. The objective of this study is to define the frequency of venous complications in free flaps employed for head and neck cancer surgeries in a tertiary care hospital to establish guidelines for the early management of failing flaps and to look for a similar pattern of venous complications in free flaps of the head and neck.

Methodology: This prospective study was conducted in the plastic surgery department of Patel Hospital Karachi from January 16th, 2017, to July 16th, 2017. It included all patients with head and neck malignancies who had free flap reconstruction and were examined for venous problems within five days of surgery, regardless of gender.

Result: Venous issues were found in 6 out of 70 free flaps (8.6%) in head and neck cancer reconstruction, resulting in a 95.4% flap success rate. Even when external factors were not considered, venous thrombosis was the most common cause of venous complications.

Conclusion: The study concluded that venous complications are the most common reason for free flap failure, followed by arterial causes, neck hematoma, recipient or donor artery issues, and infections.

Received | 11-01-2022: **Accepted** | 10-07-2022

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Keywords | Free flaps, venous complications in free flaps, salvage flaps, microvascular free tissue transfer

Introduction

Head and neck tumors, specifically oral cancer incidence, are a major health care burden in Asia. According to the World Health Organization (WHO), the incidence of oral and lip cancers in Pakistan in 2012 was 8.6%.[2] Head and neck tumors are the second most common cancer in Pakistan, second only to lung and breast cancers in males and females, respectively. It refers to cases registered with the Shaukat Khanum cancer registry only; the accurate number would be even more than this figure because of under reporting.[1-3] Anwar and colleagues also documented high incidence rates in their report (10.9%).[4] This can be attributed to the high intake of gutka, pan, chewable tobacco, betel nut and smoking, with smoking more common in males and betel nut in females.[5]

Among oral cancers most were seen in the buccal cavity (54%) and the tongue (24%). The majority have extensive oral cancers at presentation, causing complex facial defects. A microvascular-free flap is the most reliable option to reconstruct such complex defects in the head and neck regions, as there are limited local options for reconstruction. The most used free flaps are the radial forearm free flap, the anterolateral thigh flap, the fibula

osseous and osseo-cutaneous flap, the latissimus dorsi flap, etc. Free flaps are the safe alternative, even though they, like all procedures, are not without risks. Complications include vascular complications, neck hematoma, infection, and flap failure. The most common complications are vascular, as supported by Wu et al. in their study, which showed a 9.9% flap re-exploration rate most commonly due to venous insufficiency, followed by arterial bleeding and hematoma.[6-9]

Venous thrombosis is more than twice as common as arterial thrombosis and tends to develop later.[8-11] Shen et al. identified venous problems (59.9%) as the most common etiology of flap failure, followed by arterial problems (27.9%), hematoma (10.2%), infection, and recipient vessel problems.[12] Late flap failures (i.e., > 48 hours) were most often due to infection or mechanical stress around the anastomosis. The risk of venous compromise manifests itself in the first 24 to 72 hours and rarely after this period, but complications have been seen even after five days. Even though not consistently documented, prior irradiation at the recipient site has been identified by some authors as a contributing factor.[13] If the flaps are examined frequently, especially every hour in the first 48 hours, venous problems are observable clinically. A venous compromise is most certainly present if the flap swells, turns blue, and gushes out dark blood quickly after being poked with a needle.

Considering the significance and prevalence of this issue, as well as the dearth of data on local populations, the authors were propelled to conduct this study. This study was carried out to offer local data on free flap complications and explain the vascular complication patterns, which will aid in the early management of free flaps.

Methodology

This study is a descriptive case series of head and neck cancer patients operated on by the Plastic Surgery Department at Patel Hospital Karachi from January 16th, 2017, to July 16th, 2017, after approval of the synopsis for the FCPS-II thesis. The sample size was calculated to be seventy (70) by the open resource WHO (World Health Organization) calculator version by KC Lun and Peter Chiem, National University of Singapore. The proportion of overall venous complications was taken as 9.9%,[6] with a seven percent margin of error and a 95% confidence interval. It was a prospective study, and data was collected as a non-probability consecutive sampling technique. All patients operated on for head and neck cancers who met the criteria were included in this study.

All the study participants were patients of either gender with head and neck cancers between the ages of eighteen (18) to sixty (60) years, with T-1 to T-4 stages requiring reconstruction with free flaps. After informed consent, all the patients were interviewed and examined in detail by the primary authors to ensure they met the inclusion criteria. Patients were excluded from the study if there was salvage-free flap surgery, arterial insufficiency, or stage four disease with systemic metastasis found in them.

The data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 21. The frequency and percentages of venous complications, gender, and radiation, co-morbidities such as hypertension and diabetes mellitus, smoking, free flap choices, number of venous anastomoses, disease stage, and clinical symptoms were also recorded. A mean standard deviation (SD) was recalculated for the age of the patients, duration of hospitalization, and length of intensive care unit (ICU) stay. Effect variables such as age, gender, length of hospital stay, co-morbid (Hypertension and Diabetes Mellitus), length of ICU, options of free flaps, number of anastomoses, and disease stage were controlled through stratification to see the influence on venous complications. A chi-square test was used, with a p-value of 0.05 considered significant.

Result

The average age of the patients was 46 ± 9.9 years (min: 22 years; max: 60 years). There were fifty-three (75.7%) men and seventeen (24.3%) women. Both hypertension (HTN) and diabetes mellitus (DM) were present as comorbidities in individuals with head and neck cancer. None of the patients in this research had been exposed to radiation in the previous six weeks.

Most patients had moderately differentiated squamous cell carcinoma (SSC), followed by well-differentiated SCC. Almost all cases were stage IVA, with features of locally advanced disease. 28 (40%) had Radial forearm flap, 28 (40%) had anterolateral thigh (ALT) flaps, while fibula flaps accounted for 20% (n = 14). The venous complication was seen in 8.6% (n = 6) of the flaps (fig1), while the flap success rate was 95.71 percent. In 18.6% (n = 13) of the cases, a single venous anastomosis was employed, and in 81.4 percent (n = 57) of the cases, a dual anastomosis was used.

Smoking was found to have a statistically significant influence on venous complications in free flaps after head and neck reconstruction (p = 0.026). On analyzing the relationship between venous problems and the length of ICU and hospital stays, it was discovered that patients with flap failure have significantly prolonged ICU stays (p=0.033). The stratification of other confounding variables like gender, age, comorbidities like DM, HTN, radiation, and hospital stay was found to be statistically insignificant. The number of venous anastomoses, as well as the option of the free flap, are compared in terms of venous complications. With a p-value greater than 0.05, the results were deemed to be statistically insignificant. (Table 1).

Two of the six flaps with vascular complications were the free fibula, two ALTF, and two radial forearms. This distribution implies that the choice of the flap has no significant relationship with failure. The flap could not be saved in the fourth patient due to delayed vascular impairment caused by a clinically obvious wound infection (Fig 2). The development of supraventricular tachycardia in the early postoperative period, which was cardioverted with verapamil and later shifted to bisoprolol, was another aspect that could have contributed to the flap failure in this case.

Table 2 shows the clinical details of all the patients in whom there was flap failure.

Table 1: *Comparison of Venous Complications with Different Parameters of the Study Subject*

Variable of the study		Venous complication		P-Value
		YES (n=6)	NO (n=64)	
Gender Distribution	Male	4(5.7%)	49(70%)	0.292
	Female	2(2.9%)	15(21.4%)	
Smoking	Yes	3(4.3%)	9(12.9%)	0.026*
	No	3(4.3%)	55(78.6%)	
Hypertension	Yes	3(4.3%)	14(20%)	0.124
	No	3(4.3%)	50(71.4%)	
Diabetes Mellitus	Yes	1(1.4%)	4(5.7%)	
	No	5(7%)	60(85.7%)	0.897
	No	6(8.6%)	64(91.4%)	
Number of venous anastomoses	Single vein	1(1.4%)	12(17.1%)	0.900
	Dual vein	5(7.1%)	52(74.3%)	
Option of free flap	RFF°	2(2.9%)	26(37.1%)	0.694
	ALTF*	2(2.9%)	26(37.1%)	
	free fibula	2(2.9%)	12(17.1%)	

*Anterolateral thigh flap ° Radial forearm flap

Discussion

In this study, seventy (70) cases of free tissue transfer to the head and neck region were reviewed and the overall success rate was found to be 95.71% (67/70). The study had six cases of postoperative venous complications, accounting for 8.6 percent of all cases. Only three flaps were salvaged out of six, indicating a fifty percent success rate of re-exploration for vascular problems. During the trial, only one patient developed arterial insufficiency of the flap, which was ruled out. The most common cause of free flap failure was discovered to be venous.[6-11]

Table 2: *Description of Cases with Venous Complication*

Number of cases	Type of flap	Site	Comorbs	Reex-plore	Cause of venous complication	Onset of venous complication	Flap outcome
Case 1	Free fibula flap	Left lower alveolus/Mandible	None	Yes	Venous thrombosis	Day 1	salvaged
Case 2	Free fibula flap	Left cheek /Mandible	None	Yes	Expanding Neck hematoma	Day 1	salvaged
Case 3	Free ALTF*	Left cheek	None	No	Not known [Outer flap lining had venous congestion and managed conservatively]	Day 1	Viable; partial flap compromise only
Case 4	Free RFF°	Right buccal mucosa and right commissure	HTN	Yes	Infection. Supraventricular tachycardia	Day 4	Failed
Case 5	Free ALTF*	Left Orbito Maxillary	DM, HTN, hep B	Yes (twice)	Venous thrombosis	Day 2	Failed
Case 6	Free RFF°	Left cheek	HTN	Yes	Venous thrombosis	Day 1	Failed

*Anterolateral thigh flap ° Radial forearm flap

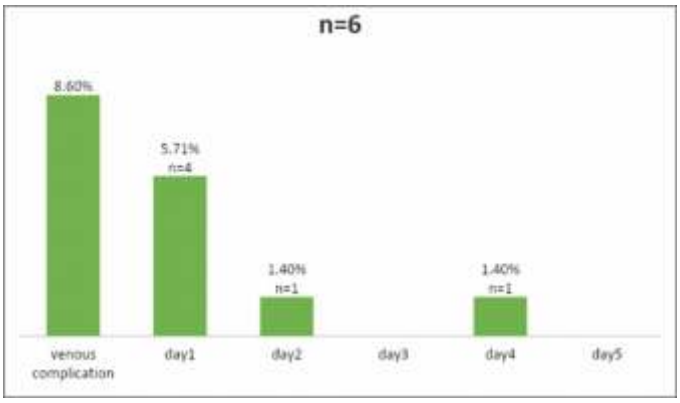

Figure 1- *Frequency of Venous Complications and Day of Development of Venous Problems*

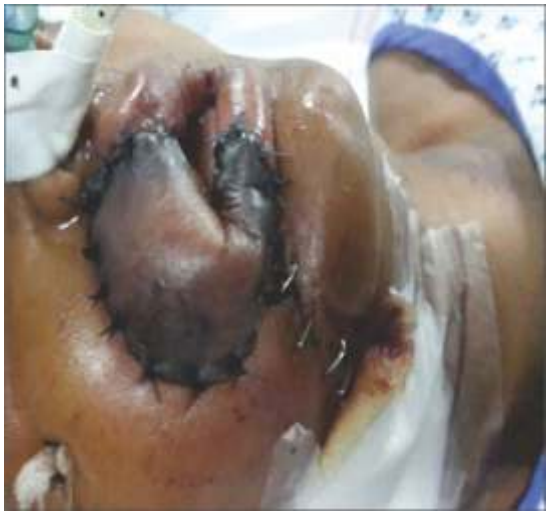

Figure 2: *Case 4 Radial forearm flap having signs of venous compromise, evident by congestion, swelling, and signs of wound infection by cheek swelling and erythema, neck covered with dressing in the picture.*

All these findings are comparable with Wu et al.'s research, which showed a 9.9% flap re-exploration rate most commonly due to venous thrombo-sis, followed by arterial bleeding and hematomas.[6,12,14-16]

The risk of venous compromise is higher in the first 24 to 72 hours and is rare after that, however, it can happen up to the fifth day. In the first 24 hours, four out of six patients showed clinical symptoms of venous impairment. Infection or mechanical stress surrounding the anastomosis were the most common causes of late flap failures (greater than 48 hours), as evident in case # 4. As discussed in a recent multi-institutional review (n = 1764), flaps showed vascular thrombosis (9%), mostly venous compromise, during the first 8 hours after surgery (Day 0), with a greater flap salvage rate (64%) if explored early.[14,17] Early recognition of signs of compromise indicates that flaps can be saved to improve outcomes, thereby lowering mortality, morbidity, and expenses. Venous issues can be identified clinically if the flap is examined often, especially every hour in the first 72 hours. The flap should be returned to the operating room (OR), which needs to be carried back to the operating room excluding external variable. If it swells, becomes blue, and gushes out a small amount of dark blood when the needle is pricked. It is most likely a venous compromise. It is possible that some of the flaps that had venous problems on Day 1 but couldn't be saved despite early intervention had venous compromise early on the table that was not recognized, perhaps as a result of surgeons' fatigue due to prolonged operative time and hesitance in exploring the flap. Delaying the exploration until changes are apparently evident in the flap is found to be the root cause of flap failures supported by Wei and Lin's work.[16-19]

Radiation is known to have deletorious effects on wound healing. Although none of the patients had radiation within the last 6 weeks, there was one patient (patient no 5 in table 2) who had been treated with excision and radiation two years ago. That patient had a venous complication of the flap which couldn't be repaired despite prompt intervention. Later, unfortunately, that patient died a month after the first surgery due to hospital-acquired pneumonia.

At Patel Hospital, we usually perform two venous anastomoses, which is another variable in flap survival and exploration rate, although our results were unreliable. There is an ongoing debate about whether one or two venous anastomoses should be done to avoid venous complications. Although many researchers now believe that double venous anastomoses are safe, the evidence is still ambiguous.[8,9,12,15,18,20,21]

Sometimes, the tiniest suggestion of vascular compromise occasionally leads to unwarranted surgeries that endanger patients' lives and add to their financial burden.[22-24] Many authorities now report other advanced measures for flap monitoring to avoid unnecessary revisions based on the clinical judgment of the observer. Advanced options to determine complications include assessment of vascular patency by handheld or implantable Doppler, tissue pH, laser Doppler, pulse oximetry, use of visible light spectroscopy to measure tissue oxygenation in free flaps and lately, the use of Fluoresceine or Indocyanine Green (ICG), etc. whereas, clinical assessment is sensitive and superior to all.[25] In contrast, clinical assessment by the residents of plastic surgery, trained ICU staff or experienced microvascular surgeons

are sensitive and superior to all, with a success rate ranging from 85 to 95%.[25] Although the clinical judgement does not put an additional burden on the patient, it is not feasible in buried free flaps of the head and neck region. For these cases, these advanced methods are the best alternative tools.[25]

Conclusion

A microvascular-free flap reconstruction is a reliable option for head and neck reconstruction after cancer defects. The most devastating complication of losing a flap can be easily controlled by through preoperative planning, reducing patients' modifiable risk, meticulous technique and diligent postoperative monitoring by dedicated members of the microvascular team. There are multiple modifiable risk factors that, if taken care of, can prevant flap failure becasue, even in teh setting of a successful free flap, a second flap may still be required to deal with late complications, such as post-radiation trismus, osteoradionecrosis (ORN), etc. By reducing failures, we can move to the next level by bringing "Aesthetics to Reconstruction".

Conflict of Interest *None*

Funding Source *None*

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Research Article

Management and Outcome of Burn During Pregnancy

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Abstract |

Background: Working in kitchens exposes women of reproductive age to burn injuries on daily basis in low socio- economic countries. Though rare burn injuries during pregnancy are a significant healthcare burden as they are a threat to the health of both mother and fetus. The objective of this study is to describe demography and burn characteristics of patients and to determine the factors affecting maternal and fetal outcomes.

Methodology: Retrospective study conducted in burn unit of Mayo Hospital / KEMU for a period of 3½ years (June 2018 – Jan2022.) Data was collected about age, TBSA, depth and mode of burn, gestational age, hospital stay, treatment and fate of mother and fetus.

