PJPS
PAKISTAN JOURNAL OF PLASTIC SURGERY
ISSN #: 2307-213X
Volume 10, Issue 01, March 2022

CONTENTS

Research Article

Treatment of Port Wine Stains with Pulsed Dye Laser: A Retrospective Study in Pakistani Population

Zainul Abidin, Asma Ilyas, Farrukh Aslam Khalid, Muhammad Amin Yousaf, Almeotan Khurshid Pasha, Moazzam Nazeer Tarar

[1-6]*Jinnah Burn & Reconstructive Surgery Center, Lahore*

Abstract

Background:- In the field of Plastic Surgery, variable-pulse 585 nm pulsed dye lasers (PDLs) are now in common usage for management of vascular skin lesions. However, there is little information available for the treatment of port-wine stains in our population.

Objectives:- To determine the efficacy of pulse dye 585 nm laser (PDL) in the treatment of port-wine stains (PWSs)in the local population.

Methodology: This was a descriptive case series conducted at Jinnah Burn & Reconstructive Surgery Centre, Lahore, from December 2018 to November 2019.A total of 36 patients of Fitzpatrick skin types III and IV with PWS underwent multiple treatments with 585 nm Pulsed Dye Laser therapy. Serial photographs were taken before and after every session and were assessed by two consultant plastic surgeons. Efficacy was measured by "The Physician Global Assessment score"in terms of clinical recovery response after 3 months of treatment. Significant improvement" (skin recovery: 51%–75%), and "cure" (skin recovery: 76%–100%) was taken as efficacy yes, otherwise taken as no.

Results: Two (5.5%) patients showed a total cure. Significant improved in 15 (41.6%) patients and moderate improvement were observed in 12 (33.3%) patients. Poor improvement was shown in 7(19.4%) patients. 8 (22.2%) patients showed post-laser bruising which settled down with steroid cream (Hydrocortisone 1%) over 1 week. None showed recurrence of PWS till now.

Conclusion: PDL 585nm wavelength with a fluence of 8-10j/cm2 with a pulse duration of 1.5 to 40 ms is an effective and safe treatment for port-wine stain in Pakistani skin.

Received | 09-09-2021: **Accepted** | 01-01-2022

Corresponding Author | Dr. Zain ul Abidin, Senior Registrar (Plastic Surgery) Jinnah Burn & Reconstructive Surgery Center, Lahore. **Email:** drzain.abidin@gmail.com,

Keywords | pulse dye laser,nevus flammeus,telangiectasia, port wine stain, capillary malformation.

Introduction

Vascular lesions of the skin include a vast range of various entities. Truly, these lesions have inadequately been comprehended, and their classification of vascular lesion reflects this. Throughout the times, with advance and development in clinical conduct, treatment, comprehension in histopathology, and visualization,the classification system has been refined.[1] In the mid-1980s, initial substantial strides towards characterizing vascularlesions and tailoring the treatment were made.[2] In 1982, the first binary system of diagnosis was established by Mulliken and Glowacki and it was based on histological characteristics, thus separating the lesions into two groups i.e. hemangiomas and vascular malformations.[3]

During the 1970s, the Argon laser's utilization was extensive and comprehensive. In any case, complications such as hyperpigmentation and fibrosis can occur more frequently. In the 1980s, in the light of these shortcomings, the specialists were impelled to supplant this

laser with flash lamp light PDL. Subsequently, a 585 nm PDL with 0.45 ms duration of pulse was picked as the optimal treatment option for vascular lesions which include nevus flammeus (PWS), haemangioma, and telangiectasia. Even now, Pulsed dye laser (PDL) is considered the highest quality level treatment.[4,5] By the process of selective photothermolysis to destroy capillary malformations is the recognized mechanism of PDL in treating vascular lesions.[6,7] In a study, good to the excellent response of pulsed dye laser was seen in 48.0% of PWSs patients, 78.0% of telangiectasia patients, and 54.0% of haemangioma patients.[8] As there is not any local study in the literature that has assessed the results of pulse dye 585 nm laser in vascular skin lesions.

So, our objective is to determine the efficacy of pulse dye 585 nm laser for the treatment of port-wine stains in our local population. No other study was published here in Pakistan regarding the management of PWS with lasers. The results of this study will not only modify the treatment of this problem but also set baseline data both at the national and international levels.

Methodology

A descriptive case series was carried out at Jinnah Burns and Reconstructive Center from December 2018 to November 2019. All patients presenting with port wine stain of either gender and age ranging from 15 years to 50 years were included in the study. Patients who had undertaken some surgical treatment or mentally retarded were excluded from the study. Ethical approval was obtained from the Hospital Review Board. The treatment protocol of variable-pulse PDL having a wavelength of 585 nm and pulse duration between 1.5 and 40 ms, fluence of 8- 10 j/cm^2, the spot size of 7mm, and pulse rate 1.5 Hz were set for each patient. Topical analgesia of 10% lignocaine gel applied half an hour before each session for surface anesthesia. Laser treatment was carried out along with the cooling of a lesion through a dynamic cooling device attached to the machine, after applied eye shield to patients and protective goggles for operators and attendants in the laser room. Topical antibiotic with a steroid (Hydrocortisone 1%) is advised to apply for 5 days along with uveal forte sp-60 sunblock and were asked to avoid ultraviolet exposure. The interval between treatment sessions were two to three weeks. Mild to moderate purpura is considered tissue reaction while charcoal grey is for pigmentation risk and over-treatment.

For clinical assessment, photographs were taken pre and post laser sessions and were evaluated by the two consultant plastic surgeons (at least 3 years of post-fellowship experience). They reviewed the color changes, size of the lesion, and proliferative changes appear in the lesion of the patient's "red mole" (PWS) by comparing the photographs pre and post treatment, by using the Physician Global Assessment.[9] The Physician Global Assessment includes "poor improvement" (skin recovery: 0%–25%), "moderate improvement" (skin recovery: 26%–50%), "significant improvement" (skin recovery: 51% –75%), and "cure" (skin recovery: 76%–100%). Cure, significant improvement, and moderate improvement were defined as yes to efficacy. Sun sensitivity of the patients was also assessed by the Fitzpatrick skin type classification system.[10] All patients were followed regularly, a total of 6-10 sessions were given and efficacy was calculated by physician global assessment after 3 months of treatment. The information collected was analyzed by using SPSS 20. For numerical variables like age, size of lesion mean and the standard deviation was calculated. Frequency and percentage were calculated for categorical variables like gender, site of lesion (face/neck/chest/upper arm/upper back). Data was stratified for age, size of the lesion, site of lesion (face/neck/chest/upper arm/upper back), to address effect modifiers. Post-stratification chi-square was applied to see their effects on efficacy and p-value $\leqslant 0.05$ was considered as significant.

Results

Within one year, the total number of 36 cases who fulfilled the inclusion criteria were enrolled from the outpatient department of JBRS&C. Mean age of patients was 24.3 +_4.6years,and males encountered were 15 (41.7%). Fitzpatrick's skin type was III to IV. None of them taken any treatment before. The PWSs treated were mainly located on the face in 27 (75%) patients, followed by neck 4(11.1%) trunk 4(11.1%),and extremities 1(2.8%). Sizes of the lesions were 0 to 10cm^2 in 11(30.6 %) and 10 to 20 cm^2 were in 25 (69.5%) patients. The mean size of the lesion was 11.6$\pm$ 5.9cm^2.

The mean number of treatment sessions was 7.33+ 1.4, the shortest follow-up period was 3 months and the longest was 1 and a half years.

The Physician Assessment scoring system showed a cure (76%– 100% of PWSs) in 2(5.5%) of the 36 patients (Fig 1: -a, b, c), a significant level of improvement or recovery (51%–75%) was scored in 15(41.6%) (Fig

1:- d, e, f)moderate level of improvement (26%–50%) was found in 12 (33.3%), and poor level of improvement or recovery (0%–25%) was in 7 (19.4%) of 36 patients (Table 1).

Table 1: *Demographic and Clinical Profile of Patients*

Variable n=36	Frequency	Percent
Age Mean= 24.30 SD=4.6 Min=16 Max=41		
< 30 years	32	88.9
> 30 years	4	11.1
Gender		
Male	15	41.7
Female	21	58.3
Total	36	100.0
Leision Size Mean=11.64 SD=5.09 Min=2.30 Max=23.00		
< 10 cm^2	11	30.6
> 10 cm^2	25	69.4
Fitzpatrick type		
Type III	28	77.8
Type IV	8	22.2
No of treatments Mean=7.33 SD=1.43 Min=5 Max=10		
< 5	3	8.3
> 5	33	91.7
Global Score		
Poor improvement (0-25%)	7	19.4
Moderate improvement (26-50%)	12	33.3
Significant improvement (51-75%)	15	41.7
Total cure (76-100%)	2	5.6

Patients were divided into two age groups (< and > 30 years) to check the effect of efficacy on age and the post-stratification chi-square test was applied and foundp= 0.209. (Table2) .when compared with gender it showed P-value is equal to 0.43, size of the lesion (< and >10cm) A p-value of 0.56 was found.(Table 2)

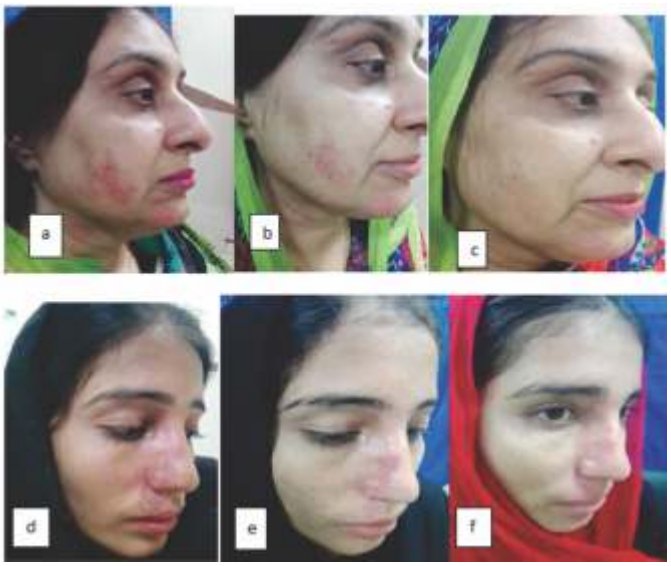


Figure 1: *(a) Initial lesion (b) After 3rd session (c) After 6th session. (d) Another patient initial lesion (e) After 3rd session (f) After 7th session.*

Discussion

PDL with 585 nm wavelength emanate wavelength which penetrates deep into the skin and in this manner specifically targets deeper vessels.[11] They likewise enable the duration of pulse to be stretched out between 1.5 to 40 ms, to make it conceivable to target vascular anomalies. Besides, it has cryogen shower cooling equipped with it, which decreases adverse outcomes, for example, scarring and pigmentation, and decreasing the discomfort during the procedure.[12]

In comparison with our study, the results are similar to the study done on the Asian population with nevus flammeus and were treated with cryogen spray cooling and 585nm PDL.[13] In 2002, the response rate in the study

Table 2: *Physician Global Assessment, age gender, and size cross-tabulation*

Variables		Global score				Total	Chi-square P-value
		poor improvement (0-25%)	moderate improvement (26-50%)	significant improvement (51-75%)	total cure (76-100%)		
Age	< 30 years	6	9	15	2	32	X^2 =4.450
		85.7%	75.0%	100.0%	100.0%	88.9%	P=.209
	> 30 years	1	3	0	0	4	
		14.3%	25.0%	0.0%	0.0%	11.1%	
Gender	Male	1	6	7	1	15	X^2 =2.713
		14.3%	50.0%	46.7%	50.0%	41.7%	P=.438
	Female	6	6	8	1	21	
		85.7%	50.0%	53.3%	50.0%	58.3%	
Size of Leison (cm^2)	< 10 cm^2	1	3	6	1	11	X^2 =2.035
		14.3%	25.0%	40.0%	50.0%	30.6%	P=.565
	> 10 cm^2	6	9	9	1	25	
		85.7%	75.0%	60.0%	50.0%	69.4%	

conducted by Ho et al. were also very close to our study.[14] In their study, 25% clearance was showed by 60% of patients, and most of the patients (41.1%) had 25%– 50% clearance. Fewer than one-fourth of patients (23%) had greater than 50% clearing, and there was no patient with complete clearance.

The response of PWSs towards laser is variable and the results depend upon multiple factors. In our study, PWS of the head and neck region had a better response to laser compare to other regions, the same concurrence with other studies that also found successful results in facial regions than other areas.[15] The difference in treatment response among different areas cannot be easily elaborated. However, every region of the body has a variable thickness and has different structural characteristics of dermis suggested the variable response and effect of the laser.[16] Several studies linked the possible correlation between treatment results of nevus flammeus in different age groups.[17,18] In our results, the age of the patient and the clinical response did not correlate; however, more intense color and protrusion of lesions were noticed with growing age: no significant difference was found relative to an age when the results of treatments were expressed as percent improvement sowing to treatment. Nevertheless, the final response to the treatment in the younger population appeared to be better. In our study, there was no correlation found between duration of lesion and treatment response and no notable difference between gender and treatment response. However, the younger patients showed better treatment response in multiple studies[12]. This may be due to differences in characteristics of the skin in younger patients, they have relatively thin dermis with fewer collagen fibers, less melanin pigment in the epidermis, which could decrease the backscattering of laser out of the skin and lower the fractional blood volume.[19]

The number of treatment sessions affects the response rate of the laser. More number of treatment sessions showed a better response. This is the same response showed in a previous study.[20] In patients with darker skin, inflammatory changes as well as unwanted injury to the epidermis may create further problems, that lead to scarring and pigmentation of the skin. In our study, the incidence of pigmentations, atrophy, and hypertrophic scarring was much less than expected compared to previous studies.[21]

It was concluded by our results that the PDL had low clearance rate but had a high response rate in our population; however, there were certain limitations in the assessment of efficacy by two different examiners. As well, the earlier the interventions, the better was the efficacy. The response rate of PDL also depends upon multiple factors that include the size of malformation, anatomical site, existing hyperplastic lesions. A study with a larger sample size with the inclusion of the pediatric population is recommended. Earlier the intervention better will be the outcome.

