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Epidemiology and Factors Related to Mortality in Patients Managed in the Adult Burn Unit at Mayo Hospital, Lahore: A Retrospective Review

Saqib Saleem, Hussan Birkhez Shami, Mehvish Aamer, Ijaz Ashraf, Hamid Hussain Ansari, Saadia Nosheen Jan, Muhammad Sohail, Muhammad Mustehsan Bashir

ABSTRACT

Objective/Purpose: To study the epidemiology and factors related to mortality in patients managed at the adult burn unit at Mayo Hospital, Lahore.

Patient and Methods: This retrospective review was conducted at the adult burn unit, between September 2013 and August 2017. Records of all hospitalized acute burn patients were included, while incomplete records were excluded. The patient's demographics, burn injury detail and outcomes were obtained from the records and entered in the Data collection form. Results were analyzed using SPSS v 16.

Results: A total of 514 adult acute burn patients were admitted, while complete data was available for 468 patients. Mean age was 28.56 yrs. (± 11.53) (11-75). They were mostly males (284 (60.7%)). The mean Percentage of burn calculated in these patients was 25.74% ($\pm 15.53\%$) (2%-95%). Most of the burns were of mixed thickness variety 377(80.6%). flame burn 303(64.7%) was the most common cause of burn followed by 68 (14.5%) scald and 66(14.1%) electrical. Medicolegal causes included mostly 428 (91.5%) accidental burns. The incident occurred most frequently at 332 (70.9%) homes. The duration of stay in hospital was 17.63 days (± 16.65) (1-111 days). 322 (68.8%) patients were discharged and 104 (24.41%) patients expired. 42 (9%) left against medical advice and their data was not used for outcomes analysis. Analysis of variables in relation to burn outcomes illustrated a statistically significant difference in patients age, percentage of burn, modified Baux score, length of stay, medicolegal causes, presence of inhalation injury and presence of comorbidity between the discharged and expired groups ($p < 0.05$).

Conclusion: Burn causes both death and deformity, and is a major problem in our part of the world. Despite this, improving both prevention and management can greatly reduce burden and outcome of this injury.

Key words: Burns, epidemiology, demographics, trends, causes, outcomes, mortality

Introduction

Without a doubt, burn is a devastating injury

*Department of Plastic Surgery
King Edward Medical University, Lahore.
Corresponding author: Hussan Birkhez
Email: hussanbirkhezshami@gmail.com*

afflicting both physical and psychological trauma. Causes include thermal, chemical, electrical etc.⁽⁰¹⁾

Every year approximately 265,000 lives are lost due to burns the world over. This loss of

life is not the only problem, hundreds and thousands more suffer from the scars of the body and mind every year decreasing their quality of life.⁽⁰²⁾

Mostly the underdeveloped and developing countries contribute the majority share of burn injuries.⁽⁰³⁾ As developed countries make progress in the field of burn prevention their share is decreasing day by day.⁽⁰⁴⁾ Whereas old burn centers are closing in countries like the USA, new burn centers have recently sprung up in Pakistan.

This has been due to both rising number of burn patients and the increasing media attention to this entity. In spite of this, Pakistan like other underdeveloped and developing countries lack adequate local policing and has been unable to develop proper protocols. While studies are available from some local hospitals, continued research is required to improve burn care in the country.⁽⁰⁵⁾

Rationale of this study is that burns is a challenging subject that warrants continuous research to gather local data, demographics and an ongoing study of the current patterns and outcomes. Moreover, due to recent establishment of burn centers in Pakistan more local data needs to be generated in this regard to improve our working. This retrospective review will help further our understanding of the local patterns and help in improving burn policing and management.

Patient and Methods

This retrospective review was conducted at the adult burn unit, Mayo hospital, Lahore between September 2013 and August 2017. Records of all hospitalized acute burn

patients were included, while incomplete records were excluded. The patient's age, gender, comorbidities, type of burn, percentage area of burn, depth of burn, place of the incident, anatomical site, inhalational injuries, number of surgeries, duration of stay, outcome and modified Baux score were recorded in a predetermined questionnaire. Demographics, burn injury detail and outcomes were obtained from the records and entered in the Data collection form. Results were analyzed using SPSS v 16.