Results: Total no of patients was 30.Mean age was 26.2±5.17.Mean gestational age was 23.±8.0.Mean hospital stay was12 ±9.95 days. Maternal Mortality was 26.7%. There were 3 deaths in less than 28 weeks and 5 deaths in more than 28 weeksof gestation. There were 13 patients with less than 20% TBSA, 10 in(21 - 40%), 5 in(41 - 60%), 2 in more than 61%.Fetal mortality was 20 %.

Conclusion: Maternal mortality is related to Percentage of total burn surface area, inhalation injury, depth of burnand gestational age. Burn in pregnant females has a strong negative effect on fetal wellbeing and survival.

Received | 22-06-2022: **Accepted** | 15-09-2022

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Keywords | Burn in pregnancy, Maternal outcome, fetal outcome, TBSA.

Introduction

Burn injury, major source of morbidity and mortality in different parts of world especially in developing countries where more than 95% of fatal fire related burns occur. Four million females suffer from burn each year[1] Burn injury in pregnancy is associated with increased morbidity and mortality in both mother and fetus. It is directly related to the depth and total burn surface area.[2] Other factors affecting outcome include site of burn inhalation. injury, age of patient, gestational age, comorbidities like diabetes, hypertension and epilepsy.

Common Causes are flame burns / scald burns, chemical and contact burns. Causes may be accidental, homicidal or suicidal. Working in kitchen exposes females of reproductive age to burn injury on daily basis.

Burn in pregnancy causes a threat to both mother and fetus simultaneously. Therefore, it has even being suggested to consider fetus as a second patient. Lethal burn injury to maternal body reduces chance of fetal survival leading to sudden in-utero death or complications like prema-turity and spontaneous labor.[3]

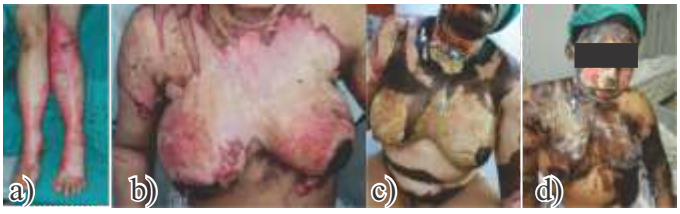
Acute management of burn in pregnancy is of utmost importance. Main goal of management should be avoidance of hypovolemia, hypoxia and hypotension to reduce risk of complications like fluid and electrolyte, imbalance, infection and systematic inflammatory response syndrome, adequate nutrition, physiotherpy and psychological support are also improtant adjunets. All therapies are directed

primarily towards saving mother as it is not clear from previous studies that either burn or resultant therapy cause deli-rious effect on fetal wellbeing.[7,8]

Methodology

Retrospective study conducted in burn unit of Mayo Hospital / KEMU over a period of 3½ years from (June 2018-Jan2022)..Inclusion criteria: pregnant females of any age presenting with flame, scald, electrical or chemical burns and both early/late presentation. Exclusion criteria:non pregnant females, patients needing direct gynecological assistance due to other complications of pregnancy. Data about all pregnant patients with burn presenting during this period was collected including Age, TBSA, depth of burn, anatomical site, mode of burn, gestational age, Hospital stay and treatment and fate of mother and fetus was documented. All the patients were managed with burn care including fluid resuscitation, fasciotomies and tracheostomy if required, wound care, nutritional support and physiotherapy. Serial ultrasounds for viability of fetus were done. Management was done in collaboration with Gynae and Obstetric department. Wound care included use of interactive dressings, wound debridement, tangential excision, fascial excision and skin grafting.

Figure 1: *Degree of Burn*
a) Superficial partial thickness burn



b) Mixed thickness burn (Superficial & deep partial thickness) c) Full thickness burn
d) Chemical burn (Acid burn – Full thickness)

Results

Total of 30 pregnant females were admitted in burn unit (June 2018 - Jan2022) during this period. Mean age was 26.2 ± 5.17, with 25 patients less than 30yrs of age (25± 3.82) and 5 patients above 30yrs (34.6±3.14).[21] 12 Patients had gestational age <28 weeks (66.7%) and 9 patients with >28 weeks of gestational age (33.5%). Mean gestational age was 23.5±8.0. 6 patients (10%) were primigravida and 24 were multi-gravida.Common causes of burn were flame burn 20 patients (66.7%), scald burn 9(30%), chemical burn 1(33.3%). 13(43.3)patients had TBSA < 20%, 10(33.3%) had TBSA (21-41%), 5 (16.7%) had TBSA(41- 60%) and 2(6.7%) had TBSA >61%). 14(46.7%) patients had superficial partial burn, 3(10%)had deep partial, 6(20%) had mixed pattern and 7(23.3%) full thickness burn (Fig 1).12(40%) presented within 12hrs, 13 (43.3%) between 12 – 24 hours and 5(16.7%) after 24hrs. 12 patients had fluid

Table 1: *Correlation of Material Outcomes with clinical data*

Patient characteristics	Maternal Survival (%)	Maternal death (%)	Total (%)	P value
Patient Number	22 (73.3)	8 (26.7)	*30 (100)*	
Age of Patient				
≤30 years (n=25)	18 (81.8)	7 (87.5)	25 (83.3)	0.7
>30 years(n=5)	4 (18.2)	1 (12.5)	5 (16.7)	
Gestational Age				
≤28 Weeks (n=20)	17 (77.3)	3 (37.5)	20 (66.7)	0.04
>29 Weeks(n=10)	5 (22.7)	5 (62.5)	10 (33.3)	
Presentation in emergency after burn				
≤12 hours (n=20)	10 (45.4)	2 (25)	12 (40)	0.03
13-24 hours (n=)	8 (36.4)	3 (37.5)	13 (43.3)	
>24 hours (n=10)	4 (18.2)	3 (37.5)	5 (16.7)	
Clinical data				
Mode of burn:				
Flame burn	13 (59.1)	7 (87.5)	20 (66.7)	0.18
Scald burn	9 (40.9)	---	9 (30)	
Electrical burn	---	---	---	
Chemical burn	---	1 (12.5)	1 (3.33)	
Total Burn surface area (% TBSA):				
≤20	12 (54.5)	1 (12.5)	13 (43.3)	0.04
21- 40	8 (36.4)	2 (25)	10 (33.3)	
41- 60	2 (9.1)	3 (37.5)	5 (16.7)	
>61	---	2 (25)	2 (6.7)	
Anatomical site:				
Head and neck	10 (45.5)	8 (100)	18 (60)	
Upper limb	10 (45.4)	4 (50)	14 (46.7)	----
Trunk	15 (68.2)	8 (100)	23 (76.7)	
Lower limb	7 (31.8)	4 (50)	11 (36.7)	
Perineum	1 (4.5)	3 (37.5)	4 (13.3)	
Depth of burn (Clinically)				
Superficial partial thickness burn (SPTB)	14 (63.6)	---	14 (46.7)	
Deep partial thickness burn (DPTB)	2 (24.5)	1 (12.5)	3 (10)	0.1
Mixed thickness (Both SPTB & DPTB)	4 (18.2)	2 (25)	6 (20)	
Full thickness burn	2 (9)	5 (62.5)	7 (23.3)	
Inhalational Burn				
Yes	10 (45.4)	6 (75)	16 (40)	0.04
No	12 (54.5)	2 (25)	14 (60)	
Fluid resuscitation in first 24 hours				
Complete	10 (45.4)	2 (25)	12 (40)	0.03
Inadequate	7 (31.8)	1 (12.5)	8 (26.7)	
Not done	5 (22.7)	5 (62.5)	10 (33.3)	
Emergency procedures done				
Tracheostomy	4 (18.2)	4 (50)	8 (26.7)	0.26
Escharotomy	12 (54.5)	7 (87.5)	19 (63.3)	
Fasciotomy	3 (13.6)	5 (62.5)	8 (26.6)	
Amputation	---	2 (25)	2 (6.7)	

resuscitation completed and 18 had inadequate or resuscitation was not done. 16 patients (40%) had inhalational injury and 14Pt (60 %) did not sustained inhalation injury. Mean hospital stay 12 ± 9.95 days. 13 of our patients had comorbidities like hypertension(4), Diabetes (5), Epilepsy (3), stroke (1) (Table 2).

Table 2: *Maternal outcome in relation to Cormorbidities*

Characteristics	Alive (%)	Dead (%)	*Total (%)*	*P value*
Hypertension	2 (9)	2 (25)	4 (13.3)	
Diabetes Mellitus	---	2 (25)	5 (16.7)	
Epilepsy	5 (22.7)	1 (12.5)	3 (10)	0.04
stroke	---	1 (12.5)	1 (3.33)	
None	15 (68.2)	2 (25)	17 (56.7)	

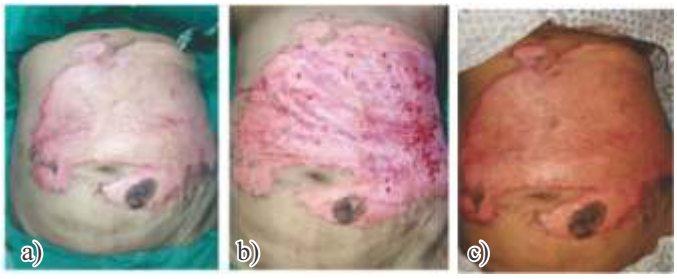
Table 3: *Fetal Outcome*

Characteristics	Total (%)	P value
Fetal outcome		
Ongoing pregnancy	15 (50)	
Spontaneous expulsion	2 (6.7)	---
Delivery at full term	5 (16.7)	
Premature birth	2 (6.7)	
Planned Caesarian section	3 (10)	
Sudden in-utero death	3 (10)	

Maternal Outcome

Maternal mortality was 26.7%.There were 3 deaths in less than 28 weeks of gestation and 5 in more than 28 weeks of gestation (p-value .04).1 death in less than 20% TBSA, 2 in (21-40), 3 in (41-60), 2 in more than 60%TBSA(p-value .04). 6 out of 8 patients who died had inhalational injury (p,-value .04) (Table1) .1 with incomplete resuscitation and 5 with no resuscitation (p-value .03). Correlation of clinical data with maternal outcomes is shown in table 1. Maternal complications leading to death were shock (n=4), septicemia (n=4), Respiratory distress(n=8), DIC (n= 5) and multi organ failure (n= 6).

Figure 2: *Flame burn anterior abdominal wall – Superficial partial thickness burn*



a) Day 2 after burn b) Wound after wound wash and curettage c) Day 9 – wound healed

Fetal outcome:

Fetal mortality was 20%. There were 2 spontaneous expulsions.2 premature birth,3 IUD, Delivery at full term was in 5 cases and planned C - section was done in three cases. Ongoing pregnancy in 15 cases.(Table 3).

Discussion

In this study we found TBSA, delay in presentation after burn injury, inhalational injury and gestational age have significant effection maternal and fetal outcome.

Burn injury in developing countries is a social issue. Working in kitchen exposes females of reproductive age to burn injury on daily basis in lower socioeconomic countries. It is rare in pregnant females but can have devastating effect on mother and fetus. Specific physiological changes occur during pregnancy to meet increased demands. Burn cause many changes which have an additional stress on system that are already highly modified. In pregnancy there is hyperdynamic cardiovascular status. Burn increases capillary permeability and third space loss leading to hypovolemia and hypotension if patient is not adequately resuscitated. This leads to placental insufficiency and fetal ischemia[9]. In case of inhalational injury and infection there is additional hypoxia in mother and fetus, thus increasing morbidity and mortality in mother and fetus.

Outcome of patients and fetus varies from one center to other. Highest incidence of burn during pregnancy is reported from India (7%-15 %).Different studies show maternal mortality ranging from 28.3 - 63%[10]. Ezatollah et al documented maternal mortality 29.2% [11]. In our study, a total of 30 women got admitted over a period of 4yrs and mortality was 26.7%. Most of the patients had large TBSA, Mixed and deep burns, inhalational injury and inadequate or no resuscitation. There were more deaths in patients with gestational age more than 28 weeks (n=5) as compared to less than 28 weeks (n=3). Similar was observed in study by Ezatollah. In a study by S. Mishra maternal mortality was 40% in first trimester, 66.7% in second trimester and 25% in third trimester.[12] Our Mean age was 26.2 (ranging from 20 - 35yrs) comparable to studies performed by Rezavand et al[7] Maghsoudi and Mago. Maternal morality has direct relationship with TBSA.[11] Gaffar et al in their study of 32 patients showed that maternal mortality increased with burns more than 25% TBSA and was maximum in more 50%TBSA13. In our studythere were 2 deaths with TBSA (21 - 40%).Both had deep burn and delayed presentation, 3 in (40-60%) and 2 in above 60%. Depth

of burn, delayed presentation, inhalational injury inadequate resuscitation had significant effect on maternal mortality. Burn precipitates abortion and premature labor in pregnant females.

Fetal mortality also varies in different series (27-72%). It increaseswith TBSA and Inhalational injury. In a study by Still J M fetal mortality was 18.8% and maternal mortality of 12%[14]. In our study it was 20% lower as compared to other studies but somewhere near to Still JM. There were 2 spontaneous expulsions and 3 IUD. 2 premature births, Delivery at full term in 5 cases and C-Section in 3 cases.

Management of burn during pregnancy is not easy rather challenging as it affects both fetal and maternal survival. For mother aim should be to minimize damage as much as possible. For fetus aim should be to reach full term being healthy. Minor burns might not affect pregnancy but burn> 30% can induce premature labor and/or fetal loss. In pregnancy there is hyperdynamic cardiovascular status and expanded total plasma volume to supply placenta. Burn increases capillary permeability and more fluid loss leading to hypovolemia and hypoxia. So we recommend 1) early and adequate fluid resuscitation to prevent hypovolemia and hypoxia, 2)Administration of antibiotics which are safe for fetus to combat infection and sepsis, 3) good oxygenation 4) special attention to management of comorbidities like diabetes and hypertension, 5) For wound management conservative approach is recommended especially surgery should be avoided in first trimester as anaesthetic drugs have adverse effect on fetus. Superficial partial thickness burns should be managed by interactive dressings. In Deep partial thickness minimal debridement followed by interactive dressing should be considered. Periodic ultrasounds for monitoring of fetus and management in collaboration with Obstetric teamis very important. It is important to judge gestational period at the time of burn which helps in making decisions about obstetric intervention. In burns <20% and between 20-40% no obstetric intervention is recommended in first and second trimester and in third trimester conservative approach and closed fetal monitoring should be done. In extensive burns with late pregnancy and viable fetus termination of pregnancy should be considered. (Table 4).

Wound management should be done according to burn degree keeping in view patient condition. This includes use of interactive dressings and wound debridement/ tangential excision and Skin grafting. In our study 18 patients underwent wound debridement, 6 tangential excision and 1 fascial excision. Interactive dressings were done in 21 pts. Skin grafting was done later to cover the wound.

Limitations and Strengths: As it was a retrospective study all the data was collected from medical charts of patients admitted in burn unit. We lack follow up of outcome of ongoing pregnancies after discharge and fate of all the babies delivered during hospital stay. Total of 30 patients were admitted during study period. We have tried to address almost all the factors effecting the maternal and fetal outcome. Not much literature is available on burns in pregnancy, there is need of more studies evaluating factors effecting the outcome and also including long term follow up of patients in regarding wound healing, fate of neonates delivered during hospital stay.

Table 4: *Obstetric management of patients*

TSBA	Gestational Age < 28 weeks	Gestational Age 28-36 weeks	Gestational Age >36 weeks
<20%	No obstetric intervention	Conservative approach Continuous monitoring	Induce labor/ C-section
20-40%	No obstetric intervention. Serial ultrasounds for fetalmonitoring.	Careful fetal monitoring	Delivery within 48 hours
40-60%	No active intervention	If baby viable – induce labor /C- section IUD- no active intervention	
>60%	No treatment	C-section as an emergency procedure	

Conclusion

Burn injury effects Maternal and fetal outcome. TBSA, depth of burn, gestational age, time of presentation, presence of inhalational injury and comorbidities all affect the outcome. Best is the prevention of burn. Early and adequate resuscitation, combating sepsis and collaboration with obstetric team is recommended.