Conclusion

In conclusion, the variable-pulse 585 nm PDL with a fluence of 8 to 12 j/cm^2 and a pulse duration of 0.4 to 20 ms has proved to be effective in treatment of vascular skin lesions. However, results may vary owing to age, disease, or the location of the lesions.

Conflict of Interest *None*

Funding Source *None*

References

1. Janardhan H, Saheera S, Jung R, Trivedi C. Vascular and Lymphatic Malformations: Perspectives From Human and Vertebrate Studies. Circulation Reseach. 2021;129:131-135.
2. Brahmbhatt A.N, Skalski K.A, & Bhatt A.A. Vascular lesions of the head and neck: an update on classification and imaging review. Insights Imaging 11, 19 (2020)
3. Steiner JE, Drolet BA. Classification of vascular anomalies: an update. Semin Intervent Radiol. 2017; 34: 225–232
4. Updyke KM, Khachemoune A. Port-wine stains: a focused review on their management. J Drugs Dermatol. 2017;16(11):1145-51.
5. Wanitphakdeedecha R, Jantarakolica T, Ng JNC, et al. The Cost-Effectiveness of Pulsed-Dye Laser Therapy Among Thai Patients with Facial Port-Wine Stain: A Retrospective Study and Economic Evaluation. Dermatol Ther (Heidelb).2021;11(2):465-473.
6. Wang T, Chen D, Yang J, Ma G, Yu W, Lin X. Safety and efficacy of dual wavelength laser (1064+595 nm) for treatment of non treatedportwine stains. J EurAcad-Dermatol Venereol2018;32:260-4.
7. Ross E, Codkiewics H, Javvaji S, Zumwalt J. Enhanced pulse dye laser for facial rejuvenation. Lasers in Surgery and Medicine. 2021;53:109-114
8. Woo SK, Ahn HH, Kim SN, md, Kye Y. Treatment of vascular skin lesions with the variable pulse 595 nm pulsed dye laser. Dermatol Surg. 2006;32:41–8.
9. Currie CL, Monk BE. Can the response of port-wine stains to laser treatment be reliably assessed using

subjective methods? Br J Dermatol. 2000; 143(2): 360 –364.

10. Ravnbak MH. Objective determination of Fitzpatrick skin type. Dan Med Bull. 2010;57(8):B4153.
11. Geronemus RG. High fluence modified pulsed dye laser photocoagulation with dynamic cooling of port-wine stains in infancy. Arch Dermatol 2000; 136: 942 – 3.
12. Loo WJ, Lanigan SW. Recent advance in laser therapy for the treatment of cutaneous vascular disorders. Lasers Med Sci 2002;17:9–12.
13. Periyasamy MK, S ekar C S, Rai R. E ffectiveness of dua sequential wavelength laser in the treatment of port-wine stains – A retrospective study. Indian Dermatol Online J 2019;10:418-21
14. Ho WS, Chan HH, Ying SY, Chan PC. Laser treatment of congenital facial port-wine stains: long-term efficacy and complication in Chinese patients. Lasers Surg Med. 2002;30(1):44–47.
15. Katugampola GA, Lanigan SW. Five years' experience of treating port wine stains with the flashlamp-pumped pulsed dye laser. Br J Dermatol 1997; 137:750–4..
16. Yu W, Zhu J, Han Y, et al. Assessment of Outcomes With Pulsed Dye Laser Treatment of Port-Wine Stains Located Proximally vs Distally on Extremities. JAMA Dermatol. 2020;156(6):702–704
17. Taieb A, Touati L, Cony M, et al. Treatment of port-wine stains with the 585- nm pulsed dye laser: a study of 74 patients. Dermatology 1994;188: 276–81.
18. Jeon H, Bernstein LJ, Belkin DA, Ghalili S, Geronemus RG. Pulsed Dye Laser Treatment of Port-Wine Stains in Infancy Without the Need for General Anesthesia. JAMA Dermatol. 2019;155(4):435–441.
19. Ortiz AE, Nelson JS. Port wine stain laser treatments and novel approaches. Facial Plast Surg. 2012; 28(6): 611–620.
20. Nguyen CM, Yohn JJ, Huff C, Weston WL, Morelli JG. Facial port wine stains in childhood: prediction of the rate of improvement as a function of the age of the patient, size and location of the port wine stain and the number of treatments with the pulsed dye (585 nm) laser. Br J Dermatol. 1998;138(5):821–825.
21. Syed S, Rinaldi G. Laser for vascular anomalies: successful outcomes in children. 2019;45(2):141-146

Research Article

Utilization of Caudal Septal Cartilage in Management of Crooked Nose Deformity

Nauman Ahmad Gill,[1] Saadia Nosheen Jan,[2] Shahir Ahmad Mir,[3] Ammara Tariq[4]

[1,3,4]*Department of Plastic Surgery, KEMU/Mayo Hospital, Lahore*
[2]*Department of Plastic Surgery, Services Hospital Lahore*

Abstract

Background: Crooked nose deformity is abnormal deviation in both bony and cartilaginous parts caused by either trauma or congenital defects. It is a cause of psychological concern to the patient as nose is of prime importance in facial appearance. Rhinoplasty is a critical surgical procedure in this regard, often requiring cartilage grafts for structural support.

Objective: The objective of the study is to share our experience of using caudal septal cartilage graft for correction on crooked nose deformity and assess in terms of patient reported outcomes, which are considered gold standard as they are paramenters for one's quality of life.

Methodology: This retrospective study was conducted at Plastic and Reconstructive Surgery Department Mayo Hospital Lahore from year 2015 to 2020. All patients with crooked nose deformity were included. All data regarding their preoperative functional and cosmetics details were collected and recorded. Syndromic patients, patients with emotional instability and patients having multiple comorbidities were excluded. An open tip approach for rhinoplasty was used. Patients were followed for six months and results were measured using Rhinoplasty Outcome Evaluation Tool pre and post operatively.

Results: Out of a total of twenty four patients, nine were males and fifteen were females. The age ranged from 16 to 34 years. The mean pre-operative rhinoplasty outcome evaluation score was 30.9 and mean post-operative score was 85.0 which was statistically significant (p-value <0.05%). There were minor complications in few patients and none of the patients required major revision surgery.

Conclusion: Caudal septum can be effectively utilized as graft for structural support in the management of crooked nose deformity

Received | 18-10-2021: **Accepted** | 04-01-2022

Corresponding Author | Nauman Ahmad Gill, Associate Professor of Plastic Surgery, King Edward Medical University, Mayo Hospital, Lahore. **Email:** naumangill22@hotmail.com

Keywords | Crooked nose deformity, Rhinoplasty, Patient reported outcome, Rhinoplasty Outcome evaluation.

Introduction

Abnormal deviation of bony and cartilaginous nasal pyramid is commonly referred to as "crooked nose" deformity and is a very common presentation to rhinoplasty surgeons.[1] Depending upon the appearance, it can be C-shaped, S-shaped or simply deviated to one side. The most common cause of this deformity is trauma to the nose. As nose is the central part of the face, its deformity assumes prime importance in social relations in addition to barring functional consequences of nasal obstruction symptoms.[2] As a result, patients with crooked nose deformity can fall prey to severe psychological issues. While the challenges of surgical correction remain a formidable task for the surgeon, risk of relapse is also a very common problem.[3] The main reasons for these relapses are related to deforming forces of the cartilaginous structures of the nasal pyramid which retain their memory and exert intrinsic and extrinsic deforming forces.[4]

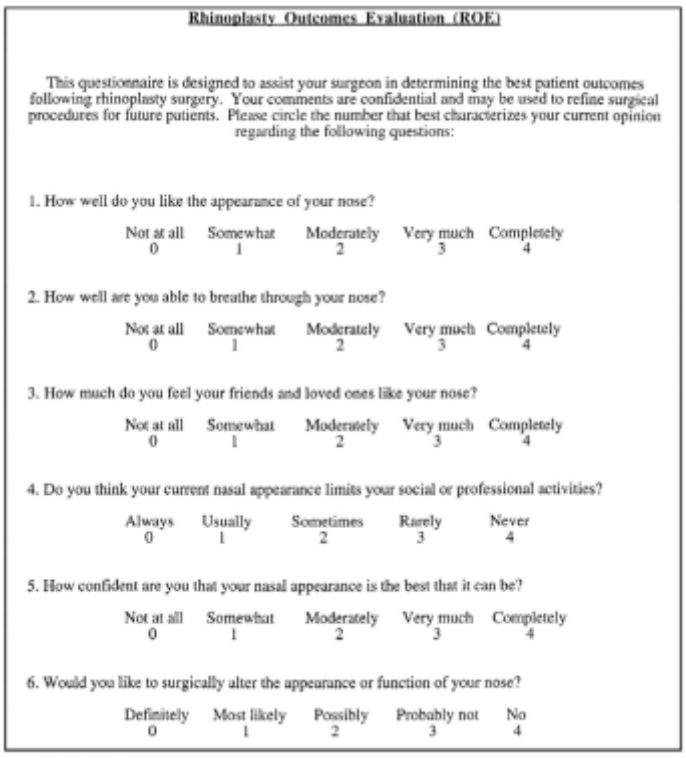
The authors utilize the septal cartilage harvested from

the caudal septum in the form of spreader grafts and septal extension grafts after straightening the septum to achieve a durable solution to deviated nasal septum. In addition, correction of bony dorsal abnormalities with osteotomies and columellar strut graft for tip support are also added. We believe that all those areas of the nose like bony dorsum, cartilaginous septum, columella and nasal tip need to be addressed separately while dealing with crooked nose deformity. In this way, acceptable aesthetic results can be achieved along with improved nasal function. We have been using the rhinoplasty outcome evaluation tool for measuring the outcome of crooked nose surgery in our patients. This study demonstrates the effectiveness of caudal septal resection which can be utilized in the form of spreader grafts, columellar strut grafts and septal extension grafts.

Methodology

Approval from ethical committee was taken prior to start of the study. A retrospective study was performed to assess the outcome of all septorhinoplasty surgeries from the patient's perspective. The study was conducted at Plastic and Reconstructive Department Mayo Hospital Lahore. All patients operated by the senior author from year January 2015 to December 2020 who presented with crooked nose (deviated nasal vault with septal deviation leading to breathing difficulty from the nose) were included in the study. Patients with multiple comorbidities like diabetes, hypertension, Ischemic heart disease and Chronic Obstructive Pulmonary Disease, history of any psychiatric illness, emotional instability, having unrealistic expectations and any intra-nasal pathology like intra-nasal polyp, allergic rhinitis etc. and any syndromic patients were excluded. Also patients with absent or deficient septal cartilage requiring costal cartilage graft reconstructions were also excluded from the study.

All preoperative records of the patients including complete history, psychological background and motivating factors for surgical procedures were recorded. Standardized photographs including frontal, lateral, oblique, and basal views were obtained for every patient. Patients were counseled about pre-operative and post-operative instructions and use of outcome analysis tool i.e Rhinoplasty Outcome Evaluation (ROE) Performa (Figure 1).



Rhinoplasty Outcomes Evaluation (ROE)

This questionnaire is designed to assist your surgeon in determining the best patient outcomes following rhinoplasty surgery. Your comments are confidential and may be used to refine surgical procedures for future patients. Please circle the number that best characterizes your current opinion regarding the following questions:

1. How well do you like the appearance of your nose?

Not at all	Somewhat	Moderately	Very much	Completely
0	1	2	3	4

2. How well are you able to breathe through your nose?

Not at all	Somewhat	Moderately	Very much	Completely
0	1	2	3	4

3. How much do you feel your friends and loved ones like your nose?

Not at all	Somewhat	Moderately	Very much	Completely
0	1	2	3	4

4. Do you think your current nasal appearance limits your social or professional activities?

Always	Usually	Sometimes	Rarely	Never
0	1	2	3	4

5. How confident are you that your nasal appearance is the best that it can be?

Not at all	Somewhat	Moderately	Very much	Completely
0	1	2	3	4

6. Would you like to surgically alter the appearance or function of your nose?

Definitely	Most likely	Possibly	Probably not	No
0	1	2	3	4

Figure 1: *Quality of life instrument.*

All the patients were operated under GA, and open-tip rhinoplasty approach was used in all. After elevation of muco-periosteal flaps, the caudal septum was harvested saving 1cm of dorsal and caudal septum. Straightening of the L-shaped septal cartilage by scoring and addition of spreader or septal extension grafts was carried out. In case the caudal septum was severely deviated, whole of the caudal septum was excised so as to completely straighten the dorsal septum as in extracorporeal reconstruction. Osteotomies for bony dorsum correction and straightening along with columellar strut for tip support were also carried out in all patients. Internal nasal as well as external nasal splintage was applied for 1 week post operatively. Splints and sutures were removed on the 7th post-operative day. Patients were followed up at tenth day, fifteenth day, sixth week and six months post-operatively.