Burn injury was defined as an injury to the skin or any tissue or organ primarily caused by heat or due to radiation, radioactivity, electricity, friction or contact with chemicals.⁽⁰⁶⁾ The three patient outcomes were discharged after treatment, dead or left against medical advice. Area of burn was calculated using the rule of nine.⁽⁰⁵⁾

Results were analyzed using SPSS v 16. Quantitative variables including age, percentage of burn, number of surgeries, duration of stay and modified Baux score were presented as mean, +/- standard deviation. Qualitative variables including gender, co-morbidities, type of burn, depth of burn, place of the incident, anatomical site, inhalational injury, and outcome of burn were expressed as frequencies and percentages. Chi-square test was used to analyze the qualitative variables, whereas T test was employed for the same for quantitative variables in relation to burn outcomes. P values ≤ 0.05 was taken as significant.

Results

A total of 514 adult acute burn patients were admitted, while complete data was available

for 468 patients. They were mostly males (284 (60.7%)). The mean Percentage of burn calculated in these patients was 25.74% ($\pm 15.53\%$) (2%- 95%). 34 (7.3%) suffered from comorbid conditions. Three hundred and eighty six 386(82.5%) patients underwent surgery.

The patients age, burn area, number of surgeries, modified Bauxscore, length of stay in hospital, depth of burn, type of burn, medicolegal causes, place of burn, number of occupational burns, presence of inhalational injury are demonstrated (Table 1).

Although the most common region involved was found to be the upper extremity, face was the most commonly injured anatomical sub-region. Complete detail is presented (Table 2).

322 (68.8%) patients were discharged, 104 (24.41%) patients expired, while 42 (9%) left against medical advice. The data of patients who left against medical advice was not used for outcomes analysis. The sub analysis

for the area of burn showed that the percentage of mortality rose rapidly from 16.51% to 50% as the area increased from 21-30 to 31-40 % group. This further increased to 66.67% in 41-50 %age group, while beyond that it reached 100% (Table 3/Figure 1)

The sub analysis for the age groups showed that 100% mortality was noted in elderly above 60 years of age. A peculiar finding was that females achieved a mortality of 52.38% in the 31-40yr group as opposed to 22.92% in males for the same age group. The opposite was true for the 41-50 year age group where the number almost halved to 21.43% for women, while it doubled for men to 40%. (Table 4)

Analysis of variables in relation to burn outcomes illustrated a statistically significant difference in patients age, percentage of burn, modified Bauxscore, length of stay, medicolegal causes, presence of inhalation injury and presence of comorbidity between the discharged and expired groups($p < 0.05$). (Table 5,6)

Table 1: Detailed burn injury demographics (Mt = Mixed thickness burn, Dpt = Deep partial thickness burn, Ft = Full thickness burn)

		Total	Male	Female
Age in years		28.56(11.53)11-75	29.47(11.64)	27.16(11.25)
Percentage of burn		25.75(15.53) 2-95	26.52(16.55)	24.52(13.76)
No of surgeries		1.25(.81)1-4	1.31(.85)	1.17(.75)
modified Bauxscore		56.11(22.54)19-164	57.73(23.82)	53.62(20.19)
Length of stay in days		17.61(16.64) 0-111	17.37(16.72)	17.99(16.56)
Depth	Mt	377(80.6%)	225	152
	Dpt	67(14.3%)	40	27
	Ft	24(5.1%)	19	5
Type	Flame	303(64.74%)	173	130
	Scald	68(14.53)	30	38
	Electrical	66(14.10)	58	8