Conflict of Interest *None*

Funding Source *None*

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Research Article

Vaginoplasty Outcomes in Terms of Post-Operative Complications and Patient Satisfaction after Reconstruction with Bilateral Pudendal Thigh Flap

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Abstract |

Background: Vaginal agenesis is a rare congenital anomaly. Vaginal reconstruction with adequate length having good sensations and minimal complications is a challenging task. There are multiple methods of reconstruction with their own pros and cons and each have variable learning curve. The aim of our study is to see the patient satisfaction and safety of pudendal thigh flap for vaginal reconstruction in congenital vaginal agenesis in our population.

Methodology: This prospective study was conducted at Bahawal Victoria Hospital, Millat Hospital Bahawalpur, and Mayo Hospital, Lahore. Data was collected over a 3-year period from November 2018 to November 2021. All patients of vaginal agenesis who underwent vaginal reconstruction with pudendal thigh flap were included. Outcomes were assessed in terms of vaginal length achieved, patients' satisfaction with their sexual lives, and post-operative complications.

Results: A total of 8 patients underwent vaginal reconstruction with bilateral pudendal thigh flaps during the study period. 87.5% of married females were sexually satisfied. Vaginal length of at least 6 cm was achieved in all patients. Wound infection was observed in two (25%) patients, wound dehiscence in one (12.5%), and folliculitis in two (25%).

Conclusion: Pudendal thigh flap is a sensate and reliable flap with excellent patient satisfaction and acceptable post-operative complications.

Received | 07-02-2022: **Accepted** | 05-08-2022

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Keywords | Vaginal Ageresis, pudendal thigh flap, vaginal reconstruction.

Introduction

Vaginal agenesis is a rare malformation of the Mullerian duct system. Its incidence ranges between 1/4000 and 1/5000.[1] It may occur as an independent developmental disorder or as a part of other syndromic complexes, most common being Mayer-Rokitansky-Kuster- Hauser (MRKH) Syndrome. Diagnosis is often made at adolescence due to primary amenorrhea or coital problems.[2] Reconstructing a functional neo-vagina is a very challenging task. It should be of an appropriate length and caliber, and with good aesthetic appearance[3]. Anatomic deformity and the presence or absence of internal genital viscera will determine the timing of surgical intervention. There is difference of opinion with respect to this.[4]

There are many surgical and non-surgical methods for vaginal reconstruction, each with their own pros and cons. In the early days, serial dilatation was practiced. This is a non-operative technique and has very low morbidity, but it requires long extended duration of stent use to be effective.[5]

McIndoe technique with use of split skin graft is considered as the gold standard by which all other techniques are compared. It's a relatively simple procedure, carries

less morbidity, and a reasonable vaginal length is often achieved.[6] Disadvantage is shrinkage of the cavity in overtime due to contraction of the skin. To avoid this development, the patient has to wear some sort of stent for a long period of time, which is cumber-some. Use of a full thickness skin graft (FTSG) rather than split skin was carried out in order to reduce contraction of the graft, but it carries a higher donor site morbidity. Also the necessity of wearing the stent remains[7]. Use of amniotic membrane to line the cavity rather than skin graft has been done but results are not satisfactory, as amniotic membrane never takes but acts as a biological dressing that helps in accelerating the wound healing. Again, this also requires wearing a stent.[8] Baldwin popularized the use of ileum and sigmoid colon to reconstruct the vagina.[9,10] The added morbidity of intra-abdominal surgery is the major restricting factor. Other disadvantages of ileum include bleeding with coital trauma, excessive mucus, periumblical pain related to coitus, and tendency to prolapse.[11,12]

To overcome the problems associated with use of grafts, flap reconstruction was implicated. Gracilis myocutaneous flap became very popular for perineal reconstruction. The disadvantage is that pedicle dissection is tedious, and chances of flap failure are quite high especially for a surgeon in his early learning curve[13]. Furthermore it produces a really conspicuous thigh scar. Wee and Joseph first described pudendal thigh flap and used it for vaginal reconstruction in cases of pelvic exenteration.[14] Comparing this way of reconstruction with above-mentioned procedures, the pudendal thigh flap is an ideal flap with a robust blood supply, least chances of flap necrosis and a short learning curve for the surgeon.[15,16]

The aim of our study is to assess our results of vaginal reconstruction using bilateral pudendal thigh flap, and to standardize and simplify the procedure for consistent and acceptable results.

Methodology

This prospective study was conducted at Bahawal Victoria Hospital,Millat Hospital Bahawalpur, and Mayo Hospital Lahore, over a 3-year period from November 2018 to November 2021. All patients who presented with congenital vaginal agenesis secondary to Mayer-Rokitansky-Kuster Hauser Syndrome were included in the study. All patients underwent standard pre-op evaluation, including baseline investigations, pelvic ultrasonography, karyotyping and MRI pelvis. Informed written consent was signed from all patients regarding surgery, pre and post-operative photography and anesthesia.

Surgical procedure:

In all patients the neo-vagina was created using bilateral pudendal thigh flaps. The procedure was carried out under general anesthesia. After placing the patient in the lithotomy position, bladder was catheterized and emptied. We used a hand-held Doppler probe to identify posterior labial artery and then marked the skin territory of the flap, which was approximately 15 cm long and 5 to 6 cm wide extending from lateral side of labia major a to medial thigh laterally (Figure 1).

A pocket was made between the rectum and bladder with blunt dissection avoiding iatrogenic injury to surrounding vital structures.

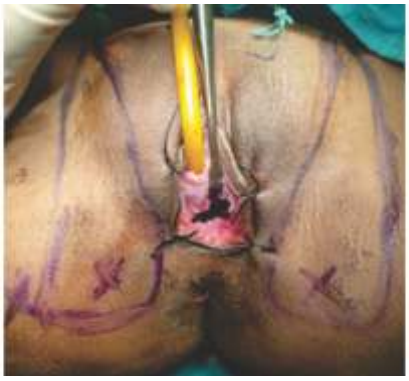

Figure 1: *Marking the bilateral pudendal thigh flap.*

Dissection of flap started from the periphery of flap, from anterior to posterior and was done in the sub-facial plane. When the dissection reached the adductor muscle, we elevated epimysium of adductor longus muscle along with flap. Posteriorly in the buttock area, after rechecking the location of the pedicle with hand-held Doppler, we performed subcutaneous undermining around the pedicle carefully toward the base of flap in order to facilitate proper rotation of the flap (Figure 2).

A subcutaneous tunnel was made in the posterio-lateral aspect of the introitus, for transposition of the flap. This tunnel was created wide enough to avoid compression of the pedicle. The portion of flaps present underneath the tunnel were de-epithelialized. Tubularization of the flap was done starting from posterior to anterior.

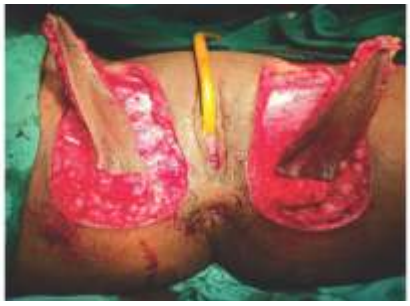

Figure 2: *Dissection of bilateral pudendal thigh flaps*

The tubularized flap was transported in space created previously. The external opening was formed by suturing ectodermal pit junction with ends of the flap. Primary

closure of the donor site was done (Figure 3).

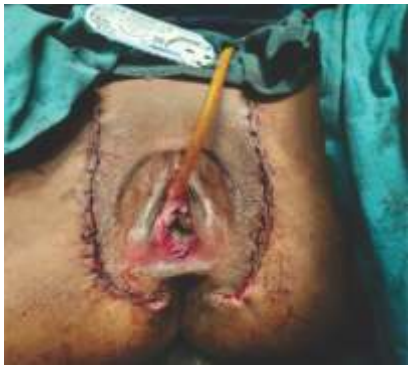

Figure 3: *Insetting of pudendal thigh flap and primary closure of donor sites*

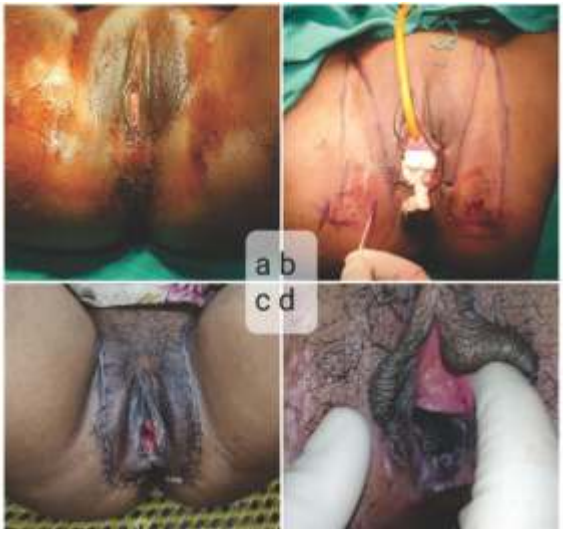

Figure 4 *patient 1:(a) pre operative (b) flap markings (c) two weeks post operative (d) three months follow up*

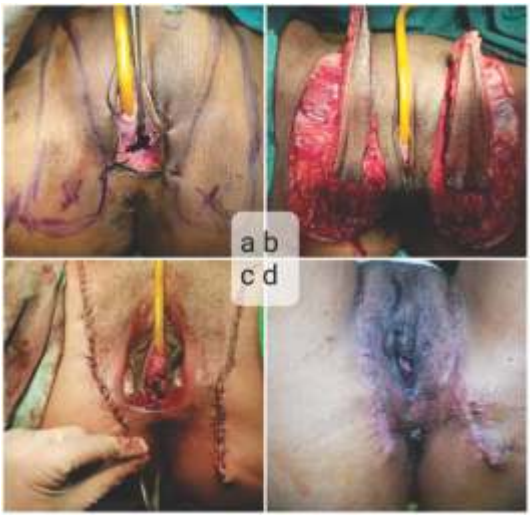

Figure 5: *Patient 2: (a) pre operative flap markings (b) flaps raised (c) immediate post operative (d) one month post operative.*

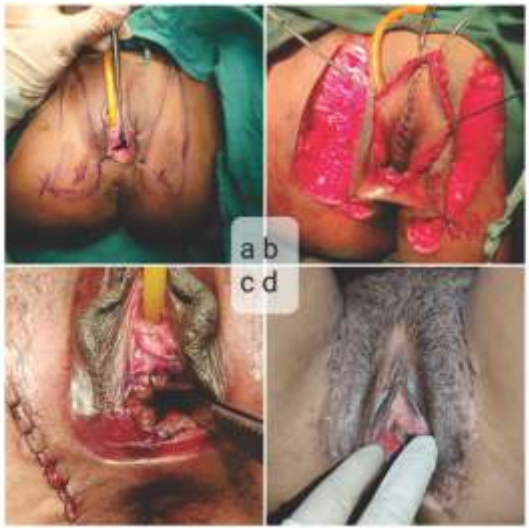

Figure 6: *patient 3: (a) pre operative (b) insetting of flap (c) immediate post operative (d) three weeks post operative.*

Post-operative care: Customized conformer is placed in neovaginal space to obliterate dead space to prevent hematoma and seroma. T-bandage was secured to give gentle external compression. Complete bed rest was advised for initial48 hours, with the patients thighs maintained in abduction. Conformer was first removed after 48 hours, vagina washed with pyodine, and the conformer replaced after applying new condom (lubricated with paraffin based antibiotic ointment) over it. Urinary catheter was kept for 1 week. All patients received triple intravenous antibiotic regimen including 1st generation cephalosporin, aminoglycoside and Metronidazole for five days.

Patients were discharged on 7th post operative day. Follow up was taken weekly for one month and fortnightly for 3 months and then yearly.

Outcome measures:

1) Flap survival (assessed by clinical examination on 5th post-operative day)
2) Wound dehiscence/infection (assessed by clinical examination at each change of dressing during the hospital stay, and at the follow-up visit
3) Vaginal length achieved (measured in centimeters, as the length of conformer easily inserted into the neovagina, at the 3-month follow-up visit)
4) Sexual satisfaction (categorized as 'satisfactory' or unsatisfactory' and rated by sexually active patient, at their 3-month follow-up visit)

Results

A total of 8 patients were included in the study. The

mean age was 25 years (range 21 to 32 years). All patients had well-developed secondary sexual characteristics, as per detailed clinical examination. Of these, two were already married at the time of presentation. Three patients got married within 3 months of the surgery. Main presenting complains was primary amenorrhea in all, and failure of coitus in the 2 married females.

There were no incidences of flap necrosis, as the flaps survived in al[18] (100%) patients

Mean vaginal length achieved was 8.4cm. All patients achieved a length of at least 6 cm. Table 1 depicts the details of vaginal length achieved in all patients.

Two patients (25%) had post-operative wound infection, one (12.5%) patient experienced wound dehiscence at introitus, and two patients (25%) presented with folliculitis of hair follicles transferred into vagina. The details of these are depicted in table 2.

Sexual satisfaction was assessed at the 3 month follow up visit for each patient. Of the 5 females who were sexually active at the time of assessment, 4 reported being satisfied with their sexual life. The one patient who reported being unsatisfied was found, on further probing, to have other ongoing problems in her relationship. Figures 4-6 show representative patients at various stages of their treatment.

Table 1: *Length of neo-vagina*

Length of neo-vagina (cm)	n (%)
6 – 6.9	1
7 – 7.9	2
8 – 8.9	3
>9	2

Table 2: *Complications and their management*

Complication	n (%)	Management
Wound infection	2	Settled with vaginal wash
Wound dehiscence	1	Healed with secondary intention
Folliculitis in neo-vagina	2	Managed with oral antibiotic therapy

Discussion

Vaginal reconstruction is a very tricky task. The main purpose of reconstruction is to make the female sexually active with good psychological health and restoration of body image. At the same time, the reconstructive procedure should be safe with minimum complications[17].

In our set-up we mostly performed Mc Indoe's procedure as it is relatively straightforward, but in the long term neo-vagina got stenosed especially in patients who were not sexually active and who did not comply with regular use of silicon stents. In contrast to this, pudendal thigh flap provides sensate pliable skin in neovagina, and stent is not needed beyond 2 weeks. Sexual activities can be started as soon as healing takes place, which is 30 to 40 days on average. Moreover there is minimal donor site morbidity with well hidden scar in groin crease. Reliability of flap is also proven by Stan Monstery in his study where all 31 flaps survived[18]. Similarly in another study conducted by Lis & Liu Y, there was only one flap necrosis in 24 flaps[19].

For flap survival we recommend few maneuvers. Use of hand-held doppler to identify and place the vascular pedicle incenter of flap improves outcomes. If hand-held doppler is not available, one should remain more medial as vascular pedicle lies medially[20]. One should avoid isolating and identifying main vessel, rather a wide base of pedicle should be maintained. Subcutaneous tunnel should be wide enough so as not to compress the pedicle. During mobilization, one must make sure there is no twist in the pedicle base. Lastly, a customized conformer should be made by placing foam over 10 cc syringe for proper pressure distribution to prevent hematoma and seroma formation.

In our study, mean vaginal length of 8.4cm was achieved, with all patients having a length of at least 6cm. Ganatra observed mean vaginal length of 7cm which is comparable to our study.[21] In one patient of our study who was not sexually active length decreased from 8.6cm to 6.2cm. This was due to neovaginal vault prolapse. Study conducted by Ajmal S reported average length of 9.3cm[22]. Loss of neovaginal length was observed in the first two cases, after which they started anchoring upper end of neo-vagina to perivesical and perirectal tissues which improved their outcomes. However, we never tried this due to fear of injury to pelvic organs and the technical difficulty in execution of these stitches. We observed that use of proper postoperative customized conformer for 15 days reduced incidence of this complication.

Pudendal thigh flap has some disadvantages. It requires longer operative time and a longer learning curve than McIn doe technique. Wound infection and dehiscence is relatively common, and are usually dealt with daily vaginal washes with antiseptic lotions. In our study we observed wound infection in 2 cases and wound dehiscence in one for which we advised proper wound care and healing occurred with secondary intention. Study conducted by Fein L.A reported similar immediate complications of wound infection and dehiscence and

they also advised same conservative measures[23].

Another long term problem is hair growth in neo-vagina especially at introitus that looks aesthetically bad. Moreover one of our patients presented with late folliculitis of these hair follicles. This is due to negligence of proper cleaning of vaginal canal. This problem may be solved by regular removal of hair with depilatory creams. A permanent solution with laser hair removal may also be done at the extra cost that comes with it.