The questionnaire was filled preoperatively and at six months' follow-up in all patients. Each ROE question was graded range from zero to four, where zero is for least satisfaction and four for maximum satisfaction. In order to achieve a range from 0 to 100, the total score of each patient was divided by 24 and multiplied by 100. Thus a range of patients' satisfaction from 0 to 100 can be obtained which is easy to comprehend. All the patients' data were compiled. Outcomes were measured using SPSS version 26.For statistical analysis, paired Student's t test and the Mann-Whitney test were applied.

Student's t test was used to compare preoperative and postoperative scores.

Results

A total of twenty four patients with crooked nasal deformity who satisfied the inclusion and exclusion criteria were assessed. There were nine males and fifteen females. Their age ranged from 16 years to 34 years (mean age 22.6 years). Among these patients, childhood trauma was the most common cause of nasal deformity (15 patients), while five patients believed that the nose was congenitally deformed and four had history of road traffic accident. The mean pre-operative Rhinoplasty outcome evaluation score was 30.9 and mean post-operative score was 85.0 which was statistically significant (p-value <0.05%). Pre and post-operative pictures of a few cases have been shown in Figures 2-4.

Regarding the complications, one patient developed septal hematoma which was drained without any further collection. Two patients complained of increased alar flare post-operatively which was corrected with alar resection under local anesthesia. One patient complained of mild nasal deviation post operatively but he was not willing for revision surgery. None of the patients required major revision.

Pictures of Representative Cases

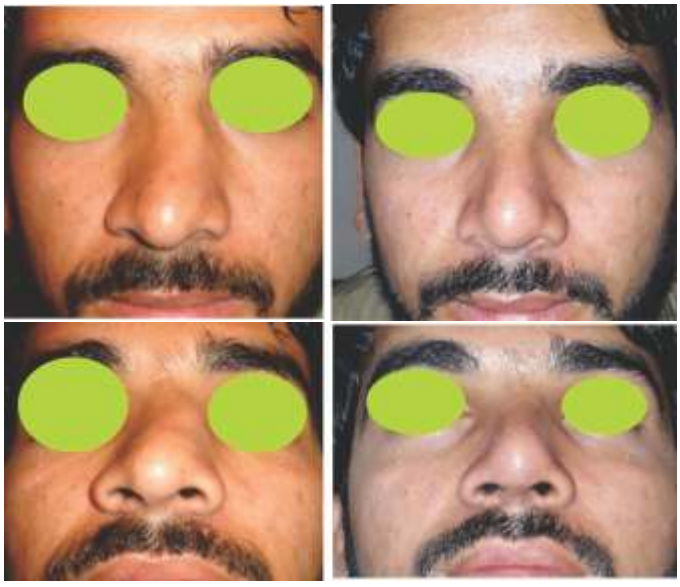


Figure 2: Pre & Post-operative views of patients with severe deviation of bony nasal pyramid. After collection of bony deviation and straightening of septum cartilage was utilized for dorsal cartilage augmentation.

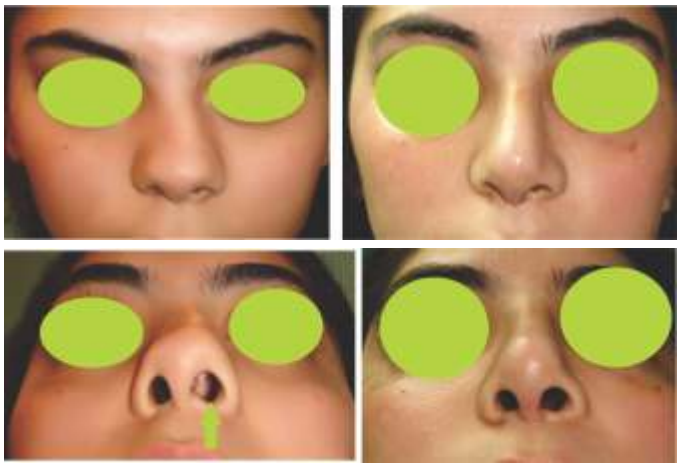


Figure 3: Patient with severe reverse c-shaped deviation pre and post op pictures after correction of deviation.

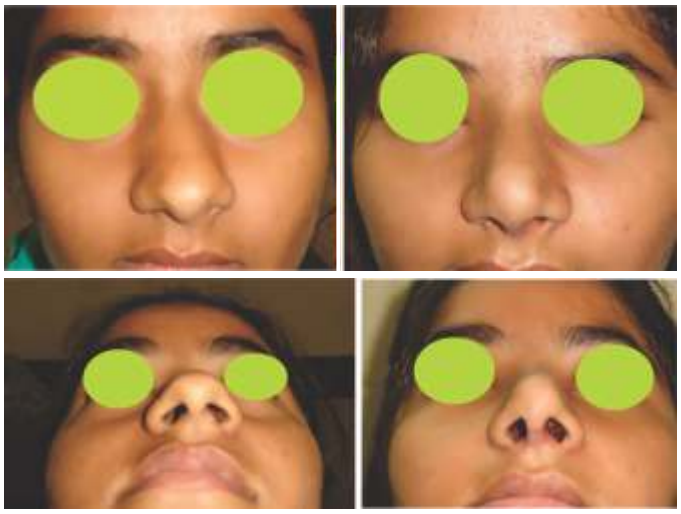


Figure 4: Another patient with severe deviation of cartilagenous and bony structures. Whole pyramid was shifted & stablized using the candle cartilage.

Discussion

Rhinoplasty is perceived as one of the most technically demanding of all cosmetic procedures. Key points for successful rhinoplasty include orientation of goal and comprehensive clinical knowledge, preoperative preparation, precise operative technique, postoperative follow-up, and critical analysis of results. Crooked nose presents a significant challenge to the rhinoplasty surgeons as relapse and reduced patient satisfaction are the most common complaints after surgery. A variety of surgical techniques have been described ranging from septal cartilage straightening, resections, morselization, weakening of the cartilage and extracorporeal reshaping of the nasal septum with varying degrees of success.[5-7]

Another landmark success in treatment of crooked

nose was use of spreader graft originally described by Sheen in 1984 which involved positioning a rectangular shaped cartilage on either side of the dorsal septum.[8] In addition to straightening the septum and preventing relapse, it also proved useful in widening of the internal nasal valve thus improving breathing. Rohrich and many others advocate unilateral spreader graft[9-12] while Guyuron tends to utilize bilateral spreader grafts.[13] The author utilizes septal cartilage harvested from the caudal portion to augment the straightened dorsal septum. In our experience, it gives strength to the septum and prevents any future deviation. As no further cartilage is required, potential donor site morbidity can be avoided in addition to reducing the overall surgical time. In our experience, it causes less post-operative pain decreased complications rate. Only one patient in the study had post-operative hematoma which was managed with simple evacuation.

Using this technique assessment of outcome was our primary objective of study. Patient satisfaction is the new standard of measurement of outcome evaluation post operatively. Outcomes research is a fast-growing field of study that focuses on patient-related aspects of medical or surgical outcomes such as satisfaction and quality of life. In cosmetic plastic surgery, there is deficiency of literature in the field of outcomes based on patient's satisfaction by quantifying the qualitative parameters despite the fact, that patient satisfaction is main target of most facial plastic surgery procedures.[14] Compared to other aesthetic procedures, rhinoplasty patients are less satisfied after surgery. [15]

Rhinoplasty Outcome Evaluation(ROE) questionnaire devised by Alsarraf is an efficient tool for measuring rhinoplasty results.[16] It consists of six questions for physical, emotional and social satisfaction of patients undergoing rhinoplasty.

In our study, mean pre-operative score was 30.9 with mean post-operative score of 85.0 with a difference of 54.1. In contrast Alsaraf et al.,[17] showed mean preoperative score of 38.8 and the mean postoperative score of 83.3, with a mean difference of 44.5 in rhinoplasty patients. Our study results can be compared favorably with the above mentioned studies on crooked nose correction patients. The better results in terms of mean difference may be because of the severe nasal obstruction of the patients pre-operatively in our study group. Arimaet al.[18] conducted a study using endonasal approach and showed mean difference (mean increase in patient satisfaction) of 50.5 between the pre- and postoperative satisfaction scores, with a statistically significant difference ($P<0.01$).

Okur et al.[19] utilized Scion Image program for pre and post-operative frontal view analysis and found that 66.7% of their patient population had good results and claimed significant correction ($p<0.05$) for crooked nasal deformity. The current literature lacks the outcome assessment using Rhinoplasty Outome Evluation (ROE) criteria for crooked nose deformity. The present study is a step towards contribution to literature regarding the said deformity.

Conflict of Interest *None*

Funding Source *None*

References

1. Boccieri A. The crooked nose. ActaOtorhinolaryngol Ital. 2013 Jun;33(3):163-8.
2. Courtiss EH. Septorhinoplasty of the traumatically deformed nose. Ann PlastSurg 1978;1:443-52.
3. Byrd HS, Salomon J, Flood J. Correction of the crooked nose. PlastReconstrSurg 1998;102:2148-57.
4. Ahmad J, Rohrich RJ. The Crooked Nose. ClinPlast Surg. 2016 Jan;43(1):99-113.
5. Sykes JM, Kim J, Shaye D, et al. The importance of the nasal septum in the deviated nose. Facial PlastSurg 2011;27:413-22.
6. Lawson W, Reind AJ. Correcting functional problems. Facial PlastSurgClin North Am 1994;2:501-20.
7. Gomulinski L. La traductionmorphologique des deformations septales. Leur correction au cours des rhinoplasties complexes. Ann ChirPlast 1982;27:343-9.
8. Gubisch W. The extracorporeal septum plasty: a technique to correct difficult nasal deformities. PlastReconstr Surg 1995;95:672-82.
9. Sheen JH. Spreader graft: A method of reconstructing the roof of the middle nasal vault following rhinoplasty. PlastReconstrSurg 1984;73:230-7.
10. Toriumi DM, Ries WR. Innovative surgical management of the crooked nose. Facial PlastClin North Am 1993;1:63-78.
11. Vinayak BC, Trenitè GJN. External rhinoplasty. FACE 1997;5:77-92.
12. Rohrich RJ. Rhinoplasty. Dorsal reduction and spreader graft. Dallas, Rhinoplasty Symposium 2000;17:153-66.
13. Stepnick D, Guyuron B. Surgical treatment of the crooked nose. ClinPlast Surg. 2010 Apr;37(2):313-25.
14. Klassen AF, Cano SJ, East CA, Baker SB, Badia L,

Schwitzer JA, Pusic AL (2016) Development and Psychometric Evaluation of the FACE-Q Scales for patients undergoing rhinoplasty. JAMA Facial Plast Surg. 18:27–35.

15. Rankin M, Borah GL, Perry AW, Wey PD: Quality-of-life outcomes after cosmetic surgery. PlastReconstr Surg. 1998, 102:2139-2145. 10.1097/00006534-199811000-00053.
16. Alsarraf R. Outcomesresearchinfacial plastic surgery: a review and new directions. Aesthetic Plast Surg. 2000;24(3):192-197.
17. Alsarraf R, Larrabee WF Jr, Anderson S, Murakami CS, Johnson CM Jr: Measuring cosmetic facial plastic surgery outcomes: a pilot study. Arch Facial Plast Surg. 2001, 3:198-201.
18. Arima LM, Velasco LC, Tiago RSL. Crooked nose: outcome evaluations in rhinoplasty. Braz J Otorhinolaryngol. 2011 Jul-Aug;77(4):510-515. English, Portuguese. doi: 10.1590/S1808-86942011000400016. PMID: 21860979.
19. Okur E, Yildirim I, Aydogan B, Kilic MA. Outcome of Surgery forCrooked Nose: An Objective Method of Evaluation. Aesthetic Plast Surg. 2004;28:203-7.

Research Article

Amputation Or Reconstruction: Assesment of Long-term Outcome And Patient's Satisfaction In Severe Lower Limb Trauma

Muhammad Osama, Tauqeer Hussain, Shehab Afzal Beg

[1-3] *Liaquat National Hospital, Karachi, Pakistan*

Abstract|

Back ground: Complex and severe lower limb injuries pose a difficult situation for reconstructive surgeons. there is no consensus on the standard criteria to decide about amputation or limb salvage,

Objectives: Objective of the study was to compare the patient satisfaction in those undergoing amputation versus reconstruction in severe lower limb trauma.

Methodology: Record of patients presenting to the accident and emergency department of Liaquat National Hospital, with limb threatening lower limb injuries during July 2016 to July 2018 were included. Patients were categorized in two groups; A) Patients who underwent primary amputation B) Patient who underwent salvage surgery. We reviewed the patients at least one year after the last procedure and assessment Performa (evaluating gait, skin and joint conditions and sensation) and patients' satisfaction questionnaire were filled.

Results: Out of 50 patients that were included, 28 patients underwent primary amputation while 22 patients had limb salvage procedure. There was no significant difference in patients' satisfaction in terms of pain, function, social activities and quality of life who under -went undergoing amputation or limb salvage.

Conclusion: A well planned and thoroughly judged primary amputation is a sensible option in certain cases with severe lower limb trauma(MESS score > 7) keeping in mind long-term patient's morbidity and satisfaction.

Received | 19-10-2021: **Accepted** | 18-01-2022

Corresponding Author | Prof. Mirza Shehab Afzal Beg, Liaquat National Hospital, Karachi, Pakistan.