	Chemical	23(4.91%)	16	7
	Flash	8(1.71%)	7	1
Medicolegal causes	Accidental	428(91.45%)	266	162
	Homicidal	28(5.98%)	11	17
	Suicidal	12(2.56%)	7	5
Place of burn	Home	332	158	174
	Factory	54	53	1
	Workplace	50	48	2
	Shop	16	15	1
	Vehicle	15	9	6
	Jail	1	1	0
Occupational burns		118	114	4
Inhalational injury		50(10.7%)	29	21

Table 2: Detail of anatomical site involved in injury

Site of burn	Grand total		Male	Female	Individual Total
Head and neck	417(21.12%)	Face	176	101	277
		Other	87	53	140
Upper limb	628(31.81%)	Arm	138	77	215
		Forearm	131	69	200
		Hand	148	65	213
Trunk	473(23.96%)	Chest	103	82	185
		Abdomen	88	76	164
		Back	70	54	124
Lower limb	401(20.31%)	Thigh	100	65	165
		Leg	95	50	145
		Foot	73	18	91
Perineum	55(2.79%)		35	20	55
Total	1974		1244	730	1974

Table 3: Outcome of burn injury further stratified according to percentage of burned surface area (M = Male, F = Female, T = Total, Lama = Left against medical advice)

% Age group	Total			Outcome								
	M	F	T	Discharge			Expired (mortality %)			Lama		
	M	F	T	M	F	T	M	F	T	M	F	T
1-10	38	31	69	34	31	65	0(0)	0(0)	0(0)	4	0	4
11-20	90	52	142	78	44	122	2(2.5)	5(10.2)	7(5.43)	10	3	13
21-30	73	53	126	59	32	91	6(9.23)	12(27.27)	18(16.51)	8	9	17
31-40	42	31	73	22	12	34	19(46.34)	15(55.56)	34(50)	1	4	5
41-50	21	11	32	6	4	10	13(68.42)	7(63.64)	20(66.67)	2	0	2
51-60	6	3	9	0	0	0	6(100)	3(100)	9(100)	0	0	0

61-70	7	2	9	0	0	0	7(100)	1(100)	8(100)	0	1	1
71-80	5	1	6	0	0	0	5(100)	1(100)	6(100)	0	0	0
81-90	1	0	1	0	0	0	1(100)	0	1(100)	0	0	0
91-100	1	0	1	0	0	0	1(100)	0	1(100)	0	0	0
Total	284	184	468	199	123	322	60(23.2)	44(26.35)	104(24.41)	25	17	42