Functional outcome in terms of both partner's sexual satisfaction is good in all married patients with no post coital dyspareunia.

Limitations of our study are small sample size with relatively short follow-up. We recommend multicenter study to increase number of patients of this rare congenital anomaly, with possible comparison of a few selected routinely performed surgical procedures.

Conclusion

Pudendal thigh flap is a safe and reliable option for vaginal reconstruction if we adhere to basic principles of proper design of flap, gentle tissue handling, use of magnification, adequate tunnel, and good and consistent post-operative care.

Both funtional and cosmetic outcomes are stisfactory, with a low donor site morbidity, and no requirement of long term use of regional stent.

Conflict of Interest *None*

Funding Source *None*

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Research Article

Outcome of Large Keloids with Precut Technique

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Abstract |

Background: Keloids are benign skin lesions that are often a cause of functional and cosmetic concern for the patient. The Objective of this study was to evaluate the aesthetic satisfaction and outcome of precut technique in patients with keloids requiring skin graft.

Methodology: This was an observational study done at the Department of Plastic Surgery, Shaikh Zayed Hospital, Lahore from June 2020 to May, 2021. An incision was made down to the subcutaneous layer around the edge of the keloid (precut), and radiotherapy (pre graft) was applied on the following day. Next day, the keloid was excised and wound closed with an intermediate thickness skin graft. Second fraction of radiotherapy was given in 2 weeks when the graft take was satisfactory. Patients were followed up,and at 12 weeksthe scar was evaluated by doctor. Aesthetic satisfaction was determined by the patient using verbal rating scale VRS questionnaire. The data was evaluated using chi- square- test.

Results: Sixty seven(67) patients with keloids greater than 4cm^2 were treated by using the precut, pre graft radiotherapy technique. Sixty four patients (64) out of 67 patients (95%) had cure at the scar site with incision margins soft, pale and flat. Three patients (5%) had graft contraction with firm, pale and protuberant incision margins. Also, 64 (95%) patients were satisfied with the aesthetic results and rated the scar site as good outcome. Only 3(5%) patients were dissatisfied with the results and rated scar site as poor outcome.

Conclusion: Keloid edge precut, pre-graft radiotherapy method is effective treatment method for patients with large keloids that require excision and skin graft.

Received | 18-04-2022: **Accepted** | 05-09-2022

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Keywords | Keloids, Skin Graft, Precut technique, Pre graft Radiation, Hypertrophic Scars,

Introduction

Keloids are benign skin lesion that occur beyond the normal boundaries of a scar.[1] Keloids occur equally in both genders across all age groups.[2] Keloids are caused by trauma, irritation, insect bite, vaccination, skin piercing, acne, folliculitis and chicken pox. Injuries that reach the reticular dermis cause keloidal and hyper-trophic scar.[3] Spontaneous keloids occur without history of any trauma and are associated with genetic conditions or with use of certain medications.[4]

Many treatment regimens have been advocated such as intralesional steroid,[5] steroid with 5 flurouracil therapy,[6] surgical excision followed by radiotherapy,[7] brachy-therapy,[8] silicon tape, laser excision, oral colchicine and pressure devices.[9] In patients with large keloids, primary closure of the defect is difficult. Skin grafts are the only remaining option to cover the defect.[10] Surgical excision without radiation leads to recurrence in 80-100% cases.[11] Radiation is effective in reducing the recurrence rate when applied within 24-48 hours.[12] Patients with skin grafts have radiation constraints due to surgical bandage and radia-tion has to be postponed

up to 14 days till the survival of the graft.

To address this issue wenbo er al[13] deviced the technique of keloid edge precut, early radiotherpy, followed by completion of excision and skim graft. This study is compared the effectiveness of this technique with the conventional method of keloid skin graft treatment. Results showed that the recurrence rate of keloids was 16.7% in the precut group as compared to 55.2% in conventional group, at 1year followup.

The rationale of this study is to determine the effect of precut technique on our set of population. It is a combination of keloid edge precut with early radiotherapy within 24 hours ,followed by excision and grafting the next day. Second fraction of radiation was given once the graft take was satisfactory.

Methodology

This was a prospective study done at departmetn of plastic surgery, Sheikh Zayed Hospital over ar period of one year from June 2020 till May 2021. Patients were enrolled through the out patient department. Patients of both gender, aged 18-80years with keloids greater than 4cm^2, at any site of the body, unable to close primarily and requiring skin graft were included. Patients who had previous treatments in the form of massage, pressure garments, intralesional steroids and excisions were also included. Small keloids-requiring primary closure or patients with previous post radiation complicated keloids were excluded from our study.

Techinque

Local anesthesia was administered at the keloid edge with 0.5% lidocaine (1:100,000 epinephrine). An incision was made along the keloid margin in the normal skin deep into subcutaneous tissue without excising the keloid (precut, fig a,b). After bipolar coagulation incision was closed with intradermal continuous suture. fig1c. The surgical site was covered with opsite dressing. Radiotherapy of 9 Gray (pre-graft radiation) was given at the keloid edge incision site within 24 hour. The excision of the keloid with skin grafting and bolus pressure dressing was done the following day (fig d). First dressing was removed on 3rd post op day. The graft take was assessed on 14th postoperative day and second set of radiotherapy. 9 Gray was given if the graft take was satisfactory. Patients followed up at 2,4, and 12 weeks to assess the graft site. Patients were advised graft massage from 4 weeks onwards. Final scar evaluation was done by Doctor at 12weeks, as cured or partially cured. A flat scar, with pale margins which stays within the limits of incision, with no graft contraction is considered to be cured scar.(fig1e). A scar with protuberant margins, red in color, which stays within the limits of incision is considered partially cured. Also, information about patient satisfaction was collected throughVRS (verbal rating scale) questionnaire, at 12 weeks follow up visit. (Table 1)

All the data of my study was entered in SPSS version 20 and was analyzed. Descriptive statistics like age of the patients were presented as Mean±SD. Qualitative variables such as genders were calculated as frequency and percentages like gender. Data was stratified for age, gender, duration of keloid and site of keloid. Post stratification Chi-square test was used taking p value and <0.05 considered as significant.

Results

Sixty seven (67) patients met the criteria and were analysed. Maletofemale ratio was 1.09:1 with 52% males and 48% females. Seventy eight 78% had keloids sized 5-30cm^2 while rest of the patients had area greater than 30cm^2. More than 50% patients had history of flame burn injuries and skin infections in the past which progress to keloids, whereas others had history of acid burn, lacerations and surgical scars. Neck and presternal area were common location of keloid formation with 22% each, followed by 12% shoulder region and 10% arm, wrist, leg, thigh and epigastric region.

Table 1: *Verbal Rating Scale*

VRS RANGE 7-10 Good outcome	VRS RANGE4-6 Average outcome	VRS RANGE 0-3 Poor out come
i.no itch at scar site. ii.no pain at scar site. Iii.Patient highly satisfiedwith scar appearance.	I. Occasional itch ii. Occasional pain iii.Patient satisfied with scar appearance	i. Marked itch. ii. Marked pain iii.Patientnot satisfied with scar appearance.

In our study, 64 (95%) patients had cure at the scar site and only 3 patients (5%) developed hypertrophic scar at the margins of the graft at 12 weeks follow up visit. According to patient VRS, 64 (95%) patients rated scar site as aesthetically good outcome. Only 5% (3) patients were dissatisfied with the aesthetic results and reported itching on the protuberant margins.

Two patients out of 3 had postoperative infections at the presternal area and their second fraction of radiotherapy was not given due to partial graft loss. One patient developed raised graft margins at wrist and did not comply with post operative massage therapy.

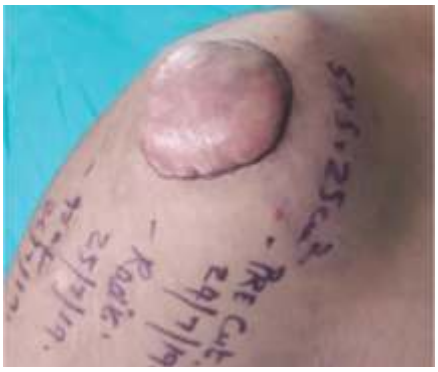

Figure 1a: *25cm² keloid on shoulder preoperative picture*

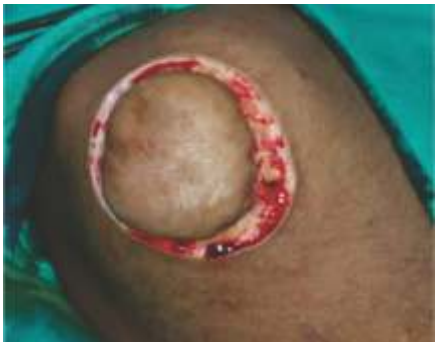

Figure b: *precut incision made*

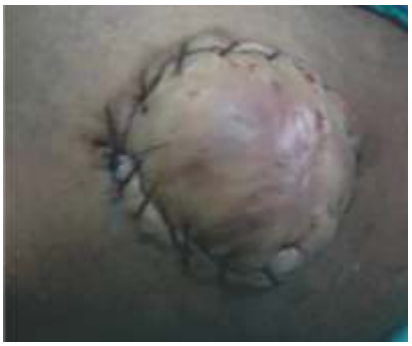

Figure c: *Hemostasis secured with prolene 3/0 and patient sent for radiation within 24 hours time*

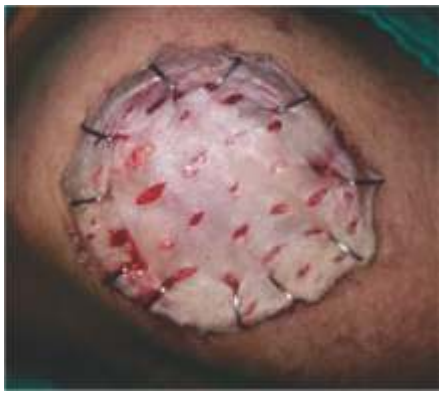

Figure d: *Excision + intermediate thickness graft application, the following day after radiation*

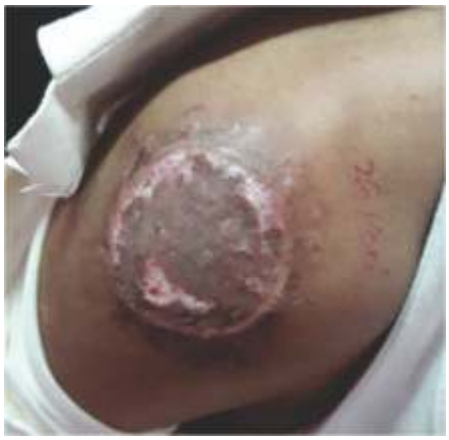

Figure e: *Results at 12 weeks follow up*

Discussion

Corticosteroid injection for the management of keloid is a first-line option and it is useful for small lesions and easy to perform.[14] The combination of 5FU and triamcinolone seems to be superior to intralesional steroid therapy alone (15 vs 40%) as reported by Davison et al.[15]

Intralesional triamcinolone injections are usually used after surgery in combination with surgical excision and decreasethe recurrence rate of keloids by about 50%.[16]

In the meta-analysis published in 2016 triamcinolone injection and radiation were both considered reasonably good treatments for keloids without significant difference[17].

Surgical excision followed by radiotherapy is helpful treatment for large and difficult-to-treat keloids especially those that failed to respond to more conservative measures. The balance between apoptosis and proliferation is impaired in keloid fibroblast and they are sensitive to Xray radiation which prevent keloid recurrence by controlling fibroblast proliferation arresting the cell cycle and inducing premature cellular senescence.[18]

Moreover, a consensus statement from European society for therapeutic radiology and oncology noted that keloids are acceptable indication for radiotherapy and place no age restrictions provided that alternative therapies were ineffective.[19]

The variety of treatments for keloid suggest that none are satisfactory. Surgery alone leads to recurrence rates of 45 to 100%.20 Combining radiation and surgical excision is considered as the last resort which can significantly reduce recurrence rate.[20] Another study done by Cheraghi et al[7] showed that there is a decrease in

relapse rate of keloid formation if radiation in given within 24 hours after surgery.

In our study we preferred radiotherapy to large keloids which are refractory to other treatments, to see the outcome of radiation on skin grafted keloids. Also, radiation was given within 24 hours of keloid edge incision to address the issue of delayed radiotherapy.

It was an old belief that extralesional incisions stimulate additional collagen synthesis, prompting quick recurrence into a possible larger keloid than the initial one. For this reason, core excision of keloid tissue was recommended to prevent stimulation of additional collagen synthesis.[21] Tan et al[22] had shown, however, that leaving a small margin of keloid skin in place will rather stimulate a recurrence similar to residues in tumor excision stimulating tumor growth. This concept was incorporated in our study where extra marginal incision (precut) was made to prevent growth of residual stimulating factor and to see the outcome on our set of patients .

In our study the results are quite encouraging at 12 weeks follow up with 95% cure rate at the scar site and recipient area rated as aesthetically good. This is comparable with the results of a study done by Wenbo[13], where 91% of the patients had cure at scar site and graded the aesthetic satisfaction as acceptable and good at 12 months followup. However, the limitation of our study is long term follow up to comment on the recurrence of the keloid growth.

Author declares no conflict of interest.

Conclusion

Early stage radiotherapy is an important adjunctive for the prevention of keloid recurrence. In patients with large keloids who require excision and skin grafting, radiation is often delayed for weeks till the graft take is satisfactory. Technique, Precut followed by pre-graft radiotherapy allows early radiation to the incised keloid margins, making this the ideal treatment choice in this subset of patients and leading to better scar outcomes.

Conflict of Interest *None*

Funding Source *None*

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Research Article

Epidemiology of Burns in Pediatric Patients at a Tertiary Care Centre of Southern Punjab

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Abstract |

Background: Burns are a common cause of childhood injury throughout the world. The objective of this article is to describe epidemiological pattern, etiology, clinical presentation, and outcome in pediatric burn patients.

Methodology: This descriptive case series was done at plastic surgery and burn department of Sheikh Zayed Hospital Rahim Yaar Khan from Jan 2020 to Dec 2020. It was a retrospective data analysis of the records of all patients up to 15 years old with burn injuries that were managed at our center. Patient data was collected via a special proforma and analyzed with Statistical Package for Social Sciences (SPSS) version 23.

Results: Total 160 children were admitted from January 2020 to December 2020.. Male patients were 84 and females were 76. Two third of the children were below 5 years of age; 53.8% had burn with hot liquids; 98.8% were accidental and 87.5% children had burn at home in kitchen environment. Average TBSA was 17%±11; 60.6% were from rural areas, and 68.8% belonged to low socioeconomic status. 89.4% patients were managed conservatively; 30.6% were cured, 30% healed with complications and 4.4% patients expired.

Conclusion: Accidental burns in household environment are the most common cause of burn in children specially those under 5 years of age.

Received | 09-01-2022: **Accepted** | 28-07-2022

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Keywords | Epidemiology, pediatric burns, burn prevention

Introduction

Burns are a major public health problem associated with high risk of mortality and morbidity. Burns are a common cause of childhood injuries throughout the world.[1] According to World Health Organization's report, 95% of burn related deaths occurred in low and middle income countries.[1] Pediatric burns are more common in low income countries as compared to count-ries with high income.[1,2] Burn is the second most common cause of accidental death in children less than 5 years and the most common cause of accidental death in the home.[3,4] Nearly 75% of all burns in children are prevent-able. Burn incidence is highest in children below 5 years of age due to their impulsiveness, lack of knowledge, higher level of activity, and dependency on care providers.[5,6]

Burn management in developing countries is a major challenge due to many reasons such as absence of a burn registry, insufficient burn care centers and lack of education and resources[7,8]. In Pakistan there is not even a single dedicated pediatric burn center.

The rationale of this study is to generate local data that can be used to effectively devise burn prevention and management strategies aimed at the vulnerable pediatric population.

Methodology

This descriptive study was conducted at the Plastic Surgery and Burn Department of Sheikh Zayed Medical College / Hospital, Rahim Yar Khan from January 2020 to December 2020. The ethical approval for the study was taken from the hospital ethical committee. The records of all pediatric patients' up to 15 years of age with burn injuries who were managed at our burn unit were retrieved from hospital patient record and included in the study.