Email: shehabbeg@hotmail.com

Keywords | Salvage, primary amputation, reconstruction, Mangled Extremity severity score (MESS)

Introduction

Complex and severe trauma to lower limbs poses a difficult situation for reconstructive surgeons in management of such injuries. In such limb threatening injuries, no standard criteria regarding amputation or salvage has been described in literature.[1-4] With recent advances in orthoplastics, more options of limb salvage have become available to surgeons.[5] However, when opting for limb salvage, need for multiple reconstructive surgeries, longer duration of hospital stay and longer time to return to occupational activities and additional costs must be taken into consideration.

Despite best of efforts by the reconstructive team, the outcome of limb salvage remains variable, if not disappointing and has been found to be associated with higher complication rates such as infection, fracture, malunion or nonunion etc and necessitating need of delayed amputation.

Primary amputation has the advantage of single surgery, limited hospital stays, cost effective, decreased patient morbidity, early rehabilitation and, with proper prosthesis, early return to work but all at the cost of loss of limb. Patient fully understanding the need of amputating limb rather should be of utmost importance as the burden of decision lies on both the surgeon and the patient.

The objective of our study is to observe the functional outcomes and short/ long term complications in patients

undergoing either amputation or limb salvage surgery after severe lower limb trauma and to compare the patient satisfaction in both groups and to compare their overall quality of life and return to work. MESS scoring system[6]

Mangled Extremity Severity Score (MESS)

Type	Characteristics	Injury	Points
1	Low energy	stab wound, simple closed fx, small-caliber GSW	1
2	Medium energy	Open/multilevel fx, dislocation, moderate crush	2
3	High energy	shotgun, high-velocity GSW	3
4	Massive crush	Logging, railroad, oil rig accidents	4
Shock Group			
1	Normotensive	BP stable	0
2	Transiently hypotensive	BP unstable in field but responsive to fliud	1
3	Prolonged hypotension	SBP <90mmHg in field and responsive to IV fluids in OR	2
Ischemia Group			
1	None	Pulsatile, no signs of ischemia	1
2	Mild	Diminished pulses without signs of ischemia	2
3	Moderate	No dopplerable pulse, sluggish cap refill, paresthesia, diminished motor activity	3
4	Advanced	Pulseless, cool, paralyzed, numb without cap refill	4
Age Group			
1	<30y/o		0
2	>30 <50		1

MESS score: six or less consistent with a salvageable limb. Seven or greater amputation generally the eventual result.

From Helfet DL, Clin Orthop 1990 256:80

has been used to evaluate the severity of injury (figure 1)

Figure 1: *Mangled Extremity Severity Score (MESS)*

Methods

It was retrospective cohort study conducted on patients presented to the accident and emergency department of Liaquat national hospital and medical Centre, with limb threatening lower limb injuries during July 2016 to June 2018. MESS scoring system was used to evaluate the severity of injury and patients with a MESS core >5 were included in the study. Patients who were unstable for reconstruction, Poly trauma patients with other life-threatening injuries and patients having previous uncontrolled co-morbidities were excluded from study.

All the patients presented with lower limb trauma, meeting the inclusion criteria were included in the study. Patients were categorized in two groups; A) Patients who underwent amputation, B) Patient who opted for limb salvage surgery that is salvage group.

We reviewed the patients at least one year after the last procedure and assessment Performa (evaluating gait, skin and joint conditions and sensation) were filled. Patients were asked to rate their satisfaction with their respective surgical procedure on a scale of 1 to 10. We used SPSS version 22 for data analysis. Quantitative variables like age and satisfaction score were presented as mean (Sd).

Results

Forty patients fulfilled the inclusion criteria. Mean age was 30.2 ± 7.2 years (Range 16 to 54 years). Average MESS score was 7.1 with minimum score of 5 and maximum of 10. Mechanism of injury is summarized in table 1. Thirty-two patients had fractures of both tibia and fibula fracture and 2 fracture of tibia alone. There were two patients with fracture of calcaneum and 4 had fractures of metatarsals. Twenty-eight patients out of 40 patients underwent direct amputation as their primary surgical procedure. We salvaged limbs of 12 patients by multiple surgical procedures. However, eight patients in which limb was salvaged , underwent delayed amputation. Reconstruction done by multiple procedures in salvage group is shown in table 2. In amputation group 16 patients had above knee amputation while in 12 patients below knee amputation was done. Complications face by salvaged group included wound infection in 4 patients, partial graft loss in 2 patients while 4 patients suffered with chronic ulcers in salvaged limb. Average satisfaction score with procedure in salvage group was 4.9 while it was 5.8 in amputation showing more contentment in amputation group. The patients who could walk on their salvaged or prosthetic limbs were more satisfied (average score 5.7) as compared to those who were not able to bear weight (average score 3.0). Similarly, patients who returned to their previous work are more satisfied with average score of 6.2 compared to score of 3,6 in those patients who are not able to continue their previous work.

Table 1: *Mechanism of Injury in Patients*

Mechanism of injury	Number of patients
Road traffic accident	20
Bomb blast injuries	12
Machine crush injury	4
Gun shot	4

Table 2: *Reconstructive Options Utilized*

Reconstructive option	No. of patients
Primary closure of wound	2
Skin grafting	4
Skin grafting + local flaps	2
Free flaps	4

Discussion

The decision to either salvage a traumatic limb or undergo amputation remains a tough one and the burden lies on both the surgeon and the patient with no current evidence to suggest either strategy being superior to the other[7].

In our center, a combined orthopedics and plastic surgery teams' approach is adopted when patients with such complex lower limb injuries present in the emergency department. After proper counseling of merits and demerits of both salvage and primary amputation and need of delayed amputation if salvage surgery fails, patient and his attendants are asked to take decision regarding the management plan.

In our study, we reviewed patients in both the groups in terms of satisfaction with the treatment plan, cost of treatment, hospital stay, return to work and overall quality of life and found that patient who underwent primary amputation reported better outcomes and overall satisfaction rates as compared to limb salvage group. Douklas et al[3] reported similar outcomes in patients with major lower extremity trauma.

When reviewing number of patients when returned to work after treatment, it was found that 56% of patients with primary amputation resumed their previous work as compared to 35% of patients in limb salvage group. Average duration of patients returning to work after intervention was also reported to be more in salvage group as compared to the amputation group.

Hoogendoorn et al[8] reported higher incidence of complications in limb salvage group. This is consistent with our study. The incidence of complications in limb salvage group were higher and included recurrent ulcers, infections, need of multiple hospital visits with multiple surgeries and delayed return to normal activities. Eight patients even ended up in secondary amputation after failure of treatment.

In contrast, patients who had primary amputation, be it above or below knee, had earlier return to job activities once prosthesis were applied as soon as the wound healed. With the advances in lower limb prosthesis, rehabilitation of amputees has become easier. Patients are able to perform their daily activities and return to work is earlier.

Conclusion

In conclusion, a well-planned and thoroughly judged primary amputation in selected patients is a sensible option in severe lower limb trauma as it results in early return to work and more patient satisfaction as compared to limb salvage surgery.

Conflict of Interest *None*

Funding Source *None*

Acknowledgment

The authors would like to thank Mr. Mustansar Zaidi and Abira at Biostats, LNH for their assistance with study design and statistical analysis and Dr Hassan Tahir for his valuable contribution.

References

1. Ladlow, P., Phillip, R., Coppack, R., Etherington, J., Bilzon, J., McGuigan, M. P., & Bennett, A. N. (2016). Influence of Immediate and Delayed Lower-Limb Amputation Compared with Lower-Limb Salvage on Functional and Mental Health Outcomes Post-Rehabilitation in the U.K. Military. The Journal of Bone and Joint Surgery, 98(23), 1996 -2005. doi:10.2106/ jbjs.15.01210
2. Ladlow P, Phillip R, Etherington J, Coppack R, Bilzon J, McGuigan MP, Bennett AN. Functional and mental health status of United Kingdom military amputees postrehabilitation. Arch Phys Med Rehabil. 2015 Nov; 96(11):2048-54. Epub 2015 Aug 6.
3. Doukas WC, Hayda RA, Frisch HM, Andersen RC, Mazurek MT, Ficke JR, Keeling JJ, Pasquina PF, Wain HJ, Carlini AR, MacKenzie EJ. The Military Extremity Trauma Amputation/Limb Salvage (METALS) study: outcomes of amputation versus limb salvage following major lower-extremity trauma. J Bone Joint Surg Am. 2013 Jan 16;95(2):138-45.
4. MacKenzie EJ, Bosse MJ, Kellam JF, Pollak AN, Webb LX, Swiontkowski MF, Smith DG, Sanders RW, Jones AL, Starr AJ, McAndrew MP, Patterson BM, Burgess AR, Travison T, Castillo RC. Early predictors of long-term work disability after major limb trauma. J Trauma. 2006 Sep;61(3):688-94
5. Durrant CA, Mackey SP. Orthoplastic classification systems: the good, the bad, and the ungainly. Ann Plast Surg. 2011 Jan; 66(1):9-12. doi: 10.1097/ SAP. 0b013e 3181f88ecf. PMID: 21173598.
6. Yeh HK, Fang F, Lin YT, Lin CH, Lin CH, Hsu CC. The effect of systemic injury score on the decision making of mangled lower extremities. Injury. 2016 Oct; 47(10): 2127-2130. doi: 10.1016/j.injury.2016.05.023. Epub 2016 Jun 7. PMID: 27375013.
7. Qureshi MK, Ghaffar A, Tak S, Khaled A. Limb Salvage Versus Amputation: A Review of the Current Evidence [published correction appears in Cureus. 2020 Oct 7; 12(10):c38]. Cureus. 2020;12(8):e10092. Published 2020 Aug 28. doi:10.7759/cureus.10092
8. Hoogendoorn JM, Van der Werken C. Grade III open tibial fractures. Functional outcome and quality of life in amputees versus patients with successful reconstruction. Injury. 2001;32(4):329–34.

Research Article

Variability in Presentation of Dermatofibrosarcoma Protuberance: A Reterospective Review From Single Center

Sobia Manzoor,[1] Ahmad Faraz Bhatti,[2] Saima Zeeshan,[3] Ehsan Ahmed Khan[4]

[1,4]Department of Plastic & Reconstructive Surgery, KEMU/Mayo Hospital Lahore,
[2]Department of Plastic Surgery, Bahria International Hospital, Lahore.
[3]Department of Physiology, Niazi Medical & Dental College, Sargodha.

Abstract

Background: Dermatofibrosarcoma protuberance(DFSP) is slow growing, locally aggressive tumor of skin and subcutaneous tissue. It has multiple variants which show different clinical features and malignant potential. The aim of this retrospective review is to compare variation in presentation and management of DFSP.

Objective: To better understand the variability in clinical presentation of dermatofibrosarcoma protuberance (DFSP) in patients treated at Shaukat Khanum Memorial Hospital & Research Center.

Methodology: We retrieved data, of patients with DFSP who underwent surgery from December 2014 to December 2020, from hospital data base system. Information about patient's demographics, clinical features, surgical treatment, complications and outcome was and collected on proforma.

Results: A total of 63 patients presented with DFSP with mean(SD) age 38.56(12.1) years, of which 69.8%(44) were males in their 3rd and 4th decade. Most common site was trunk in 41.3%(26). Most common tumor appearance was nodular in O-DFSP i.e. 26(49.1%) and 3(30%) in FS-DFSP group (p=0.03). Most of O-DFSP patients (84.9%) had size <10cm while more FS-DFSP patients (70%) had tumor size >10cm (p= 0.0001). FS-DFSP patients were more prone to develop post-operative complications. Most of the patients of both groups are alive without disease i.e, 60% of FS-DFSP group and 54.7% of O-DFSP group(p=0.05).

Conclusion: Clinical characteristics of O- DFSP are non-specific and variable mimicking benign lesions. Short duration, ulcerated lesion with discharge, enlarged regional lymph nodes, and local recurrence should raise suspicion ofFS-DFSP. Long-term follow-up is strongly recommended.

Received | 01-11-2021: **Accepted** | 29-01-2022

Corresponding Author | Dr. Sobia Manzoor, Senior Registrar, Department of Plastic & Reconstructive Surgery, KEMU/Mayo Hospital, Lahore Pakistan. **Email:** drsobiamanzoor@yahoo.com

Keywords | Dermatofibrosarcoma protuberance, O-DFSP, FS-DFSP, Wide excision, Recurrence, Radiotherapy.

Introduction

Dermatofibrosarcoma protuberans (DFSP) represents relatively rare skin sarcomas constituting 4 % of all skin malignancies.[1] Its variant with fibrosarcomatous transformation, being called fibrosarcomatous dermatofibrosarcoma protuberans (FS-DFSP), is said to have a 10–15 %rate of distant metastasis and poorer prognosis compared with ordinary DFSP (O-DFSP) that does not havefibrosarcomatous transformation.[2] (Figure 1)

DFSP is slow growing tumor affecting both genders of all ages, mostly in adult age (25-50 years) and occur most commonly on the trunk, proximal extremities, and head and neck regions.[3] Clinically, DFSP has variable presentation ranging from painless, skin-colored plaque with probable reddish brown or blue discoloration (similar to benign lesion)which later on becomes protuberant or ulcerated and tend to infiltrate adjacent structures but rarely metastasize. It has high local recurrence rate about 26-60%.[4] Surgical excision with wider margins

is recommended treatment.[5] Adjuvant radiation therapy has traditionally been used to reduce the risk of local recurrence when residual disease remains after surgery, but it has limited role.[6,7]

There is scarcity of studies showing variations in clinical features and treatment outcome of patients with both variants of DFSP in our country. Therefore, the aim of this study was to review the variability in clinical presentation of DFSP, its surgical treatment, complications and outcome, in patients who were treated at Shaukat Khanum Memorial Hospital & Research Center.