Patients' data were collected through a proforma from previously recorded history and clinical examination. Patients' demographic data, etiology, place of burn injury, burn type, body area involvement, percentage of burn and parents' knowledge about burn prevention and first aid were recorded. Outcome in terms of cured completely, survived with complications and mortality were also recorded. Children over the age of 15 years and those who were previously admitted and treated for burn injuries at some other hospitals were excluded from the study. Patients with minor superficial burns (< 10% TBSA) treated as out patients and those with incomplete record were also excluded.

All patients received standard ER management according to ATLS protocol followed by specific management for burns such as fluid resuscitation, pain management and the need for emergency escharotomy. The patients also received standard care in the ward as dictated by the requirements of their burn wounds. During the follow-up period of minimum six months, patients were assessed for wound healing in terms of healed completely, or healed with complications (Hypertrohic scars, keloids, and contractures). The data were analyzed via Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistical tests were applied.

Results

Total 160 pediatric patients were treated in the burn unit during the study period from January 2020 to December 2020. This was amongst a total number of 620 patients admitted to the burn unit during this period, accounting for an incidence of 25.8 % for pediatric burns. The mean age was 61 ± 45 months (Range 5 months to 15 years). Two third of the children, (n=99, 61.9%) were below 5 years of age. 84 (52.5%) were male and 76 (47.5%) were females. Majority of patients hailed from rural areas and were from families that belonged to low socio-economic status. 51% of the fathers were laborers by professions, 82.5% of the mothers were house wives. A high proportion of the parents were illiterate. Table 1 shows the demographic details of the study population. 98.8% of pediatric burns were found to be accidental in nature. There was only 1 reported homicidal and 1 suicidal case of pediatric burn. 87.5% children had burns at home in the kitchen environment. Regarding mode of injury, scald burns were most common (n=86, 53.8%), followed by flame burns (n=69, 43.1%). Table 2 shows the mode of injury and gender distribution in different age groups.

The average Total body surface area (TBSA) burnt was 17%. Majority of the patients had less than 20% TBSA involved. Figure 1 shows the distribution of patients according to percentage of TBSA burnt. Majority of the children (67%) had mixed pattern (superficial partial thickness and deep dermal) burns. Commonly involved different body parts included anterior trunk (55%), upper limb (46.5%), head & neck (33.8%) posterior trunk (29.4%), lower limb 43%, Buttock (21.3%) and genitalia (12.5%). Associated inhalational injury was seen in 12 (7.5%).

Comorbid conditions (epilepsy) were present in 3 (1%) of the patients, and only one patient had hepatitis C positive status. Average time lapsed since burn and arrival to hospital was 8 ±3 hours. Most of the patients (89.4%) were managed conservatively by closed method and 17(10.6%) patients had skin grafting for their wound coverage.

Regarding treatment outcome (Fig. 2), 8 (5%) patients left against medical advice, and 48 (30 %) were discharged on request, 49 (30.6%) were cured, 48 (30%) healed with complications and 7(4.4%) patients, having 30% or more burnt area, expired. Expiry was more in patients with inhalation injury, (16.7%) vs those without inhala-

Table 1: *Demographic Details of study sample*

Variable	Value
Mean Age	**61 months**
Age bracket	
<5 years	99 (61.9%)
5-10 years	38 (23.8%)
11-15 years	23 (14.3%)
Gender	
Male	84 (52.5%)
Female	76 (47.5%)
Origin	
Rural	97 (60.6%)
Urban	53 (39.4%)
Socioeconomic Status	
Low	110 (68.8%)
Medium	36 (22.5%)
High	14 (8.75%)
Illiteracy Rate	
Mother	62.5%
Father	38%

tional injury (3.4%). Regarding nature of complications; 23 (14.4%) patients developed Hypertrophic scars, 5(3.1%) keloids and 20 (12.5%) developed contractures.

Most of the parents (61.3%) had none or poor knowledge about first aid and preventive measures against burns at home. There were 4±1.6 children in a family and 61% of families the home consisted of only one living room. Number of admissions during winter was 43.8% more than the summer season: 115 vs 45 (71.9% vs 28.1%).

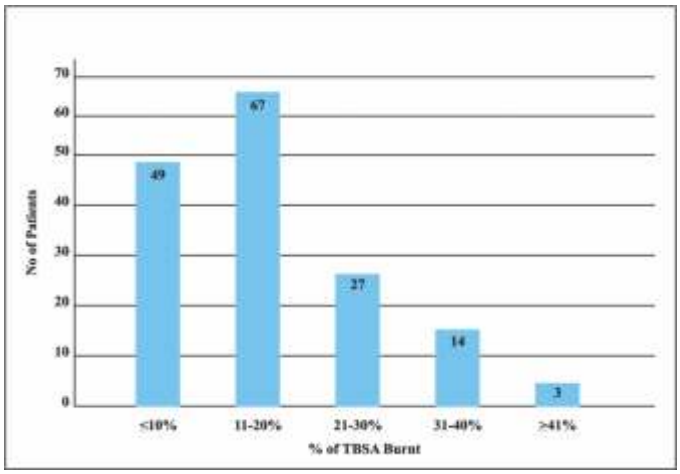

Figure-1: *Distribution of patients according to percentage of TBSA burnt (n=160)*

TBSA, Total Body Surface Area

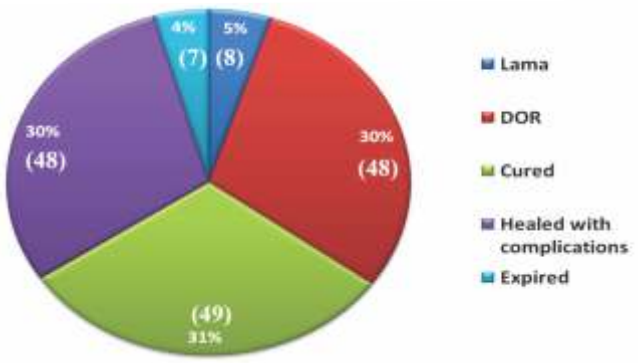

Figure- 2: *Treatment outcome of the burns patients (n=160)*

Discussion

Burn is an important cause of preventable injury, especially in the pediatric age group. Although burn injury is known to have a poor prognosis, with recent advances in fluid resuscitation, critical care and early surgical intervention, survival of even severely burnt patients has become an expectation.[9,10,11]

This study was carried out on 160 pediatric burn patients with an objective to analyze different factors which influence the management and outcome of burns in different age groups. Based on this study's findings, we can suggest measures that can be taken to prevent burns in children and these preventive measures can be implemented through public education.

Our study showed that about two-third of children were below 5 years and both genders were equally affected. Both of these findings are consistent to other studies on pediatric burns.[2,12,13]

Overall Scald burn (53.8%) was the most common mode of injury in children and 80.3% were less than 5 years of age, all happening accidentally in home environment. In older children flame burn (58%) was relatively more common cause of burn injury. This finding was also similar to other studies.[5,6,9,13] However the incidence of electrical and chemical burns was much less as compared to other studies.[2,12,14]

Most of the burns (67%) were of mixed pattern, superficial partial thickness and deep dermal. This finding is also similar to other studies.[2,5,6,11,15] In our study the burn admissions increased by 43.8% in winter season. The reason for this is increased use of gas cylinders, heaters, and open fires. The practice of boiling of water in large open pots and then transferring it to other places for showering and cleaning utensils also contributes to increased scald burns in young children.[2,8,16]

Majority of our patients (60.6%) were from rural areas and most of them (68.8%) belonged to low socioeconomic status. Most of the parents were also illiterate. These factors account for lack of awareness toward safety measures and lack of educational and preventive programs in our population.

The mortality rate among our population was 4.4%.

Table 2: *Mode of injury and Gender distribution in different age groups (n=160)*

Mode of Injury	0-5 Years		6-10 Years		11-15 Years		Total	Percentage
	Male	Female	Male	Female	Male	Female		
Scald Burn	37	32	09	04	01	03	86	53.75 %
Flame Burn	19	10	06	17	08	09	69	43.125 %
Electric Burn	0	01	02	0	01	0	04	2.5 %
Acid Burn	0	0	0	0	01	0	01	0.625 %
Total	56	43	17	21	11	12	160	100 %

The rate was significantly low in our patients as compared to other studies.[2,9,10,12,17] Our burn and reconstructive surgery unit is very primitive and consists of 26 beds and lacks burn ICU and other modern burn care facilities. A significant number (30%) of moderate to major burn patients were discharged on request as the parents were willing to take their patients to some better burn care centers in other cities. This could be the reason of the apparently low mortality rate in our studied population.

Majority of our patients (89.4%) were managed conservatively; and only 10.6% patients had skin grafting for their wound coverage. Mean hospital stay was 7.1± 6.8 days. It was less as compared to other studies because significant number (30%) of patients were discharged on request and 5% left against medical advice.[5,9,,12,18,19]

Our studied population had poor knowledge about first aid for a burned patient and only in 13% patients cold water was used to cool the burned area. In other patients unspecified medicinal creams, blue dye (neel), butter, toothpaste and homemade remedies were applied or nothing was used. Other studies also confirm use of such remedies.[8,20] Most of the parents did not use water to cool the burned area due to fear of blister formation after use of water. There is a tremandus need to improve knowledge of burn first aid in our general population.

Conclusion

Children less than 5 years are most vulnerable to accidnetal burn injuries, usually sustained in the kitchen. These findings should guide the development and implementation of burn preventation policies. Through a combination of preventive measures and improved burn care, not only the death rates can be lowered but also the goal of physical, social and psycho-logical rehabilitation can be achieved in pediatric burn patients.

Conflict of Interest *None*

Funding Source *None*

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Research Article

Our Experience of 1,2 Intercompartmental Supra Retincular Artery Pedicle Vascularized Bone Graft for Scaphoid Nonunion

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Abstract |

Background: The aim of this study was to observe efficacy and outcomes of 1,2 inter compartmental supraretinacular artery(ICSRA) pedicle vascularized bone graft in scaphoid non-union at our center.

Methodology: This retrospective study was conducted over a four-year period from January2015 till January 2019. All patients who underwent 1,2 ICSRA pedicle vascularized bone graft for scaphoid non-union were included in the study. The vascularized grafts were fixed with k-wires and compression screws. The outcome was measured by radiological healing time, range of motion at the wrist joint, and grip strength of hand, and the DASH (Disability of the Arm, Shoulder and Hand) score.

Results: 13 patients underwent 1,2 ICSRA pedicled vascularized bone graft for scaphoid non-union. According to the topography of fracture, 9 were proximal pole fractures and 4 were waistline fractures. 11 out of 13 patients achieved radiological healing by a mean time of 9.8 weeks. There was a significant decrease in the DASH score from 77.3 to 25.1. All scaphoid unions were pain-free. The range of movement at the wrist joint was comparable to the contralateral hand.

Conclusion: Treatment of scaphoid non-unions with 1,2 ICSRA pedicled vascularized bone grafts has favorable outcomes in terms of quicker healing and better hand function.

Received | 02-01-2022: **Accepted** | 25-06-2022

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Keywords | scaphoid non-unions, proximal pole fractures,avascular necrosis, vascularized bone graft, 1,2 ICSRA pedicle bone graft

Introduction

Scaphoid fractures account for 50 – 70 % of all carpal fractures and almost 11% of all hand fractures.[1] The challenging complications are non-union and avascular necrosis of the proximal segment, which are difficult to manage. Rate of non-union after surgical fixation of scaphoid fracture is as high as 10%. Delay in diagnosis and treatment, compromised blood supply, proximal pole fracture, smoking, and type of fixation technique, all contribute to nonunion of the scaphoid.[2] Clinically, nonunion renders patients in pain, deformity, and restricted range of motion.[3]

Bone graft has remained the mainstay of treatment of scaphoid non-union. Though conventional bone grafting has been successfully used for scaphoid nonunion[(4)], it has been challenging with proximal fractures and avas-cular necrosis. Zaidemberg et al,[5] in 1991 described the use of pedicled vascularized bone graft for scaphoid non-union. More recent studies report significantly higher union rates of scaphoid fractures with vascula-rized graft,[6-8] even though previous studies showed contrary results.[9,10] This variability might depend on variable presentation of scaphoid nonunion, patient selection, and factors affecting its union.

In our center, we have been treating scaphoid fractures for more than a decade based on Zaidemberg's tech-nique.[5] 1,2 inter compartment supra retinacular artery (ICSRA), Pedicled vascularized graft has been our mainstay of treatment in scaphoid non-union, as it

demonstrated satisfactory results with less morbidity. The purpose of this study was to measure the outcome and efficacy of 1,2 ICSRA pedicle vascu-larized bone graft in all scaphoid nonunion at our center.

Methodology

The study was conducted over a 4-year period from January 2015 –January 2019.This was a retrospective review of prospectively maintained data. Approval from the hospital ethical committee was taken (Ref: APP # 0568-2020 LNH-ERC). Data were extracted from the hospital information management system (HIMS) and OPD register.

All the patients who were operated on with 1,2 ICSRA pedicle vascularized radial bone graft for scaphoid non-union were included in this study. Exclusion criteria were age less than 14 years and above 60 years, any other associated fracture, and previous history of scaphoid surgery. All patients were called and requested to visit the clinic for last follow up, where they were examine for the functional outcomes in term of pain, range of motion at wrist joint, pre and post-o4p DASH (Disability of the Arm, Shoulder and Hand) scores, and grip strength of hand

Range of motion at wrist joint was measured by two arm goniometer, as the angle at radial deviation, ulnar deviation, wrist flexion and ulnar flexion, and compared with the contralateral hand.

The grip strength of the affected hand was measured and compared with the contralateral hand by using sphygmomanometer.

Pre and postop DASH SCORE were calculated on last visit as outpatient and recorded. Time of radiologic healing was extracted from hospital follow up records. Any tenderness and pain was also noted.

Surgical Technique

All Patients were operated under general anesthesia with loupe magnification and tourniquet by a single senior surgeon. Lazy S-shaped incision was centered over the styloid process of radius allowing exposure of scaphoid dorsoradially. While preserving the cephalic vein and superficial radial nerve, extensor retinaculum was incised over the 1st and 2nd compartment, and 1,2 ICSRA visualized (Fig 1a). Corticocancellous bone graft from radial bone was marked along with pedicle. Pedicle dissection was carried out with a perivascular soft tissue cuff (Fig 1b).The scaphoid capsule was opened under wrist extensors, fracture visualized and the scaphoid bone prepared for graft placement. Radial bone graft was harvested with a fine osteotome. Tourniquet was released to see the viability of graft and punctate bleeding of the scaphoid. The vascularized graft was then placed and fixed with k wire or compression screws under c arm.

Patients were discharged when stable, on the 1st or 2nd post-op day. They were followed weekly. Back-slab was removed at 6 weeks, and rehabilitation started with active and passive range of motion of fingers with conti-nuation of wrist brace and thumb spica up to radiological healing. K-wires were removed once signs of healing were achieved on x-rays.

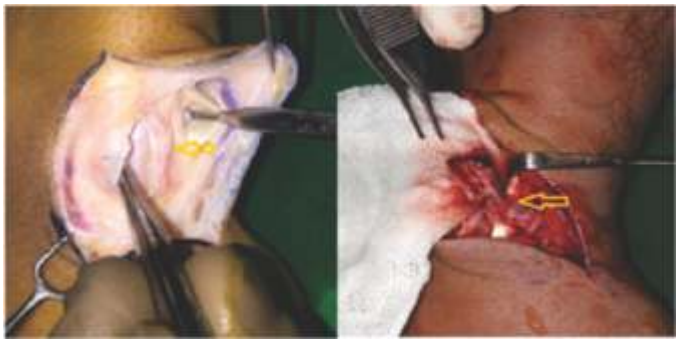

Figure 1(a)1, 2 *ICSRA pedicle (yellow arrow), and (b) pedicle with radius bone graft (yellow arrow)*

Data Analysis:

Patient data was compiled and analyzed through the statistical package for Social Sciences (SPSS) Version 25. Frequency and percentage were computed for quali-tative variables. Means were calculated for the quanti-tative variable. The mean comparison was done by dependent and independent t-test. Association was checked by using the chi-square test and Fisher exact test as appropriate. $P \leqslant 0.05$ was considered as significant.

Results

There were 13 patients with scaphoid non-union. Majo-rity of the patients were male. The mean age was 35.2 years. Fracture patterns were 69.2 % (n=9) proximal pole fractures and 30.8 % (n=4) waistline fractures. The mean time period between injury and surgery was 6.5 months. All patients had 1,2 ICSRA pedicle vascula-rized bone graft which were fixated with either k – wire (n=8) or compression screw (n=5). Table 1 shows the demographic and clinical details of the patients.

11 out of 13 patients (84.6%) achieved radiological healing, with an average time of 9.8 weeks (range 8 to

12 weeks). Union rate of proximal pole fracture were 88% and waistline fracture was 75% with radiological healing times as shown in Table 2. Out of two non-united cases, one was proximal and the other was waistline fracture along with humpback deformity.

All the cases that achieved radiological healing were pain-free. Outcomes were assessed with DASH scores, which declined significantly from a pre-operative value of 77.3 to 25.1 post-operatively. Range of motion of the affected wrist was recorded on the last follow-up and compared with the non-affected side (Table3). Wrist flexion in the affected hand was 92%, extension 95%, radial deviation 81%, ulnar deviation 85% and grip strength 92% as compared to unaffected hand.

Table 1: *demographic and clinical characteristics of the patients (n=13)*

Mean age (years)	35.2
Gender (n,%)	
Male	12
Female	1
Fracture patterns (n,%)	
Proximal pole	9 (69.2)
Waistline	4 (30.8)
Fixation method (n,%)	
K wires	8 (61.5)
Compression screws	5 (38.5)

Table 2: *Union rate and healing time of different fracture types*

Fracture pattern	Union rate	Mean readiological healing time
Proximal pole	88%	10 weeks
Waist	75%	9 weeks

Discussion

Scaphoid fractures are common injuries accounting for 80% of all carpal fractures.[11] If missed at initial evaluation, they result in malunion, nonunion or avascular necrosis, consequently leading to advanced collapse arthritis.[1] Treatment depends on the type of fracture encountered. Conservative treatment with cast immobilization is a valid choice in stable fractures, but at the cost of longer immobilization.[11] Unstable fractures including displaced waistline fracture and proximal pole fractures are more prone to its scaphoid nonunion leading to avascular necrosis and arthritis, with the latter having a higher risk due to its tenuous blood supply.[12-14] Scaphoid nonunion is defined as no signs of healing on radiology by 12 weeks with symptoms of persistent pain and decreased range of movements.[1] The goal of treatment for Scaphoid nonunion is to achieve consistent union, reduction in pain, better range of movement and prevent progression to osteoarthritis.[15] Bone grafting is the mainstay of treatment in scaphoid nonunion. To achieve early and better consolidation vascularized or non-vascularized bone grafts are both options, but there is little evidence as to which method is superior. A syste-mic review of existing evidence showed 95-100% sca-phoid union rate with vascularized bone grafts.[16] However this result varies, as another systematic review concluded mean union rate of 84% and 80% in vascularized and non-vascularized bone graft respectively.[6] This difference in success rate in literature might be attributed to differences in the expertise of the surgeon, patient factors and post-operative management. Union rate with pedicled vascularized grafts in this study was 84% which is comparable to our study.

A vascularized graft could be free or pedicled. Some studies showed better outcomes[17] with free femoral vascularized graft with union rate of 88.9% as compared to 1,2 ICSRA bone graft with 79%, but those were done in complicated scaphoid non-union.However at our center we prefer 1,2 ICSRA pedicle bone graft based on ziedemberg technique,due to its ease of execution and lower morbidity as compared to free flap surgery, with comparable overall outcomes.

Our experience with pedicle anatomy was consistent in all patients. All elevated grafts were checked for bleeding after tourniquet release. This technique requires

Table 3: *Ranges of motion achieved at wrist joint of affected hand as compared to contralateral normal hand*

	Wrist Extension (Degree)(SD)	Wrist Flexion (Degree)(SD)	Radial deviation (Degree)(SD)	Ulnar deviation (degree)(SD)
Mean ranges of motion at wrist joint in affected Hand	62.7(3.1)	67.0(3.8)'.. nnnbmmmn nm	13.1(1.2)	25.1(1.0)
Mean ranges of motion at wrist joint in unaffected Hand	68.6(1.7)	73.2(2.4)	15.2(4.3)	29.6(1.9)
P - value	0.999	0.838	0.833	0.729

expertise to produce consistent results. Meticulous dissection of the pedicle is needed and taking a perivascular cuff of soft tissue around the pedicle is a lifesaver. We did not encounter any difficulty regarding reach of pedicle. Stable fixation of graft is important for early consolidation and union. Fixation of the vascularized graft was done by two methods in our patients: headless screw and k-wire. In our setting most of the cases performed were for proximal pole fractures. Placing a screw in a shorter proximal pole is technically difficult so k-wire was used in most of our cases. We believe that stable fixation is the cornerstone of any fracture fixation, and we were able to achieve that by both methods. Fixation techniques did not make a significant difference on union rate and DASH score in our study. Factors that define the prognosis of scaphoid nonunion include delayed treatment. Euler et al in their study showed significantly higher union rates with early scaphoid surgery before the commencement of Dorsal Intercalated Segment Instability or DISI.[18] In our study average time of surgical intervention was 6.5 months. We made sure to have no further delays once diagnosis of nonunion was established. This could be one of the factor for our 84 % union rates postoperatively.

Proximal pole fractures are themselves a bad prognosis for scaphoid union, about 3% of proximal pole fractures lead to avascular necrosis (AVN) of proximal pole.[2] AVN is considered the worst prognostic factor in scaphoid healing. Thus, vascularized bone graft is superior to non-vascularized bone grafts as it eliminates stacking up of non-vascularized tissue. Recent systematic reviews showed excellent results of vascularized bone grafts, improving the rate and time of healing by revascularising ischemic bone.[8,19,7] We had 9 proximal pole fractures out of a total of 13 cases, which showed an 88% union rate. None of the fractures showed pre-op signs of DISI.

Generally, rapid consolidation is achieved in 6-13 weeks, with some studies showing early healing time with vascularized bone grafts. One study showed an average healing time of 9.9 weeks treated with pedicle vascularized bone graft.[7] Our result also witnessed an average healing time of 9.6 weeks.

The present study showed significant functional outcomes with vascularized pedicle graft. All patients with united fractures returned to their respective work with a significant decrease in DASH score from 77 to 25, and grip strength and range of movement at the wrist comparable to the contralateral unaffected hand. Similar results have been demonstrated in other studies too.[7]

The presence of humpback deformity with scaphoid fracture affects the healing of fracture due to the collapsing nature of scaphoid unless wedge inlay bone graft is used.[20] Pedicle bone graft from distal radius is somehow unable to achieve scaphoid height,[7] so nonunion is predicted. We studied that one out of two nonunion cases had humpback deformity.

There were certain limitations of this study. As this was a retrospective study, we faced problems with data collection. We lacked information about avascular necrosis of proximal pole of scaphoid at time of surgery, and size of bone grafts used. Height of scaphoid could not be measured as pre-and post-op CT scans were not always available. Our study was on a small number of patients. Lastly, pre-operative DASH scores were recalled by patients on their last visit.

Conclusion

1,2 ICSRA pedicle bone graft for scaphoid nonunion following proximal pole and waistline fractures has very good outcome in terms of union rate, early radiological healing, and functional status of hand.

Conflict of Interest *None*

Funding Source *None*

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Ideas and Innovation

Our Experience with Achilles Tendon Reconstruction with Semitendinosus Graft Wrapped in Fascia Lata

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Abstract |

Background: Achilles' tendon rupture leads to significant disability causing abnormal gait. With time, the cut ends of the tendo-Achilles retract creating a huge gap in between which needs reconstruction by a tendon graft like semitendinosus, gracilis, flexor hallucis longus tendon, and tensor fascia lata. However, they are not sturdy enough to replace the powerful Achilles tendon. We used a novel technique to make a suitable replacement for the Achilles' tendon in which the semitendinosus tendon was wrapped in fascia lata and this combination was used to bridge the gap between cut ends of the Achilles tendon.

Methodology: All the patients who presented with chronic Achilles tendon injury (>6weeks of injury) from Jan 2017 to Dec 2020 were included. The gap between the retracted ends of tendo-Achilles was bridged by semitendinosus tendon wrapped in fascia lata. The postoperative splint was given on the anterior leg in a plantar flexed position for 6 weeks which gradually converted to 90 degrees of ankle flexion. MRC grade of ankle plantar flexion and gait of the patient was observed at 12 weeks and 6 months postoperatively.

Results: Five patients were operated on in four years. The average MRC grade at 12 weeks post-operative was 3 which increased to 5 in all patients at 6 months with the help of post-operative physiotherapy. Observed gait was normal at 6 months of 4 patients and near-normal of 1 patient.

Conclusion: Further reinforcement of semitendinosus graft with fascia lata is an innovative technique that constitutes a strong and tough substitute for a broken Achilles tendon.

Received | 16-03-2022: **Accepted** | 27-08-2022

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Keywords | Achilles' tendon, Fascia Lata, Reconstructive Surgical Procedures, Tendon graft.

Introduction

Achilles tendon is a combined tendon of gastrocnemius and soleus muscle that inserts on the calcaneum's posterior surface. It is the most common tendon to rup-ture in the lower extremity.[1] Traumatic rupture of the Achilles tendon is far more common than spontaneous rupture in our region.[2] Traumatic ruptures are common in road traffic accidents, spoke wheel injuries, and sharp lacerations on the lower posterior leg while spontaneous rupture usually occurs in athletes during strenuous sports.[3] The Achilles tendon is vital for ankle plantar flexion and it's rupture leads to significant disability causing difficulty in walking and abnormal gait. Primary repair of the Achilles tendon is only possible in acute injuries while chronic rupture of the Achilles tendon requires complex reconstruction.[4-6] With time the cut ends of tendo-Achilles retract creating a huge gap in between which needs to be reconstructed by a tendon graft.[7]

Commonly used tendon grafts to bridge the gap between the retracted ends of ruptured Achilles include semitendinosus, gracilis tendon, tensor fascia lata, and flexor hallucis tendon.[8-11] However, all the

above-mentioned tendons are not sturdy enough to replace the powerful Achilles tendon. Therefore, we used a novel technique to make a suitable replacement for the Achilles tendon in which we harvested semitendinosus tendon and wrapped it in fascia lata and we secured the combination with multiple polyester sutures and the combination was used to bridge the gap between the retracted ends of tendo-Achilles.

Methodology

It was a prospective study done between the years 2017 to 2020. All the patients who presented with chronic Achilles tendon injury (>6weeks from the day of injury) during this period were included. After obtaining the informed consent and doing baseline workup, the patients were enrolled in the study and operated under general anesthesia, with the technique menditoned below. The gap between the retracted ends of tendo-Achilles was bridged by the semitendinosus tendon wrapped in fascia lata. The post-operative splint was given on the anterior leg in a plantar flexed position for 6 weeks which gradually converted to 90 degrees of ankle flexion then continued for 6 more weeks.

Strength of reconstructed Achilles' tendon was measured subjectively by MRC grade of ankle plantar flexion in comparison to the normal side, observed at 12 weeks after surgery at the time of the removal of the splint and again at 6 months after surgery. MRC grade was measured by the operating surgeon. The gait of the patient was analyzed at 6 months post-operatively by a separate plastic surgeon and categorized subjectively as normal, near-normal, or abnormal. Complications in post-operative periods were observed and documented.

Surgical Technique

In the prone position, a curvilinear incision was given on the lower one-third of the posterior leg. Proximal and distal ends of ruptured Achilles tendon were identified and dissected by sharp and blunt dissection in the subfascial plane. Both margins of tendon were freshened until healthy and the resultant gap measured in centimeters. A 3 to 4 cm transverse incision was given on the medial border of the popliteal fossa. Semitendinosus tendon was identified, divided at the distal end, and harvested using a circular tendon harvester. Tensor fascia lata was marked on the lateral aspect of the thigh which originates from the anterior one-third of the iliac crest and inserts on the lateral tibial condyle. A curvili-near incision was given on marked territory and fascia lata was harvested according to the size of the defect. Semitendinosus tendon was wrapped in harvested fascia and secured with multiple 2/0 polyester sutures (Fig 1). The combination was then interposed between the ends of the tendon by the pulvertaft weave method (Fig 2-4).

Results

Five patients were operated on in four years. 4 were males and 1 female. The mean age of the patients was 34±2.9 years. The average duration of trauma to reconstruction was 7.5 weeks. The average gap between the retracted tendons was 6.2cm (4.1cm to 8.3cm). The average MRC grade at 12 weeks post-operative was 3 which increased to 5 in all patients at 6 months with the help of post-operative physiotherapy. Observed gait was normal at 6 months of 4 patients and near-normal of 1 patient. One patient had seroma formation at the donor site of fascia lata which was drained at the bedside. We used a suction drain at the donor site in all other patients. Table 1 illustrates the important results of our study.

Table 1: *Demographic data and summary of results*

Total no. of patients	**5**
Males	**4**
Females	**1**
Mean age of patients (in years)	34±2.9
The average duration from trauma to reconstruction	7.5 weeks
The average gap between the retracted tendons	6.2cm
Average MRC grade of plantar flexion	
At 12 weeks	3
At 6 months	5
Observed gait at 6 months*	
Normal	4
Near-normal	1
Abnormal	0

*Assessed by a clinician as not related to research

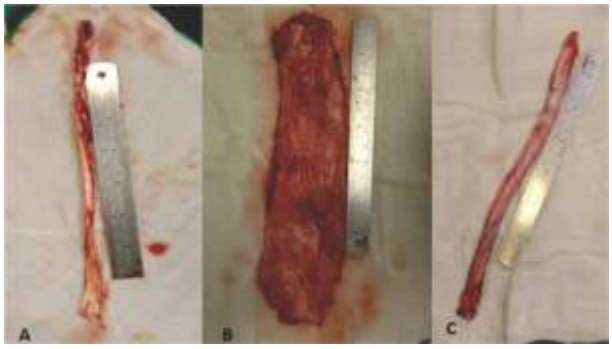

Fig 1: *(A) Harvestecd Semitendinosus tendon (B) Harvested Fascia lata (C) Semitendinosus tendon wrapped in fascia lata graft*

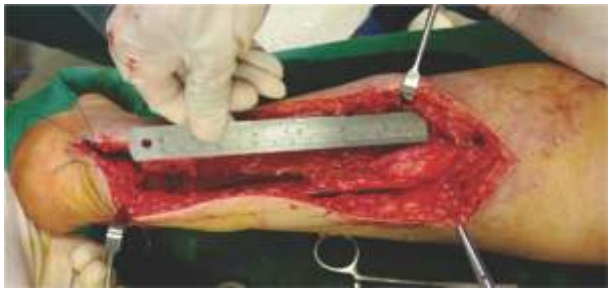

Fig 2: *Gap between the cut ends of Achilles tendon*

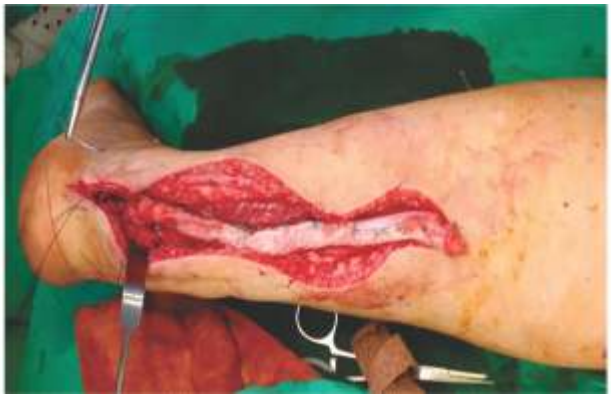

Fig 3: *Securing proximal and distal ends of combination to Achilles tendon stumps.*

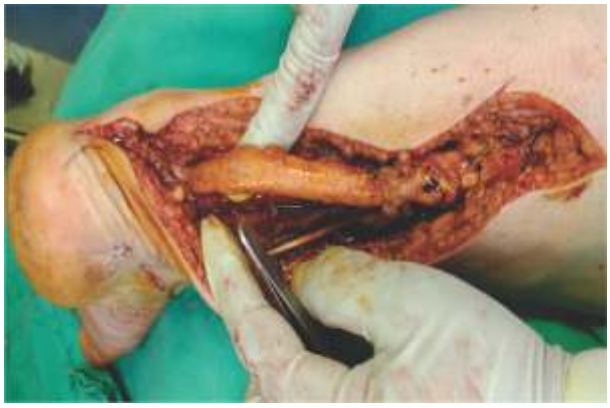

Fig 4: *Final result showing powerful replacement for Achilles tendon*

Discussion

The technique used in our study for Achilles' tendon reconstruction is innovative and has not been used before. The further reinforcement of semitendinosus graft with fascia lata makes it strong enough to bear weight.