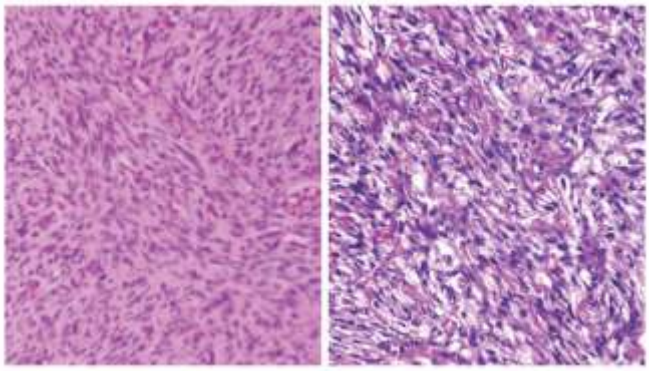


Figure 1: *Histopathology Image of Dermatofibrosarcoma protuberance (DFSP).*

a) *H & E stain showing spindle shaped tumor cells*

b) *Fibrosarcomatous DFSP showing plump spindle cells arranged in fascicles, high nuclear grade and increased number of mitosis/ HPF.*

Methods

After taking exemption from hospital institution review board (EX-14-08-19-01), retrospective review of cases who underwent surgery for DFSP from December 2014 to December 2020. Patients of both genders with age >14 years, having biopsy proven DFSP as primary disease, patients who underwent inadequate surgery for DFSP or recurrent disease were included in study. Patients having inoperable disease or distant metastasis were excluded.

All the patients were initially seen in OPD where history and examination completed and surgery planned. Wider excision with tumor free margins on frozen section done in all patients after taking consent followed by wound closure directly, by grafting or flap.

Data was retrieved from hospital database of Shaukat Khanum Memorial Cancer Hospital and Research Center (SKMCH & RC), Lahore, where study was conducted. Data was collected on standard proforma containing demographics, variability in clinical presentation of DFSP, its surgical treatment, complications and outcome.

Descriptive variables were presented by proportions, mean or median values, and percentage as appropriate by data distribution. Age (14-50 or ⩾ 50 years) and dura-tion of recurrence were dichotomized. In Ordinary and Fibrosarcomatous DFSP patients, categorical variables like age, gender, size of tumor, duration of tumor, Lymph node status, and outcome measures were compared using chi square test. Data of variables like anatomical site, histological subtype, complications and current status were compared by T-test. Statistical analysis was performed using SPSS 21.0 statistical software. Statistical significance was defined as p value <0.05.

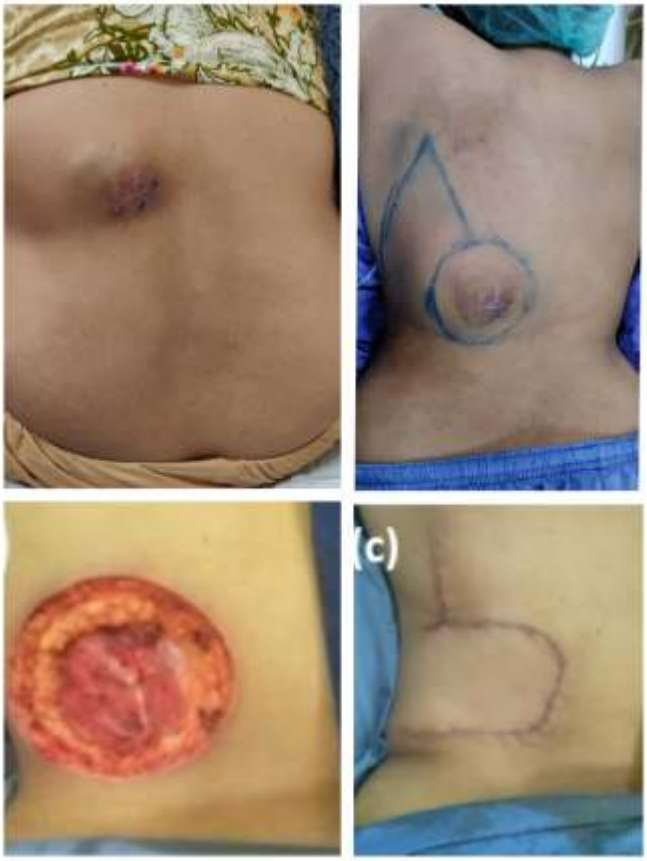


Figure 2: *O-DFSP in 36 years old Female*

a) *DFSP of nodular variety on left side of back*

b) *Marking of 3cm excision margins and rhomboid flap*

c) *Muscle deep defect of 8x7cm*

d) *Rhomboid flap insetting on defect*

Results

A total of 63 patients presented with biopsy proven DFSP and underwent surgery for DFSP from December 2014 to December 2020.Among them, 53 (84.1%) had biopsy proven O-DFSP while 10 (15.9%) had FS-DFSP. Mean follow up period after surgery was 42.3 months (3.5 years) with range of 9.6-78 months (0.8-6.5 years).

The Mean (S.D) age 38.56(12.1) years, of which 69.8% (44) were males.Patients with age 14-50 years were more likely develop DFSP of both varieties i.e, 43 (81.1%) of O-DFSP group and 9 (90%) of FS-DFSP group. The Mean(S.D) size of tumor was 6.56 cm (2.7). Among them, more patients of O-DFSP group had size <10 cm (45 out of 53 i.e, 84.9%) while FS-DFSP group had more tumor size >10 cm (7 out of 10 i.e, 70%) and it was found to be statistically significant (p=0.0001).

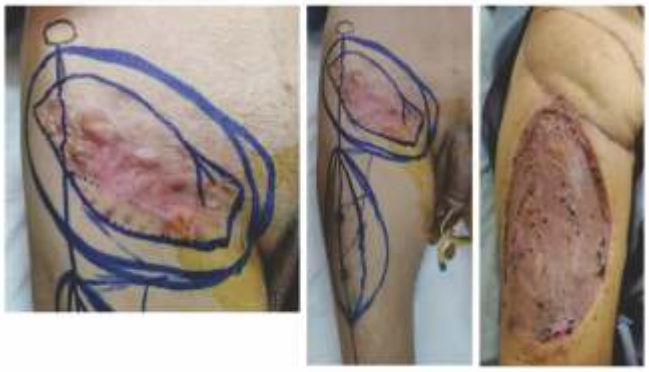


Figure 3: *O-DFSP in 45 years old Male*

a) *DFSP of Indurated nodular variety on Right groin*

b) *Marking of 3cm excision margins and pedicled Anterolateral thigh flap for a defect of 18×10cm defect*

c) *Day 20 post op showing well healed pedicle ALT flap and skin graft*

Table 1: *Main tumor clinical features.*

Patient characteristics	Ordinary DFSP patients (%)	Fibrosarcomatous DFSP patients (%)	*Total (%)*	*P value*
Patient Number	53 (84.1)	10 (15.9)	63 (100)	
Age				
14-50 years (n=52)	43 (81.1)	9 (90)	52 (82.5)	0.5
⩾50 years (n=11)	10 (18.9)	1 (10)	11 (17.4)	
Gender				
Male (n=44)	36 (67.9)	8 (80)	44 (69.8)	0.44
Female (n=19)	17 (32.1)	2 (20)	17 (30.2)	
Anatomical location				
Head and neck (n=2)	1 (1.9)	1 (10)	2 (3.2)	0.46
Trunk (n=26)	21 (39.6)	5 (50)	26 (41.3)	
Upper limb (n=15)	13 (24.5)	2 (20)	15 (23.8)	
Lower limb (n=20)	18 (34)	2 (20)	20 (31.7)	
Clinical data				
Duration of tumor (Months)				
⩽48	40 (75.5)	9 (90)	49 (77.8)	0.31
>48	13 (24.5)	1 (10)	14 (22.2)	
Tumor size				
⩽10 cm	45 (84.9)	3 (30)	48 (76.2)	0.0001
>10 cm	8 (15.1)	7 (70)	15 (23.8)	
Tumor Appearance				
Nodular	26 (49.1)	3 (30)	29 (46.03)	0.03
Cystic Nodule	7 (13.2)	1 (10)	8 (12.7)	
Indurated nodule	3 (5.7)	2 (20)	5 (7.9)	
Diffuse swelling	5 (9.4)	2 (20)	7 (11.1)	
Swelling with atrophoderma	8 (15.1)	1 (10)	9 (14.3)	
Fungating growth	4 (7.5)	1 (10)	5 (7.9)	
Tumor with mobility	33 (62.3)	5 (50)	38 (60.3)	---
Tumor with Ulceratin	18 (34)	7 (70)	25 (39.7)	---
Recurrent tumor	28 (52.8)	4 (40)	32 (50.8)	---
Enlarged regional lymph nodes				
Yes	13 (24.5)	3 (30)	16 (25.4)	
No	40 (75.5)	7 (70)	47 (74.6)	0.71
Adjuvant Radiotherapy	25 (47.2)	10 (100)	35 (55.6)	

Mean (S.D) duration of tumors was 32.95 (24.85). Nodular variety was most common in both groups with 26 (49.1%) of O-DFSP group and 3 (30%) of FS-DFSP group. Their comparison was found to be statistically significant (p=0.03).

Total number of tumors with ulceration and discharge was 39.7% (25). This included 18 out of 53 (34%) patients of O-DFSP group and 7 out of 10 (70%) for FS-DFSP group showing that there are more chances of developing fibrosarcomatous changes in patients having DFSP with ulceration and discharge. Most of the O-DFSP group tumors were mobile i.e, 33 (62.3%) compared to 5 (50%) of FS-DFSP group. Also more of the O-DFSP group tumors were recurrent 28 (52.8%) compared to 4 (40%) of FS-DFSP group tumors.

Trunk was most common site 41.3% (26) and enlarged regional lymph nodes were found in 25.4% (16) of patients. Adjuvant radiotherapy was done in 10 (100%) patients of FS-DFSP group and 47.2% (25) of O-DFSP group patients.(Table 1)

FS-DFSP group patients were more prone to develop complications post-operatively like hypertrophic scar 70% (7), wound healing issues 60% (6), distant metastasis 40% (4) and local tumor recurrence 20% (2) and their comparison with that of O-DFSP group was not statistically significant (p=0.1).

Most of the patients of both groups are alive without disease i.e, 60% (6) of FS-DFSP group and 54.7% (29) of O-DFSP group followed by 19.04% (12) who are alive with disease, 15.9% (10) who lost follow up and 9.52% (6) who died during course of treatment. Outcome comparison was also found to be statistically significant (p=0.05). (Table 2)

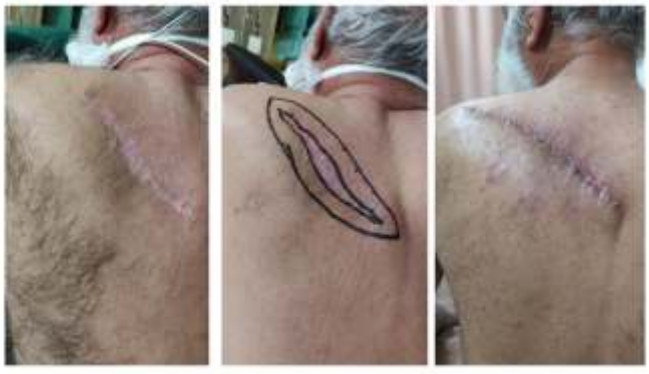


Figure 4: *FS-DFSP in 68 years old Male*

a) *Residual FS-DFSPon Left Scapular region*

b) *Marking of 2cm excision margins followed by direct closure*

c) *Day 22 post op showing well healed scar*

Table 3: *Complications and outcome after surgical treatment.*

Complications				
Wound healing issues	10 (18.9)	6 (60)	16 (25.4)	0.1
Wide & Hypertrophic scar	32 (60.4)	7 (70)	39 (61.9)	
Local recurrence	7 (13.2)	2 (20)	9 (14.3)	
Distant metastasis	6 (11.3)	4 (40)	10 (15.9)	
Outcome				
Alive without disease	29 (54.7)	6 (60)	35 (55.6)	
Alive with disease	11 (20.8)	1 (10)	12 (19.04)	0.05
Death	4 (7.5)	2 (20)	6 (9.52)	
Lost follow up	9 (17)	1 (10)	10 (15.9)	

Discussion

The term of dermatofibrosarcoma protuberance (DFSP) was coined by Hoffmann in 1925.[8] It behaves like benign tumor to start with but in 2-5 % of cases, it can metastasize. A typical feature is its invasion in surrounding tissue by irregular subcutaneous projections which makes it impossible to determine its real boundary on clinical examination. Histologically composed of monomorphic spindle cells with low mitotic index, it tends to infiltrate subcutaneous tissue in honey comb pattern. The diagnosis of DFSP is confirmed by incisional biopsy and it is excised with wide margins (at least 3 cm) to get tumor clearance.

DFSP is a rare entity and even rare is its variety with fibrosarcomatous changes. Many studies show incidence of FS-DFSP to be 5-20%.9 In our study, we found incidence of FS-DFSP to be 15.9%. Du K et al.[10] found that DFSP has a male predominance in their 3rd and 4th decade. Same was observed in our study with both varieties of DFSP being common in males (69.8%),in their 3rd and 4th decade (50.8%).