Several other tendons have been tried before to bridge the cut ends of the Achilles tendon but the combination of tendon and fascia was never tried before. Pintore et al[12] used autologous peroneus brevis tendon graft in both acute and neglected Achilles tendon rupture and found more proficient results in acute ruptures while in chronic cases post-operative strength was not sufficient because the length of peroneus brevis is short as compared to semitendinosus making in less ideal for chronic ruptures.

Wapner et al[13] introduced the use of flexor hallucis longus graft for Achilles tendon reconstruction. Since then numerous studies have been done on its use. The problem with flexor hallucis tendon is that it is not expendable. Its harvest leads to loss of great toe plantar flexion, however in Wapner et al study he did not find any re-rupture of the reconstructed tendon but he found a small decrease in range of motion, which, according to him was insignificant. One of his patients required orthoses for playing sports making use of flexor hallucis longus tendon less ideal for Achilles tendon reconstruction.[11,14]

Maffulli et al[15] used a minimally invasive technique for Achilles tendon reconstruction using semitendinosus graft. He modified the posterior calf incision into two separate small incisions, one in the proximal posterior calf and the other in the distal calf. He then passed the tendon graft under the skin bridge and secures it with proximal and distal ruptured Achilles' tendon stumps. He proposed that using two separate small incisions makes them less prone to surgical site infections as compared to the open technique. We used the open technique with a long incision on the posterior calf but none of our patients developed wound infection.

The use of facia lata for Achilles tendon reconstruction is usually done in open wounds with associated soft tissue defects.[16] In such case facia, lata is harvested along with vascularized anterolateral thigh flap or tensor fascia lata flap making it a composite flap with simultaneous tendon reconstruction and wound coverage as well.[17] Inoue et al[18] harvested vascularized fascia lata along with anterolateral thigh flap and used the combination for tendon reconstruction and wound coverage and found that at 2 months post-procedure patient was able to walk normally. However but his patients requires a second session of surgery for flap thinning due to bulkiness of flap. In our patients wound was not present in spontaneous ruptures and it was already healed in chronic cases there-fore vascularized fascia lata was not required in our cases.

Most of the patients in our study were male which may be because males are more involved in sports or have a laborious occupation in our region.[19] We only included neglected Achilles ruptures in our study because acute ruptures are usually amenable to primary repair. The major drawback of our technique is the need for two separate long incisions on the calf

and thigh making donor site morbidity a principal issue however none of our patients developed hypertrophic scarring. One patient developed seroma in the thigh wound which was identified on 7th post-operative day. It was drained at the bedside under local anesthesia. We used suction drains in all subsequent patients.

The use of the endoscopic technique for the harvest of fascia lata leads to less donor site mor-bidity but this technique was not available at our setup.

Conclusion

Further reinforcement of semitendinosus graft with fascia lata is an innovative technique that constitutes a strong and tough substitute for a broken Achilles tendon.

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View Point

Hurdles Faced at Remote Tertiary Care Hospital as a Female Plastic Surgeon

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Abstract |

Objective: The purpose of this essay is to highlight the hurdle faced by the author as a female plastic surgeon working at a tertiary care centre in a rural area of Pakistan. Futhermore, the article aims to raise awareness, educate professional peers and administrative authorities to identify and resolve these issues.

Received | 19-10-2021: **Accepted** | 05-06-2022

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Keywords | Female plastic surgeon, gender bias

Introduction

Plastic surgery is a diverse specialty that is difficult to summarize because its scope is not limited to patient age, gender, organ system, or pathology. It is a common misconception that plastic surgery is merely a way to mimic the exaggerated looks of physical traits. It couldn't be further from the truth. Plastic surgery provides a way to repair the physical damage caused by illness and injury. Aside from that, it serves to correct their insecurities and even restore the function or wholeness of several body parts. Furthermore, Plastic surgery also plays a significant role in boosting patients' self-esteem and enhancing their quality of life. For these reasons, plastic surgery is a vital field of medicine.[1]

The ability to offer immediate care after recognizing a need is referred to as the timeliness of care. Timely care yields better health results in any specialty and the same applies to plastic surgery. According to recent research,[2,3] the limited availability of plastic surgeons in the far-flung areas of the USA results in suboptimal care, increasing the burden of disease. One of the most worrying issues in global health is access to necessary surgery. The poorest one-third of the world's population has 3.5% of the world's surgical procedures,[4] with five billion people lacking access to safe surgery.[5]

In Pakistan, there is a huge disproportion of skilled health care workers, especially surgeons, and to be more specific plastic surgeons among rural and urban areas with saturation seen in urban areas and a scarcity of surgeons and physicians in rural areas.[6] This disproportion is even more evident when it comes to female plastic surgeons in the rural medical workforce, where female doctors have always been outnumbered by their male counterparts.

Despite increasing female inclination and enrollment in medical colleges and excelling academically and professionally the proportion of females desiring to join surgery is still scarce. According to a recent analysis, there are an estimated 1112727 specialist surgeons around the world with less than one-third being female.[7,8] One of the main reasons why females avoid surgical sub-specialties purposefully is because of the discrimination they endure during medical school and training. The small number of females who choose to pursue plastic surgery despite all this reported facing challenges like gender inequality at the workplace, sexual harassment, work-life imbalance, less salary and funding benefits etc.[(9-11)]

Pakistan has only a handful of female plastic surgeons, and most of them are from urban areas. This mismatch makes them reluctant to work in rural areas because

of no understanding of rural life predicaments. Plastic surgeons are rare specialists at rural centers, and due to this prevailing frame of mind, female plastic surgeons are considered extinct.

The author is a female plastic surgeon who has recently been assigned to a rural hospital. The hospital is near Tando Muhammad Khan in the Hyderabad division's rural area. Tando Muhammad Khan is a town with a population of 677,228 people in 2017. It is one of 200 cities in Pakistan and ranks 93rd in terms of population. The rural population (79 percent) makes up the majority of the population in this district. The bulk of the population is impoverished, having a low socioeconomic standing and a low literacy rate.[12,13]

The author penned down all the hurdles faced during the first six months of rural posting as a plastic surgeon and being a female. These issues need to be recognized, addressed and require solutions, to increase the influx of females toward plastic surgery specialty in rural areas.

Administrative

The administration department is considered the backbone of any organization. They serve as a link between the various divisions of the organization to ensure that everything runs smoothly. Hence, if an organization's management is ineffective, it will not run professionally or smoothly. According to the author, the administration in the rural is not as supportive as it should be. The management is inefficient in managing staff and budgets, resulting in a schism between medical and non-medical departments. Aside from that, the institute does not hold regular academic sessions for staff training to keep them up to date on medical advancement. This mismanagement and negligence create an environment of uncertainty where employees have no confidence in the administration. Each individual appears to be functioning freely within the hospital, seemingly disregarding norms and policies, which ultimately impact the quality of patient care delivered.

Gender Discrimination

Gender discrimination against women in the workplace isn't a new thing. Women across the globe face these issues on daily basis irrespective of their designation[14] and profession. The author believes that competent female plastic surgeons in rural areas are paid less compensation and offered a lower designation as compared to their male counterparts having the same designation, experience, and qualification. According to the author, the main reason for this discrimination is stereotypes, workplace culture and social expectations from a specific gender.

Moreover, there is a general lack of acceptance for working women in rural areas, owing to a trend of females either staying at home or not completing secondary school.[14-16]

Poor referral system

A strong referral system is a vital part of the overall patient experience. Moreover, it allows health care providers to exchange information with each other, and proper referral is crucial for continuing the patients' care.

However, in the rural area, despite an extensive network of over 5000 basic health units in Pakistan, which are backed by higher-level facilities, there have been no improvements in the quality of healthcare noticed. The author observed that part of the problem could be due to a malfunctioning inter-hospital referral mechanism. The author found that the trend of in-house referrals is lacking. Healthcare providers are reluctant to refer the patient further despite having the specialist in their surroundings and range. The lack of knowledge regarding their health among the illiterate rural people and healthcare providers being reluctant and resistant to refer them to proper specialists results in the poor outcomes of patients' health. It eventually increases morbidity and mortality and decreases overall the quality of health in rural areas.

Primary health care activities have not brought about expected improvements in health status, especially of rural population groups.[17] During her time working in a rural hospital, the author witnessed a case in which a young woman with extreme breast enlargement was operated on by a surgeon who had little to no experience with breast reduction procedures, resulting in mastectomies. Facial lesions being removed by neurosurgeons, hand trauma is being treated by OR techs without clinical examination and exploring wounds for damage and repair are a few of the other incidences. Hence, increasing the disease burden in an already overloaded society.

Lack of Resources

Another problem that the writer experienced and found to be a hurdle working as a plastic surgeon in a rural area is the unavailability of resources. The delay in the

availability of instrumentation was a recurrent source of disorganization at the rural facility where the author was working. Plastic surgery deals with a wide range of tissues, from the skin to the bones. Each type of tissue has its own set of needs. The demand for suture materials can be different depending on the kind of tissue, such as 8/0, 9/0, or 10/0 proline for nerves and vessels, 5/0, 6/0, or 7/0 face skin or eyelid restoration, and so on. The proper and steady supply of resources requires a complex process and close collaboration between the administration and the operating room staff. The author identifies a significant gap between the supply and demand that need to be filled to produce and sustain a continual supply of resources for operating plastic surgeons.

Unawareness

People nowadays are more health-conscious and cognizant of their own well-being. Despite the tremendous acceptance of various fields of medicine and people's perception about their health, there seems to be limited knowledge among the general public and also among medical professionals regarding the spectrum of plastic surgery. Plastic surgery is poorly understood not only by the general public but also by some medical experts as well. Even in this day and age of enlightenment, many people still confuse plastic surgery with cosmetic surgery[1]. People are suffering in silence with treatable morbidities such as finger and hand contractures and chronic wounds, or they are contacting other specialists without realising that a plastic surgeon is the best option for them. The author personally visited all departments of the hospital to educate colleagues and paramedics, and distributed pamphlets in local languages in marketplaces, mosques, and schools to raise awareness about plastic surgery.

The author also considers the general lack of awareness in patients, and referring physicians are also accountable for referring plastic surgery patients without identifying root causes that eventually increases the burden on the urban hospital. Moreover, it deprived patients of the necessary first aid measures that could potentially decrease mortality or morbidity.

Cost of Healthcare

Feudalism is rampant in Pakistan's rural areas, where the majority of people are illiterate and unemployed. Many lack basic necessities such as food and shelter and COVID was the final nail in the coffin. In the circumstance where people are struggling to make ends meet, health often gets neglected. With no steady income, no health insurance and welfare people are reluctant toward their wellness and health and frequently leave things be rather than seeking solution. To address the current scenario, Pakistan's government issued a "Sehat Insaaf Card" and a "Prime Minister Health Card" two years ago, but it is too soon to determine their impact.

Marketing

People nowadays acquire information from a variety of sources, so if you want to be recognized, you need to be visible practically everywhere. Marketing is a tool to not only spread awareness but also to keep the conversation going. Considering current unawareness regarding the plastic surgery domain the author believes that well-thought out marketing strategies are immediately required to attract patients and increase consciousness about this genre. The author, at a personal level, tried to spread the word by communicating and conducting various camps. However, the needs are considerably greater, necessitating aggressive marketing aimed at the general public. Their perception of plastic surgery is such a way that they will consult plastic surgery for their complex health issues.

Discussion

Plastic surgeons are needed in rural areas because of their wide scope of surgical skills. It is a problem-solving field and it helps to decrease disease burden on society by treating congenital and traumatic deformities. Moreover, they can reconstruct lost body parts after cancer, and enhance anatomies. A plastic surgeon is a much needed specialist in such areas along with other surgical specialties. It is not a super-specialty, nor it requires expensive medical equipment to start with.

Supportive administration and an unbiased workspace that allows a female to work freely is the demand of time.[9] It is an advantage to have female surgeons treat female patients (majority of the population is female 51.6%)[12,13] under local and religious constraints and not letting them simmer in deformities, suffering and deaths. The majority of reconstructive procedures can be performed safely in good or light under loupe magnification. Although it does require a team for postoperative care and rehabilitation, which is also doable in a rural setting by inducting manpower

and providing training in respective departments. Naomi Parker has concluded in a recent study that geography, socioeconomic status, and literacy levels are related and have cyclic nature.[18] Increasing reconstructive plastic surgery education at all levels, including undergraduates, primary care professionals, and legislators, could assist in reducing disease burden and improving the lives of many people, corro-borating the idea of Naomi Parker. Rural communities must evolve to appropriately accommodate a future in which women play a key role. Female surgeons aspire to bring about a paradigm shift in surgical practise that will benefit all of our associates, collaborators, and patients.

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Editorial

Holistic Plastic surgery training: Cleft and Burn rotations

Muhammad Mustehsan Bashir, Saadia Nosheen Jan

The editorial board is pleased to present October 2022's issue. Following recognition from the HEC and more recently the CPSP, contributions to the journal are steadily increasing. The days of coercion (read badgering) and arm twisting to extort articles from our gracious community are hopefully over. We are very grateful to our patrons who supported us during our times of oblivion. Consequentto the many pending papers, the editors are proud to announce an increase in the number of articles from the mandatory 5, obtaining which had been a Herculean taskduring our dark ages.

Cleft and burn surgery are an inextricable, exquisitely important component of plastic surgery. Both are just textbook secrets for FCPS candidates from certain training centres. Some plastic surgery departments do not host burn units. Acute burn care and surgery therefore are pedagogical, theoretical entities they've memorised from their times but never experienced or learnt the practical nuances of. Similarly, the advent of cleft centres where patients get free surgeries from experienced surgeons at the blink of an eye areundeniably attractive compared to the agonisingly long waiting lists available in the government hospitals.

To produce holistic, self sufficient plastic surgeons, wide exposure even if minimal to an array of all relevant topics is imperative. The notion of raising plastic surgery consultants without anyexperience in burn and clefts is disconcerting. Mandatory rotation of candidates from certain departments in cleft centres and burn units has been mulled over and bandied around for ages long but never implemented.A symbiotic relationship should be envisioned, whereas the rotating candidates lend a helping hand to the extremely busy schedules of both cleft centres and burn units while adding to their own armamentarium. It is hoped that the importance of such a **liasonis soin** realized by the relevant people at the helm of plastic surgery training schemes.

In the meanwhile, our immense gratitude to all our reviewers and contributors for their time and effort in our Holy grail quest to make this journal a resounding success, now and in the future.

INSTRUCTIONS TO THE AUTHORS AND REVIEWERS OF THE MANUSCRIPTS

(Base upon Minimum Requirements for Writing and Editing of Manuscripts)

Introduction

The new Editorial Board of Pakistan Journal of Plastic Surgery during its meeting held on January, 2019 decided to follow the "Uniform requirements for manuscripts submitted to Biomedical Journals: writing & Editing for Biomedical Publications by International Committee of Medical Journal Editors. A brief account of minimum requirements is given below for assisting the authors, reviewers and editors, the full text can be read, (www.icmje.org). Moreover plagiarism policy of ICMJE, Higher Education Commission and PMDC will be observed. It is authors' responsibility to apprise them of plagiarism in any form including paraphrasing and self plagiarism. The Plagiarism Standing Committee of Pakistan Journal of Plastic surgery would deal with cases of plagiarism and comprise of staff members, and editors. Those claiming intellectual/ idea or data theft of an article must provide documentary proof in their claim otherwise their case will be sent for disciplinary action.