Patients with DFSP tend to seek treatment late as these tumors are usually painless in start and mimic benign skin lesions.[11] Same was the observation in this study where most of the patients presented after > 2 years of first appearance of tumor. As DFSP is a slow growing tumor, mostly patients of this study had size <10 cm in both groups and about 70% of FS-DFSP had associated ulceration with discharge. Li Y and colleagues 12 found nodular variety as most common type of DFSP. We also observed nodular variety to be most common in both groups with (46.03 %) followed by swelling with atrophoderma (14.3%), Cystic nodule (12.7%), Diffuse swelling (11.1%), Indurated nodule (7.9%) and Fungating growth (7.9%).

Most common anatomical site in our patients of both groups, was found to be Trunk (41.3%) followed by lower limb (31.7%), upper limb (23.8%) and head and neck (3.2%) and it was similar to various studies.[13,14]

As the tumor shows radial growth pattern in subcutaneous plane and due to its asymptomatic features, mostly physician treat them as benign lesion taking close margins and that's why many patients with DFSP show high rate of local recurrence.[15] In this study, 52.8% of the O-DFSP and 40% of FS-DFSP were recurrent tumor with most of them having first recurrence (46.03%) combined.

The overall risk of metastasis to regional lymph nodes or distant organs is reported to be <5%.[16] In this study, one fourth of the cases i.e, 25.4% were observed to have enlarged regional lymph nodes with more cases (30%) in FS-DFSP group as compared to O-DFSP (24.5%). It was in contrast to other studies and was most likely due to delayed presentation.[17,18,19]

None of our patients received treatment with Imatinib Mesylate, a tyrosine kinase inhibitor which works against activated PDGFB and is indicated for recurrent, unresectable or metastatic disease, due to its unavailability at our center. All our patients underwent wide local excision with recommended 2-3cm margins with frozen section.[20] Adjuvant radiotherapy was given to all of FS-DFSP patients and 47.2% of O-DFSP patients.

Almost all the patients with FS-DFSP developed postoperative complications. Wide and hypertrophic scar being most common in both FS-DFSP (70%) and O-DFSP (60.4%). Wound healing issues (wound dehiscence, infection, graft or flap loss) were also common in FS-DFSP (60%) and 18.9% in O-DFSP patients and were managed conservatively. It was comparable to results of various studies.[16] Saiga P et al.[21] found that FS-DFSP has more propensity for developing distant metastasis which is similar to as observed in this study (40% of FS-DFSP and 11.3% of O-DFSP cases). Local recurrence occurred in 20% of FS-DFSP and 13.2% of O-DFSP of our cases with mean time to local recurrence 24 months.

There are certain studies showing guidelines regarding the follow up of DFSP patient suggesting 6 monthly follow up for first 5 years and then annual examination till ten years.[22] In our study, follow up was done for duration of 9.6-78 months (0.8-6.5 years). A total of 55.6% of patients are alive without disease with 60% patients of FS-DFSP group followed by 19.04% still having disease (20.8% of O-DFSP group). The total patients who lost follow up were 15.9% combined and 9.52 % patients died during course of treatment.

Our study has certain strengths and limitations. Main strength of this study is detailed analysis of demographical, clinical characteristics, surgical and follow up data of DFSP with respect to ordinary and fibrosarcomatous changes in patients presenting to our center. The main limitation of our study is that it is a retrospective cohort from a single center leading to more chances of selection bias. Patient number was also small and results were based on relatively short follow up period (6.5 years instead of 10 years) and therefore our study results cannot be generalized.

Conclusion

This is a single center study assessing the clinical features, surgical treatment along with its complications and outcome at 5 year follow up in both varieties of DFSP. The data presented here demonstrate that the clinical characteristics of O- DFSP are non-specific and variable mimicking benign lesions. While FS-DFSP variety is associated with short duration, ulcerated lesion with discharge, enlarged regional lymph nodes, and local recurrence commonly. Any lesion with these clinical features should raise suspicion of aggressive disease. Due to its high local recurrence rate, follow-up for a longer period i.e, at least 10 years, is recommended.

Conflict of Interest *None*

Funding Source *None*

References

1. Hayakawa K , Matsumoto S, Ae K, et al. Risk factors for distant metastasis of dermatofibrosarcoma protuberans. J Orthop Traumatol. 2016 Sep; 17(3): 261–266.
2. Li Y, Liang J, Xu X, Jiang X, Wang C, Chen S, et al. Clinicopathological features of fibrosarcomatous Dermatofibrosarcoma Protuberans and the construction of a back-propagation neural network recognition model. Orphanet J Rare Dis 2021; 16(48): 1-9.
3. Chiang K.T, Lee S.Y, Chu H. Dermatofibrosarcoma protuberans, a rare but locally aggressive tumor on finger: clinical and aeromedical considerations. Case Reports Plast Surg Hand Surg. 2015; 2(1): 15–18.
4. Rasheed AA, Barwad A, Dhamija E, Garg R, Pandey R, Shamim SA, et al, Advanced dermatofibrosarcoma protuberans: an updated analysis of cases from an Indian sarcoma clinic. Future Science OA 2021; 7(9):1-11.
5. Li Y , Wang C, Xiang B, et al. Clinical Features, Pathological Findings and Treatment of Recurrent Dermatofibrosarcoma Protuberans. J Cancer. 2017; 8(7): 1319–1323.
6. Huis In 't Veld EA, van Coevorden F, Grunhagen DJ, Smith MJ, van Akkooi ACJ, Wouters M, et al. Outcome

after surgical treatment of dermatofibrosarcoma protuberans: is clinical follow-up always indicated? Cancer. 2019;125(5):735–41.

7. Hao X, Billings S.D, Wu F, et al. Dermatofibrosarcoma Protuberance: Update on the Diagnosis and Treatment. J Clin Med. 2020 Jun; 9(6): 1752.
8. Ahmad I, Mir MA, Bariar LM, Afroz N. Recurrent Dermatofibrosarcoma Protuberance and its Management with Radical Excision and Interval Skin Grafting: A case Report. World J Plast Surg 2016;5(1):67-71.
9. Stacchiotti S, Astolfi A, Gronchi A, et al. Evolution of Dermatofibrosarcoma Protuberans to DFSP-Derived Fibrosarcoma: An Event Marked by Epithelial-Mesenchymal Transition–like Process and 22q Loss. Mol Cancer Res 2016;14:820-829.
10. Du K, Li J, Tang L, Lin X, Kong X, Liao X, et al. Role of postoperative radiotherapy in dermatofibrosarcoma protuberans: a propensity score-matched analysis. Radiat Oncol. 2019;14(20):1-8.
11. Effiom OA, Olojede ACO, Akinde OR, Olawuyi AB, Amoo AT, Arotiba GT. Dermatofibrosarcoma Protuberans: clinicopathologic presentation in Nigerians. Pan Afr Med J. 2018; 31(25): 1-7.
12. Li Y, Wang C, Xiang B, Chen S, Li L, Ji Y. Clinical Features, Pathological Findings and Treatment of Recurrent Dermatofibrosarcoma Protuberans. J Cancer. 2017 May 12;8(7):1319-1323.
13. Larbcharoensub N, Kayankarnnavee J, Sanpaphant S, et al. Clinicopathological features of dermatofibrosarcoma protuberans. Oncol Lett. 2016 Jan;11(1):661-667.
14. Kashyap L, Noronha V, Patil V, et al. Dermatofibrosarcoma protuberans of head and neck: Clinical outcome of nine cases treated with imatinib. Cancer Res Stat Treat 2019;2(1):112-8.
15. Yadav S, Verma N, Khurana N, Neogi S. Recurrent DermatofibrosarcomaProtuberanswith Pigmentation and Myoid Differentiation. Sultan Qaboos Univ Med J. 2018 May;18(2):e228-e230.
16. Kim BJ, Kim H, Jin US, et al. Wide Local Excision for Dermatofibrosarcoma Protuberans: A Single-Center Series of 90 Patients. Biomed Res Int. 2015; 2015: 642549.
17. Ramirez-Fort MK, Meier-Schiesser B, Niaz MJ, et al. Dermatofibrosarcoma Protuberans: The Current State of Multidisciplinary Management. Skinmed. 2020; 18(5):288-293.
18. Rutkowski P, Debiec-RychterM. Current treatment options for dermatofibrosarcoma protuberans. Expert Rev Anticancer Ther 2015;15(1):901–9.
19. Liang CA, Jambusaria-Pahlajani A, Karia PS, et al. A systematic review of outcome data for dermatofibrosarcoma protuberans with and without fibrosarcomatous change. J Am Acad Dermatol 2014;71(1):781-6.
20. Nardelli AR, Marcarini R, De Franco MFB, et al. Dermatofibrosarcoma protuberans rapid growth after incisional biopsy. Med Cutan Iber Lat Am. 2017;45(1): 41-44.
21. Saiga P, Grob JJ, Lebbe C, et al. Diagnosis and treatment of dermatofibrosarcoma protuberans. European consensus-based interdisciplinary guideline. Eur J Cancer 2015 Nov; 51 (17): 2604-8.
22. Brooks J. Dermatofibrosarcoma protuberans. [Updated 2022January, Cited 2022 March] Available from: [https://www.ncbi.nlm.nih.gov/books/NBK513305]

Research Article

Efficacy of Pulse Dye Laser for Hypertrophic Scars and Keloids

Ijaz Hussain Shah,[1] Muhammad Bilal Saeed,[2] Muhammad Akmal Shah,[3] Naheed Ahmed[4]

[1-4]*Nishtar Medical University and Hospital Multan*

Abstract

Background: Keloids and hypertrophic scars are a common problem encountered by plastic surgeons. Traditional treatments like intralesional steroids, or excision have high recurrence rate and often suboptimal results. Pulse Dye Laser is a relatively newer modality for treatment of such scars, especially if administered within the first 12 months.

Objective: The Objective of this study is to determine the efficacy of pulse dye laser in treatment of hypertrophic scars andkeloids.

Methodology: This descriptive case series was carried out at Pak Italian Modern Burn center, Nishtar Medical University and Hospital Multan. All patients who presented with keloids and hypertrophic scars over a period of one year from 01 April 2020 to 31st March 2021 were included in the study. All patients underwent 3 sessions of PDL therapy. Effectiveness of pulsed dye laser was assessed in terms of vascularity, pigmentation and pliability.

Results: After three sessions of PDL, 32(80%) patients were able to achieve 'normal' vascularity; 38(95%) patients achieved normal pigmentation; and 24(60%) patients were able to have pliable skin.

Conclusion: Pulse dye laser is very effective in treatment of keloids and hypertrophic scaring. Its noninvasive, and easily tolerable especially in children with negligible adverse effects.

Received | 27-01-2022: **Accepted** | 24-02-2022

Corresponding Author | Associate Professor Department of Plastic Surgery, Nishtar Medical University and Hospital Multan

Email: drijazshah@gmail.com

Keywords | pulse dye laser, keloids, hypertrophic scar

Introduction

Due to complex physiological cascade of wound healing, there is always scar formation following any injury to the deep dermis. These physiological events can be grouped under distinct phases of inflammation, proliferation, and remodeling.[1,2,3,4] In normal wound healing the inflammatory and proliferative phases last about 2 weeks, and are characterized by the formation of granulation tissue. At this time, contraction of wound is initiated by myofibroblasts. Once wound closure is achieved, remodeling phase begins, in which there is gradual degradation of extracellular matrix. The balance between collagen synthesis and breakdown/lysis results in the formation of a normal scar.

Proliferative scar formation describes a series of events that result in overhealing due to a disbalance in the above-mentioned equilibrium. The two types of proliferative scars are hypertrophic scars and keloids. Besides the obvioouos aesthetic concerns, such scars are often associated with functional problems like pain, pruritis and limitation of movement.

Traditional treatments like surgical excision, corticosteroid injections and continuous laser destruction have mixed results in treating keloids and hypertrophic scars with reports of high recurrence rates. Also, in children, general anesthesia is often required for most of these procedures.

The difficulty to assess the efficacy of existing treatment modalities is due to the limited numbers of controlled, comparative studies of the effectiveness of available treatment options in improving the appearance and/or

symptoms of hypertrophic scars especially for new scars of less than 12 months' duration.

In the past several years, the pulse dyed laser has been successfully used in treatment of such scars, with promising resluts.[5] Some of its advantages include ease of use, patient comfort, and avoidance of anesthesia in the pediatric population.[6]

A study by Cannarozzo G, et al. has showed the efficacy of pulse dye laser to be 49.1% in treatment of keloids scars.[7]

In another study, Chan HH, et al. have reported the efficacy of pulse dye laser to be 66% in treatment of hypertrophic scars.[8]

Most previous studies investigated the use of lasers in patients with lighter skin types[7,8] whereas, the use of lasers for treatment of hypertrophic and keloids scars in dark skinned patients like our local population is not well established. The rationale of this study is to determine the efficacy of pulse dye laser in treatment of keloids and hypertrophic scars in darker skin types of Pakistani population,

Methodology

This descriptive case series was carried out at Pak Italian Modern Burn centre, Nishtar University and hospital. All patient presenting with keloids and hypertrophic scars during a one-year period from 1st April 2020 till 31st March 2021 were included in the study. Exclusion criteria were scars present for more than 12 months duration, and any condition preventing the patient form sitting still during the session.

Demographic data (such as age and gender), type of scar (hypertrophic vs keloid), and duration of scar were noted pre-operatively and recorded on a proforma.

Scar characteristics of vascularity, pigmentation, and pliability were assessed by a single person pre-treatment and recorded, as follows:

Vascularity:

normal-pink-red-purple

Pigmentation:

hypopigmented-normal-hyperpigmented

Pliability:

normal-supple-yeilding-firm-bending

Standard laser safety measures were undertaken and an occlusive dressing with Lidocaine/prilocaine cream was applied for about an hour before session. All patients underwent treatment with Flash lamp pulsed dye laser (585nm, Candela, SPTL-1 b Laser System, USA), at a fluence of 5-7 J/cm^2. Pulse duration of 450µsec and spot sizes of 5 and 7mm, were used. Treatment was carried out with pulses overlapping of up to 10%. After treatment, antibiotic and sun protection cream were given and patients were advised to avoid sun exposure. Treatment was repeated at 4 week intervals for three months. Scar was reassessed at 1-month intervals for the same three characteristics of vascularity, pigmentation and pliability. Pre and post-treatment scar chararcteristics were compared individually within the patient population

Results

After 3 months of treatment, 32(80%) patients showed excellent results in terms of 'normal' vascularity, as opposed to none of the patients being in the 'normal' category pre-operatively. 4(10%) patients had pink coloration, 2(5%) patientshad red coloration, while in 2(5%) patients, the scar remained purple. Details are shown in bar graph in Figure 1. Figure 2 shows pre and post-operative pictures of a representative patient.

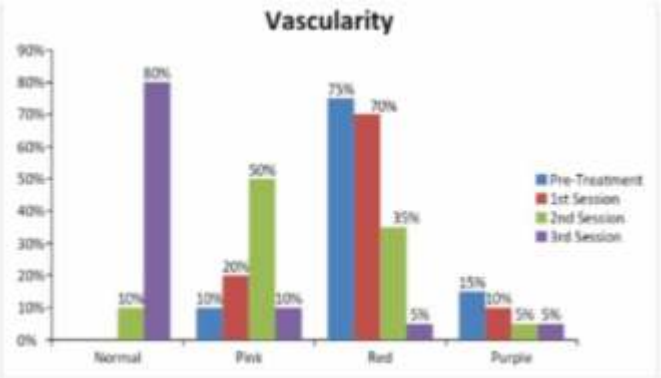


Figure 1: *Cases in term of vascularity pretreatment and during 1,2 & 3month intervals*

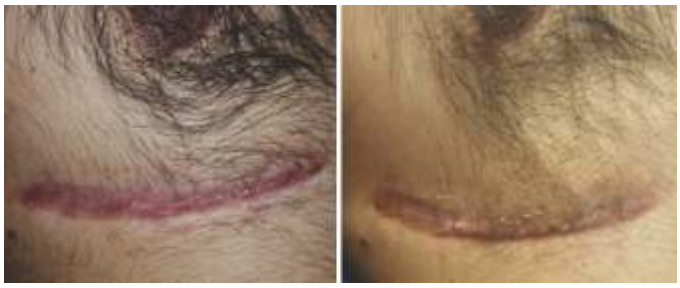


Figure 2: *(a) pre-operative and (b) post-operative pictures showing improvement in vascularity*

With respect to pigmentation, 38(95%) patients had normal color post-treatment, as opposed to 34(85%). The details are depicted in Table 1, and figure 3 shows

pre-and post-op pictures of a representative case.

Table 1: *Cases in term of Pigmentation Results at1, 2 & 3month Intervals*

	Pigmentation		
	Hypo-pigmentation	Normal	Hyper-pigmentation
Pre Treatment	0	34	6
1st Session	0	36	4
2nd Session	0	38	2
3rd Session	0	38	2

Scar firmness and lack of pliability was most challenging to treat. In our study, 24(60%) patients had 'supple' skin after treatment, versus none before treatment.[6] (15%) patients still has firm and unyielding skin even after 3 sessions of PDL treatment. Table 2 describes the details of skin pliability.

Discussion

Keloid and hypertrophic scars are difficult conditions to treat, especially in the case of children. Different treatment modalities are available, but they are often painful and time consuming. Recurrence rates are also quite high for these lesions Sometimes due to these reasons, compliance is very poor.

For past several years, treatment of hypertrophic scars and keloids with lasers, specifically PDL laser, has shown promising results.

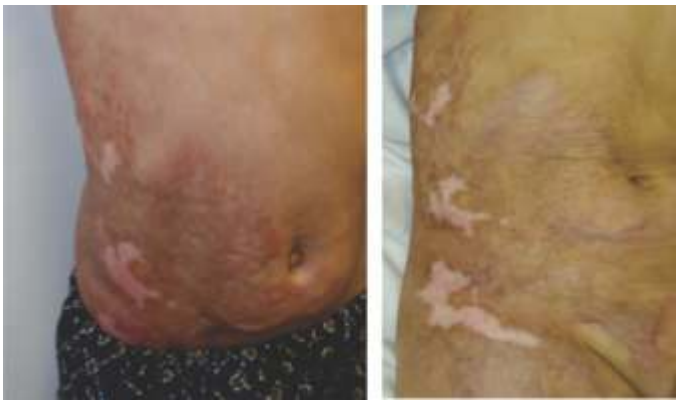


Figure 3: *(a) pre-op and (b) post-operative appearance of scar pigmentation*

Table 2: *Skin pliability*

	Pliability				
	Normal	**Supple**	**Yielding**	**Firm**	**Bending**
Pre Treatment	0	0	4	36	0
1st Session	0	2	10	28	0
2nd Session	0	16	12	8	0
3rd Session	0	24	10	6	0

It is thought that the improvement in hypertrophic scars and keloids with the use of pulse dye laser is due to hypoxemia generated by destruction of capillaries by PDL, which in turn increases local collagen production.[9] Some studies in past have reported that with PDL there is decrease in expression of transforming growth factor beta-1, which stimulates the production of matrix metalloproteinases including collagenase.[10] According to Alster and colleagues, up to six sessions may be needed for noticeable improvement in scar color, height, texture and pliability.This study reported few side effects like erythema and purpura, which settled in a week or two.[2] In 2017 Annabathula et al.[13] found that 8(73%) out of 11 lesions showed improvement in size and erythema/color of keloids with PDL therapy.

Keeping in mind the favorable safety profile of the 595 wavelength PDL, and the satisfactory outcomes reported in the above-mentioned studies, we opted to choose this laser for our study. Also, for Asian skin type, a laser having longer wavelength and low absorption are better[11,12]. Larger sizespot (10 mm) can enhance the deeper penetration and therefore could be better than a smaller size spot (5 mm or 7 mm).

With our study we were able to get good results with 90% patients having excellent and good response in vascularity. In our study, we noticed that firmness and a non-yielding nature are hallmarks of hypertrophic scars and keloids and are somewhat difficult to treat, with only 24(60%) patients being able to achieve supple skin.

One limitation of the study is that we looked at collective outcomes and did not compare and score the pre and postoperative scars of each patient individually. Also we did not compare subgroups of keloids versus hypertrophic scars.

Conclusion

Pulse dye laser is a good alternative to treat hypertrophic scars and keloids. It is painless, therefore it is a very useful modality in children. Side effects are negligible and self-limiting.

Conflict of Interest *None*

Funding Source *None*

References

1. desJardins-Park HE, Mascharak S, Chinta MS, Wan DC, Longaker MT. The spectrum of scarring in craniofacial wound repair. Frontiers in physiology. 2019;10:322.

2. Gauglitz GGJC, cosmetic, dermatology i. Management of keloids and hypertrophic scars: current and emerging options. 2013;6:103.
3. Arango Duque G, Descoteaux AJFii. Macrophage cytokines: involvement in immunity and infectious diseases. 2014;5:491.
4. Brown BN, Badylak SFJTR. Extracellular matrix as an inductive scaffold for functional tissue reconstruction. 2014;163(4):268-85.
5. Yun SH, Kwok SJ. Light in diagnosis, therapy and surgery. Nature biomedical engineering. 2017; 1(1): 1-16.
6. Mamalis A, Lev-Tov H, Nguyen DH, Jagdeo JJJotEAoD, Venereology. Laser and light-based treatment of Keloids-a review. 2014;28(6):689-99.
7. Cannarozzo G, Sannino M, Tamburi F, Morini C, Nisticò SP. Flash-lamp pulsed-dye laser treatment of keloids: results of an observational study. Photomedicine and laser surgery. 2015;33(5):274-7.
8. Chan HH, Wong DS, Ho W, Lam L, Wei WJDs. The use of pulsed dye laser for the prevention and treatment of hypertrophic scars in Chinese persons. 2004; 30(7): 987-94.
9. Pongcharoen P, Pongcharoen B, Disphanurat W. The effectiveness of a 595 nm pulsed-dye-laser in the treatment of surgical scars following a knee arthroplasty. Journal of Cosmetic and Laser Therapy. 2019; 21(6): 352-6.
10. Kuo YR, Jeng SF, Wang FS, Chen TH, Huang HC, Chang PR, et al. Flashlamp pulsed dye laser (PDL) suppression of keloid proliferation through down-regulation of TGF-β1 expression and extracellular matrix expression. 2004;34(2):104-8.
11. Kono T, Erçöçen AR, Nakazawa H, Honda T, Hayashi N, Nozaki MJAops. The flashlamp-pumped pulsed dye laser (585 nm) treatment of hypertrophic scars in Asians. 2003;51(4):366-71.
12. Kono T, Erçöçen AR, Nakazawa H, Nozaki MJAops. Treatment of hypertrophic scars using a long-pulsed dye laser with cryogen-spray cooling. 2005; 54(5): 487-93.
13. Annabathula A, Sekar CS, Srinivas CR. Fractional Carbon Dioxide, Long Pulse Nd:YAG and Pulsed Dye Laser in the Management of Keloids. J Cutan Aesthet Surg. 2017 Apr-Jun;10(2):76-80

Research Article

Fodder Machine Scalp Avulsion in Females: An Unintentional, Preventable Injury

Farhat ul Ann Tayyaba,[1] Abdul Munaf Saud,[2] Zahid Tayyab,[3] Javeria Mahmood,[4] Saliha Zafer,[5] Akusha Amber,[6]

[1,2,4,5,6]Quid e Azam Medical college Bahawalpur,[3] Mayo Hospital, Lahore

Introduction: Mortality and morbidity caused by agriculture related injuries are more common as compared to other occupational injuries. These preventable injuries are on a rise due to increased availability of high power equipment. This is a great concern in a country like Pakistan, where up to 40% of taskforce is involved in agriculture related activities.

Objectives: The objective of this study is to see spectrum of scalp trauma due to agricultural injury.

Methodology: This retrospective study was carried out at department of plastic surgery, Quaid-e-Azam medical college, Bahawalpur. 43 patients were referred from neurosurgery, orthopedic surgery and general surgery wards, 5 females were directly presented to plastic surgery ward. All selected patients were divided into 3 groups according to severity of scalp injuries they received, and were managed accordingly. Patients were further evaluated on follow -up visits.

Results:A total of 48 patientswere included in the study of these five patients presented directly to plastic surgery OPD, whereas the remaining 43 were referred from other departments. In patients included in group A & B the average duration of stay was 60 days whereas in patients of group C this stay increased to 3 to 4 months. All the patients were successfully treated and discharged home after completing their sessions.

Conclusion: Scalp injuries in our rural settings could be avoided by improving community education. Such injuries are economic burden not only on poor patients but also on healthcare system.

Received | 31-01-2022: **Accepted** | 27-02-2022

Corresponding Author | Zahid Tayyab Senior Registrar Mayo Hospital, Lahore

Email: zahidtayab@gmail.com

Keywords | scalp injuries, community education, law making.

Introduction

In Pakistan almost 40% of workforce is involved in agriculture related activities. Estimated mortality caused by agricultural injuries is five times as compared to other occupational injuries.[1]Such preventable injuries are rapidly increasing due to easy availability of high-power assisted motors without a formal education regarding their use, especially in rural population. Fodder cutter (tokka machine) is used commonly in our rural areas for cutting straw, hay and corn fodder into small digestible pieces for their livestock. When these power-assisted machines are used without proper education, they cause severe injuries that are preventable.[2]

Other factors that increase morbidity and mortality in patients with these injuries include poorly built infrastructure, limited pre hospital and primary hospital care, underdeveloped transport system, and lack of triage activities in tertiary care hospital[3]. In our area of southern Punjab this public health issue is often neglected which leads to significant mortality and permanent disability of work force.

In this study we describe demographic features with mode and pattern of scalp injuries in female population caused by agricultural trauma and burden of these injuries on health care system and on families. We also tried to assess how these injuries affect a victim's life. As education of workforce is most neglected component in our area we have tried to come up with practical solutions to minimize these preventable injuries. This will, in turn, reduce the financial burden of such injuries on healthcare delivery system.

Methodology

Clinical setting

This retrospective study was carried out at Bahawal Victoria Hospital over a duration of 5 years from Januray 2016 to December 2020. All the female patients, of all age groups, who presented to plastic surgery department with scalp injury due to agricultural trauma were included in the study. Patients with concomitant serious injuries to other parts of the body (such as chest/abdominal wall or limbs) were excluded.

The catchment area of our hospital includes rural areas of all districts of Bahawalpur division and most of districts of Multan division. We took basic demographic information along with mechanism of injury. Moreover, information regarding previous treatment received in different referral departments were taken.