General Principles

1. Title Page

The title page should carry the following information:

1. The title of the article. Concise titles are easier to read than long, convoluted ones. Authors should include all information in the title that will make electronic retrieval of the article both sensitive and specific.
2. Authors' names and Title of the Program. The names and other relevant information should be on title page only to ensure blind peer review of research article.
3. The name of the department(s) and institution(s) to which the work should be attributed.
4. Disclaimers, if any.
5. Corresponding authors. The name, mailing address, telephone and fax numbers, and e-mail address of the author responsible for correspondence about the manuscript.
6. Source(s) of support in the form of grants, equipment, drugs, or all of these.
7. Word counts. A word count for the text only (excluding abstract, acknowledgments, figure legends, and references). A separate word count for the Abstract is also useful for the same reason.
8. The number of figures and tables.
9. Conflict of Interest Notification Page

2. Conflict of Interest Notification Page

To prevent the information on potential conflict of interest for authors from being overlooked or misplaced, it is necessary for that information to be part of the manuscript. It should therefore also be included on a separate page or pages immediately following the title page.

3. Abstract and Key Words

An abstract (requirements for length and structured format vary by journal) should follow the title page. The abstract should provide the context or background for the study and should state the study's purposes, basic procedures (selection of study subjects or laboratory animals, observational and analytical methods), main findings (giving specific effect sizes and their statistical significance, if possible), and principal conclusions. It should emphasize new and important aspects of the study or observations.

Authors are requested to provide, and identify as such, 3 to 10 key words or short phrases that capture the main topics of the article. These will assist indexers in cross-indexing the article and may be published with the abstract. Terms from the Medical Subject Headings (MeSH) list of Index Medicus should be used.

4. Introduction

Provide a context or background for the study (i.e., the nature of the problem and its significance). State the specific purpose or research objective of, or hypothesis tested by, the study or observation; the research objective is often more sharply focused when stated as a question. Both the main and secondary objectives should be made clear, and any pre-specified subgroup analyses should be described. Give only strictly pertinent references and do not include data or conclusions from the work being reported.

5. Material and Methods

The Methods section should include only information that was available at the time the plan or protocol for the study was written; all information obtained during the conduct of the study belongs in the Results section.

(a) Selection and Description of Participants

Describe your selection of the observational or

experimental participants (patients or laboratory animals, including controls) clearly, including eligibility and exclusion criteria and a description of the source population. The guiding principle should be clarity about how and why a study was done in a particular way. When authors use variables such as race or ethnicity, they should define how they measured the variables and justify their relevance.

(b) Technical Information

Identify the methods, apparatus (give the manufacturer's name and address in parentheses), and procedures in sufficient detail to allow other workers to reproduce the results. Give references to established methods, including statistical methods (see below); provide references and brief descriptions for methods that have been published but are not well known; describe new or substantially modified methods, give reasons for using them, and evaluate their limitations. Identify precisely all drugs and chemicals used, includ-ing generic name(s), dose(s), and route(s) of administration. Also describe diagnostic or therapeutic procedures if part of the study design.

(c) Statistics

Describe statistical methods with enough detail to enable a knowledgeable reader with access to the original data to verify the reported results. When possible, quantify findings and present them with appropriate indicators of measurement error or uncertainty (such as confidence intervals). Define statistical terms, abbreviations, and most symbols. Specify the computer soft-ware used.

6. Results

Present your results in logical sequence in the text, tables, and illustrations, giving the main or most important findings first. Do not repeat in the text all the data in the tables or illustrations; emphasize or summarize only important observations.

When data are summarized in the Results section, give numeric results not only as derivatives (for example, percentages) but also as the absolute numbers from which the derivatives were calculated, and specify the statistical methods used to analyze them. Restrict tables and figures to those needed to explain the argument of the paper and to assess its support. Use graphs as an alternative to tables with many entries; do not duplicate data in graphs and tables.

7. Discussion

Emphasize the new and important aspects of the study and the conclusions that follow from them. Do not repeat in detail data or other material given in the Introduction or the Results section. For experimental studies it is useful to begin the discussion by summarizing briefly the main findings, then explore possible mechanisms or explanations for these find-ings, compare and contrast the results with other relevant studies, state the limitations of the study, and explore the implications of the findings for future research and for clinical practice.

Link the conclusions with the goals of the study but avoid unqualified statements and conclusions not adequately supported by the data. Avoid claiming priority and alluding to work that has not been completed. State new hypotheses when warranted.

8. References

(a) General Considerations Related to References

Although references to review articles can be an efficient way of guiding readers to a body of literature, review articles do not always reflect original work accurately. Small numbers of references to key original papers will often serve.

Avoid using abstracts as references. References to papers accepted but not yet published should be designated as “in press” authors should obtain written permission to cite such papers as well as verification that they have been accepted for publication. Informa-tion from manuscripts submitted but not accepted should be cited in the text as “unpublished observations” with written permission from the source.

Avoid citing a “personal communication” unless it provides essential information not available from a public source, in which case the name of the person and date of communication should be cited in parentheses in the text. For scientific articles, authors should obtain written permission and confirmation of accuracy from the source of a personal communication.

For articles published in journals indexed in MEDLINE, the Pakistan Journal of Plastic Surgery considers PubMed (http://www.pubmed.gov) the authoritative source for information about retractions.

(b) Reference Style and Format

The Uniform Requirements style is based largely on an ANSI standard style adapted by the National Library of Medicine (NLM) for its databases. For samples of reference citation formats, authors should consult National Library of Medicine web site.

References should be numbered consecutively in the order in which they are first mentioned in the text. Identify references in text, tables, and legends by Arabic numerals in parentheses. The titles of journals should be abbreviated according to the style used in Index Medicus. Consult the list of Journals Indexed for MEDLINE, published annually as a separate publication by the National Library of Medicine.

9. Tables

Tables capture information concisely, and display it efficiently; they also provide information at any desired level of detail and precision. Including data in tables rather than text frequently makes it possible to reduce the length of the text.

Type or print each table with double spacing on a separate sheet of paper. Number tables consecutively in the order of their first citation in the text and supply a brief title for each. Do not use internal horizontal or vertical lines. Give each column a short or abbreviated heading. Authors should place explanatory matter in footnotes, not in the heading. Be sure that each table is cited in the text.

10. Illustrations (Figures)

Figures should be either professionally drawn and photo-graphed, or submitted as photographic quality digital prints. In addition to requiring a version of the figures suitable for printing, Pakistan Journal of Plastic Surgery ask authors for electronic files of figures in a format (e.g., JPEG or GIF) that will produce high quality images in the web version of the journal; authors should review the images.

For x-ray films, scans, and other diagnostic images, as well as pictures of pathology specimens or photomicrographs, send sharp, glossy, black-and-white or color photo-graphic prints, usually 127 x 173 mm (5 x 7 inches). Letters, numbers, and symbols on Figures should therefore be clear and even throughout, and of sufficient size that when reduced for publication each item will still be legible. Figures should be made as self-explanatory as possible, since many will be used directly in slide presentations. Titles and de-tailed explanations belong in the legends, however, not on the illustrations themselves.

Photomicrographs should have internal scale markers. Symbols, arrows, or letters used in photomicrographs should contrast with the background.

If photographs of people are used, either the subjects must not be identifiable or their pictures must be accompanied by written permission to use the photograph. When-ever possible permission for publication should be obtained.

Figures should be numbered consecutively according to the order in which they have been first cited in the text.

11. Legends for Illustrations (Figures)

Type or print out legends for illustrations using double spacing, starting on a separate page, with Arabic numerals cor-responding to the illustrations. When symbols, arrows, numbers, or letters are used to identify parts of the illustrations, identify and explain each one clearly in the legend.

12. Units of Measurement

Measurements of length, height, weight, and volume should be reported in metric units (meter, kilogram, or liter) or their decimal multiples.

Temperatures should be in degrees Celsius. Blood pressures should be in millimeters of mercury, unless other units are specifically required.

13. Abbreviations and Symbols

Use only standard abbreviations; the use of non-standard abbreviations can be extremely confusing to readers. Avoid abbreviations in the title. The full term for which

14. Drug Name

Generic names should be used. When proprietary brands are used in research, include the brand name and the name of the manufacturer in parentheses after first mentioning of the generic name in the Methods section.

15. Guidelines for Authors and Reviewers

All material submitted for publication should be sent exclusively to the Pakistan Journal of Plastic Surgery. Work that has already been reported in a published paper or is described in a paper sent or accepted elsewhere for publication, should not be submitted. Multiple or duplicate submission of the same work to other journal should be avoided as this fall into the category of publication fraud and are liable for disciplinary consequences, including reporting to Pakistan Medical & Dental Council and Higher Education Commission. A complete report following publication of a preliminary report, usually in the form of an abstract, or a paper that has been presented at a scientific meeting, if not published in full in a proceedings or similar publication, may be submitted. Press reports of meetings will not be considered as breach of this rule, but additional data or copies of tables and illustrations should not amplify such reports. In case of doubt, a copy of the published material should be included with a

manuscript for editors' consideration.

Authors can submit their articles by post or by E-mail: pjpspakistan@gmail.com to the Editor, Pakistan Journal of Plastic Surgery. Article can also be submitted by post or by hand on a Compact Disc (CD) with three hard copies. Articles submitted by E-mail are preferred mode of submission and do not require any hard copy.

All authors and co-authors must provide their contact telephone/cell numbers and E-mail addresses only on the title page of manuscript.

A duly filled-in author's certification proforma is mandatory for publication. The duly signed ACP must be returned to the Pakistan Journal of Plastic Surgery office as soon as possible. The sequence / order of the authors on ACP once submitted shall not be changed at any stage.

It is mandatory to provide the institutional ethical review board / committee approval for all research articles, at the time of submission of article.

The editors reserve the right to edit the accepted article to conform to the house-style of the Journal.

16. General archival and linguistic instructions

Authors should submit the manuscript typed in MS Word. Manuscripts should be written in English in British or American style/format (same style should be followed throughout the whole text), in past tense and third person form of address. Sentences should not start with a number or figure. Any illustrations or photographs should also be sent in duplicate. Components of manuscript should be in the following sequence: a title page (containing names of authors, their postal and Email addresses, fax and phone numbers, including mobile phone number of the corresponding author), abstract, key words, text, references, tables (each table, complete with title and footnotes) and legends for llustrations and photographs. Each component should begin on a new page. The manuscript should be typed in double spacing as a single column on A4 (8-1/2" x 11" or 21.5 cm x 28.0 cm), white bond paper with one inch (2.5 cm) margin on one side.

Sub-headings should not be used in any section of the script except in the abstract. In survey and other studies, comments in verbatim should not be stated from a participating group. Acknowledgements are only printed for financing of a study or for acknowledging a previous linked work.

From January 2016, all randomized trials should also provide a proof of being registered at the **International RCT Registry.**

17. Material for Publication

The material submitted for publication may be in the form of an Original research (Randomized controlled trial - RCT, Meta-analysis of RCT, Quasi experimental study, Case Control study, Cohort study, Observational Study with statistical support etc), a Review Article, Commentary, a Case Report, Recent Advances, New techniques, Debates, Adverse Drug Reports, Current Practices, Clinical Practice Article, Short Article, KAP (Knowledge, Attitudes, Practices) study, An Audit Report, Evidence Based Report, Short Communication or a Letter to the Editor. Ideas and Innovations can be reported as changes made by the authors to an existing technique or development of a new technique or instrument. A mere description of a technique without any practical experience or innovation will be considered as an update and not an original article. Any study ending three years prior to date of submission is judged by Editorial Board for its suitability as many changes take place over the period of time, subject to area of the study. Studies more than three years old are not entertained. In exceptional cases, if Editorial Board is of the view that data is important, an extension of one year may be granted. Pakistan Journal of Plastic Surgery also does not accept multiple studies/multiple end publications gathered/derived from a single research project or data (wholly or in part) known as 'salami slices'.

Original articles should normally report original research of relevance to clinical medicine. The original paper should be of about 2000-2500 words excluding abstract and references. It should contain a structured abstract of about 250 words. Three to 10 keywords should be given for an original article as per MeSH (Medical Subject Headings). There should be no more than three tables or illustrations. The data should be supported with 20 to 25 references, which should include local as well as international references. Most of the references should be from last five years from the date of submission.

Clinical Practice Article is a category under which all simple observational case series are entertained. The length of such article should be around 1500 - 1600 words with 15 - 20 references. The rest of the format should be that of an original article. KAP studies, Audit reports, Current Practices, Survey reports and Short Articles are also written on the format of Clinical Practice Article. Evidence based reports must have at least 10 cases and word count of 1000 - 1200 words with 10 - 12 references and not more than

2 tables or illustrations. It should contain a non-structured abstract of about 150 words. Short communications should be of about 1000 - 1200 words, having a non-structured abstract of about 150 words with two tables or illustrations and not more than 10 references. Clinical case reports must be of academic and educational value and provide relevance of the disease being reported as unusual. Brief or negative research findings may appear in this section. The word count of case report should be 800 words with a minimum of 3 key words. It should have a non-structured abstract of about 100 - 150 words (case specific) with maximum of 5 - 6 references. Not more than 2 figures shall be accepted.

Review article should consist of critical overview/analysis of some relatively narrow topic providing background and the recent development with the reference of original literature. It should incorporate author's original work on the same subject. The length of the review article should be of 2500 to 3000 words with minimum of 40 and maximum of 60 references. It should have non-structured abstract of 150 words with minimum 3 key words. An author can write a review article only if he/she has written a minimum of three original research articles and some case reports on the same topic.

Letters should normally not exceed 400 words, with not more than 5 references and be signed by all the authors-maximum 3 are allowed. Preference is given to those that take up points made in contributions published recently in the journal. Letters may be published with a response from the author of the article being discussed. Discussions beyond the initial letter and response will not be entertained for publication. Letters to the editor may be sent for peer review if they report a scientific data. Editorials are written upon invitation.

Between 3 to 10 key words should be given for all the category of manuscripts under the abstracts as per mesh [medical subject heading].

18. Thesis Based Article

Thesis based article should be re-written in accordance with the journal's instructions to the author guidelines.

Article shall undergo routine editorial processing including external review based upon which final decision shall be made for publication. Such articles, if approved, shall be published under the disclosure by author that 'it is a Thesis based article'.

19. Ethical Considerations

If tables, illustrations or photographs, which have already been published, are included, a letter of permission for re-publication should be obtained from author (s) as well as the editor of the journal where it was previously published. Written permission to reproduce photographs of patients, whose identity is not disguised, should be sent with the manuscript; otherwise the eyes will be blackened out. If a medicine is used, generic name should be used. The commercial name may, however, be mentioned only within brackets, only if necessary. In case of medicine or device or any material indicated in text, a declaration by author/s should be submitted that no monetary benefit has been taken from manufacturer/importer of that product by any author. In case of experimental interventions, permission from ethical committee of the hospital should be taken beforehand. Any other conflict of interest must be disclosed. All interventional studies submitted for publication should carry Institutional Ethical & Research Committee approval letter.

Ethical consideration regarding the intervention, added cost of test, and particularly the management of control in case-control comparisons of trials should be addressed: multi-centric authors' affiliation may be asked to be authenticated by provision of permission letters from ethical boards or the heads of involved institutes.

20. Authorship Criteria

As stated in the Uniform Requirements, credit for authorship requires substantial contributions to (a) the conception and design or analysis and interpretation of the data, (b) the drafting of the article or critical revision for important intellectual content, critical appraisal of findings with literature search and actual write up of manuscript, (c) final approval of the version to be published. Each author must sign a statement attesting that he or she fulfills the authorship criteria of the Uniform Requirements.

The Journal discourages submission of more than one article dealing with related aspects of the same study. The journal also discourages the submission of case reports unless unreported from Pakistan. Unusual but already reported cases should, therefore, be submitted as letters to the editor.

21. Copyright

The Pakistan Journal of Plastic Surgery is the owner of all copyright to any work published by the journal. Authors agree to execute copyright transfer of their Forms-ACP (Authors Certification Proforma) as

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22. Proofs

Page proofs will be emailed, without the original manuscript, to the corresponding author for proof correction and should be returned to the editor within three days. Major alterations from the text cannot be accepted. Any alterations should be marked, preferable in red.