Based on the injury patterns, the patients were divided into3 groups A - total scalp avulsion from supraorbital ridge of frontal bone to nape of neck

B - partial scalp avulsion

C - exposed skull bone at the time of presentation

Results

A total of 48 patients with scalp avulsion injury were included in our study. Age range was 15 to 45 years, with the mean age being 20 years.

Out of 48 patients, 43 were injured by power-assisted fodder cutters, whereas 5 were injured by tube-well belts. The mechanism of injury was always that loose fitted clothes, dupattas or hair got tangled in unshielded rotating shaft of fodder machine, or belts of tube well machines.

Avulsion plane was sub-galeal in 32 patients, which is the plan of least resistance. In 16 patients, it was sub-periosteal, exposing the scalp bone. The overall mean hospital stay was 4 months.

There were 18 patients in group A, having total scalp avulsion. 4 of these patients had concomitant ear avulsions; 14 patients in group B with partial scalp avulsion; and 16 in group C having exposed skull bone at presentation

Details of Operative procedures performed

Group A:

4 patients reached within 6 hours of warm ischemia time. In these patients scalp replantation in emergency theatre was done after optimizing patient. In all patients replantation failed. The dead scalp skin was debrided after 48 hours and wound subsequently prepared by repeated saline soaked dressings and grafted once ready. Remaining 14 patients wound washed and saline soaked foam dressing was doneuntil wound was ready for grafting, and subsequently STSG was done. The mean hospital stay of this group was 45 to 60 days.

Graft uptake per session was70 to 90 percent with average loss of 10 percent.

Group B:

In 7 patients of group B where some part of bone was also exposed we performed transposition flap. In remaining 7 patients STSG was done.

Group C:

The remaining 16 patients of scalp avulsion in which scalp bone is exposed we did burr hole at 1st stage. Patient was then sent home with advice of wound dressing with heparin saline solution with constitution of 1;1000 on daily basis. Patients were advised to visit every 15 days to see granulation tissue formation. Once granulation tissue was formed effectively covering whole of scalp bone then we did skingrafting for wound coverage

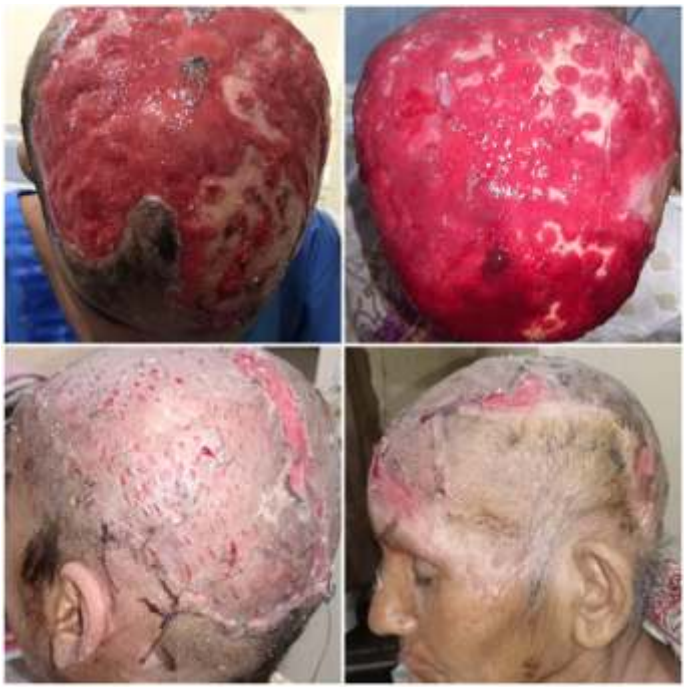


Figure 1: patient with almost complete scalp avulsion injury.

a: wound partially covered with granulation, b: almost completely covered with granulation, c: 7 days after grafting, d: 1 month after grafting

At 3 month follow-up, 12 of these patients who received grafts on granulation tissue presented with unstable scars that disrupt on minor trauma resulting in ulcer formation. These ulcerations were

treated conservatively with simple wound care.

Main long term complication of all these patients was scalp alopecia. Four patients who presented with concomitant ear avulsion presented with meatal stenosis as late complication. This stenosis was treated by opening and removing of scar tissue and application of skin graft with placement of stent for a long period of 3 months.

Discussion

The use of motor assisted devices is becoming more common in the agricultural world. These power-assisted devices not only decrease manual power but also shorten time required for performance of different agricultural tasks.

In Pakistan one third of agricultural workforce is provided by females who routinely use power assisted fodder cutter machines for preparation of food for the livestock. These females using these power-assisted devices are unfortunately uneducated. More over there is no designed system to educate end users of these machines.

Different studies assessing demography of agricultural injuries showed male dominance followed by female and children.[4] but we assessed risk and morbidity of only female population in our rural area of southern Punjab. It is a cultural norm that more than one third of agricultural tasks are provided by females specially taking care of livestock.

Some studies of other countries showed distribution of such injuries in different parts of body, and stated that hand and upper extremities are most commonly involved by agricultural trauma[5]. There are very few studies in the literature about scalp trauma with agricultural injuries. According to those studies, scalp injury is a very rare injury in agricultural trauma. However, in our study, the incidence of scalp injury was about 10 to 12 cases per year. The main cause of this high incidence in our study is that the end users of these machines are commonly females in our rural area who are illiterate and they are not given education about safety measures of these power assisted devices. Secondly, traditional clothing of our rural area is loose-fitted clothes which they wear in everyday life as well as while handling these machines. Also there is a tradition in our rural areas that these females use paranda (long head ribbon) to braid their hair and sometimes these paranda or dupatta gets tangled in open shaft of machines. Entanglement in these high power machines causes high power traction injury leading to avulsion of scalp mostly in sub galial plane (which is more prone to avulsion). As these machines are not well designed and most moving parts are unshielded there are high chances of entanglement of parandas and dupattas. Studies conducted in Saskatchewan discussed briefly role of different safety measures that should be used to prevent these entanglement. [6-7]We also noted that mild change in manufacturing of these machines decrease chances of such devastating injuries.[8]

We offered scalp replants in 4 of group A patients with total scalp avulsion. All of these failed within 24 hours. Main cause of these failures is that the people in our areas are not educated about how to properly transport the amputated parts. Moreover, even health care providers in rural health centers are also not educated for preservation of body parts for their better survival. Secondly, the poor infrastructure of health care delivery system delays proper and timely referral of these patients to save the golden time of ischemia.

Thirdly, the mechanism of injury is so cruel that high force avulsion trauma causes very extensive intimal damage in recipient vessels and evident ribbons sign that after few hours of patent successful anastomosis there developed thrombosis that leads to transplant failure within 48 hours. But studies conducted in china and India showed good results of replantation but these are case reports with 2 to 3 cases[9-11].

In-group B in 5 patients we immediately took graft from avulsed scalp and placed it over the defect. Hospital stay of these patients was very less ranging from 20 to 25 days.

Patients with exposed bones got very prolonged treatment where we performed burr hole at first stage then waited for 3 to 4 months and then did grafting in 3 to 4 stages.

While assessing the economic burden of these patients on their families and on health care delivery system we were shocked that these preventable injuries cause great burden. The prolonged hospital stay and multiple surgical procedures not only make these patients psychologically ill and depressed, it also collapses their home economy. It also create very large burden on health care delivery system.

We would like to stress that this neglected preventable injury should be considered important at government level.There should be strict check on proper ergonomics of these power assisted machines with proper coverage of their shafts. By using emergency brakes, flash sensor, and automatic switching devices, safety of these machines can be enhanced.

Government should structure a program by involving local health care providers to educate these illiterate

people regarding safety measures. Companies on social media and FM radio should design to educate these people. Logistics of proper dress wearing and head caps while operating these devices should be made and applied.

More over,development of proper infrastructure for quick and easy referral of these patients to respected health care providers will result in good outcome in minimal period of time.

Conclusion

Scalp avulsion injuries are very devastating for females of rural area, which causes great burden not only on families but also on whole of health care delivery system. There is a dire need of a better transportation and referral system to designated tertiary health-care facilities. Also creating awareness on prevention may lead to a lower incidence of such injuries

Conflict of Interest *None*

Funding Source *None*

References

1. Yaffe MA, Kaplan FT. Agricultural injuries to the hand and upper extremity. J Am AcadOrthopSurg 2014;22:605-13.
2. Ch NA, Azeem M, Iqbal MZ, Ch AA. Fodder Cutter Amputations-Evaluation of Risk Factors. J Pak Med Assoc 2016;28:46-9.
3. Danish Ali, Muhammad Adeelkaiser, Muhammad Imran khokhar, Anwer Zeb, Hassan Zaheer& Muhammad Farooq Afzal (2020). Fodder cutter (Tokka) injuries; a preventable morbidity. *Journal of the Pakistan Medical Association* 1-9.
4. Ch NA, Azeem M, Iqbal MZ, Ch AA. Fodder Cutter Amputations-Evaluation of Risk Factors. J Pak Med Assoc 2016;28:46-9.
5. Jawa RS, Young DH, Stothert JC, Yetter D, Dumond R, Shostrom VK, et al. Farm machinery injuries: the 15-year experience at an urban joint trauma center system in a rural state. J Agromedicine 2013;18:98-106. doi: 10.1080/1059924X.2013.76614
6. Pickett W, Day L, Hagel LM, et al. The Saskatchewan farm injury cohort: rationale and methodology. Public Health Rep. 2008;123:567–575
7. Pickett W, Hagel L, Dosman JA. Safety features on agricultural machines and farm structures in Saskatchewan. J Agromedicine 2012;17:421-4.
8. Ahmed SA, Shafi A, Khan MA, Javid MN. Farm Machinery Accidents Due to use of Poor Engineering Approach. NFC IEFR Journal of Engineering and Scientific Research 2014;2:67-79.
9. Raja SS, Bharathi VH, Ravindra R, etal.Technical considerations in replantation of total scalp avulsions. J Plast Reconstruct AesthetSurg 2006;59:2–10
10. Singh, K. and Aggarwal, K., 2020. Total Scalp Replantation after Traumatic Avulsion. *Indian Journal of Plastic Surgery*, 53(02), pp.311-312.
11. Jiang Z, Li S, Cao W. Emergency management of traumatic total scalp avulsion with microsurgical replantation. Turkish Journal of Trauma and Emergency Surgery. 2014;20(1):66-70.

Editorial

Prof. M. Mustehsan Bashir,[1] Dr. Saadia Nosheen Jan[2]

[1]Professor of Plastic Surgery, King Edward Medical University/ Mayo Hospital, Lahore, [2]Associate Professor, Service Hospital, Lahore

Creativity is integral to man's evolution for survival. From the idea of using chopsticks to pick up food to the masterpieces in a museum, creativity is inherent to man. Creativity is simply to let imaginations roam unfettered, to dwell on the hitherto unheard of and unthought of and to imagine the impossible as possible. The mind is a very powerful creation. If it believes in something with sufficient conviction for a sufficient period, it actually makes it happen. Nevertheless, what is allegedly embedded in our DNAs (1) needs a propitious milieu to foster and fester.

Plastic Surgery and creativity are analogous. Creativity, especially in plastic surgery does not require experience or tutelage. I've heard first year residents provide uncanny suggestions to improve on surgical results. An instant bond of admiration and mutual respect ensues, that nurtures further learning and creativity on both ends. Unfortunately, like creativity is innate to mankind, ego is notoriously immanent to surgeons. Snubbing attitudes and scathing remarks to residents who dare suggest a deviation or ask a "silly" question are not uncommon in our culture, embedding fear and vacillation as by-products of training, like confounders in a scientific study. In reality, no question is silly, and no answer is stupid. We should avoid our primal urge to humiliate to feel powerful that evokes such ignominy and ignobility in a noble profession.

Sorrow begets creativity in poets not in surgeons. In surgeons it only begets stress that suppresses any burgeoning creative proclivities (2, 3). It cannot be denied that feedback and self-critique is vital for perpetuating ingenuity and to discourage complacence. However, it is almost always easy to tell the difference between healthy critique and irascible scorn from a mentor.Let us as Plastic Surgery consultants provide a stress free, friendly and healthy environment conducive to extracting Michelangelos and Picassos out of dilettantes.

References

1. Weisberg RW. Creativity: Understanding innovation in problem solving, science, invention, and the arts: John Wiley & Sons; 2006.
2. Kassymova GK, Tokar OV, Tashcheva AI, Slepukhina GV, Gridneva SV, Bazhenova NG, et al. Impact of stress on creative human resources and psychological counseling in crises. International journal of education and information technologies. 2019;13(1):26-32.
3. Brown R, Dunn S, Byrnes K, Morris R, Heinrich P, Shaw J. Doctors' stress responses and poor communication performance in simulated bad-news consultations. Academic Medicine. 2009;84(11):1595-602.

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

requested with respect to their contributions accepted by the journal.

Material printed in this journal being the copyright of the PAKISTAN JOURNAL OF PLASTIC SURGERY, may not be reproduced without the permission of the editors or publisher. Instructions to authors appear on the last page of each issue. Prospective authors should consult these before submitting their articles and other material for publication. The PAKISTAN JOURNAL OF PLASTIC SURGERY accepts only original material for publication with the understanding that except for abstracts, no part of the data has been published or will be submitted for publication elsewhere before appearing in this journal. The Editorial Board makes every effort to ensure the accuracy and authenticity of material printed in the journal. However, conclusions and statements expressed are views of the authors and do not necessarily reflect the opinions of the Editorial Board of PJPS. Publishing of advertising material does not imply an endorsement by the PJPS.

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.