Figure 1: Number of Discharges and expiries according to percentage of burn

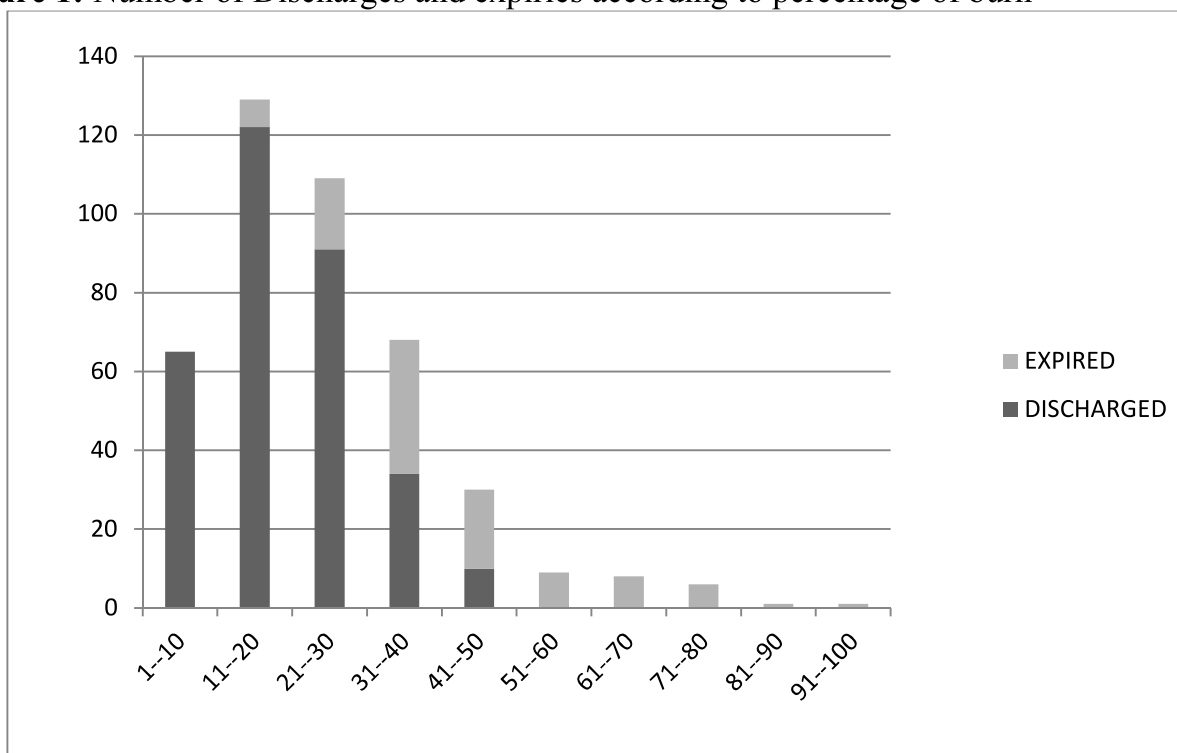


Table 4: Outcome of burn injury further stratified according to age of patients(M = Male, F = Female, T = Total, Lama = Left against medical advice)

Age group in years	Total			Outcome								
				Discharge			Expired (mortality %)			Lama		
	M	F	T	M	F	T	M	F	T	M	F	T
11-20	75	60	135	58	44	102	12(17.14)	12(21.43)	24(19.05)	5	4	9
21-30	111	80	191	79	57	136	21(21)	16(21.92)	37(21.39)	11	7	18
31-40	51	22	73	37	10	47	11(22.92)	11(52.38)	22(31.88)	3	1	4
41-50	34	17	51	18	11	29	12(40)	3(21.43)	15(34.09)	4	3	7
51-60	12	2	14	7	1	9	3(30)	1(50)	4(33.33)	2	0	2
61-70	0	2	2	0	0	0	0(0)	1(100)	1(100)	0	1	1
71-80	1	1	2	0	0	0	1(100)	0(0)	1(100)	0	1	1
Total	284	184	468	199	123	322	60(23.2)	44(26.35)	104(24.41)	25	17	42

Table 5: Factors related to burn(LOS = Length of stay)[*P value < 0.05 using T test]

	Outcome of Burn	N	Mean	Std. Deviation	Std. Error Mean
Age of Patient*	Discharge	322	27.25	10.429	.581
	Death	104	31.26	12.635	1.239
Percentage of Burn*	Discharge	322	20.18	10.073	.561
	Death	104	43.62	17.243	1.691
Modified Baux Score*	Discharge	322	48.22	15.724	.876
	Death	104	80.43	24.632	2.415
LOS*	Discharge	322	21.0000	17.28756	.96340
	Death	104	10.2885	12.84839	1.25989

Table 6: Factors related to burn (S = Suicidal, A = Accidental, H = Homicidal)[**P value < 0.05 using Chi Square test]

Outcome of burn	Total	Inhalation injury**		Co-morbidity**		Medicolegal causes**		
		Yes	No	Yes	No	S	A	H
Discharge	322	15	307	14	308	3	297	22
Death	104	34	70	16	88	6	95	3
Total	426	49	377	30	396	9	392	25

Discussion

Burn injury causes both physical and psychological trauma, both to the patients and their families. Indeed, it is a source of great morbidity and mortality.⁽⁰⁷⁾ We carried out this study to better understand the epidemiology of burns and the variables related to patient outcomes at our adult burn center, mayo hospital, Lahore.

Almost 60 percent patients were male, whereas the rest were females. Our findings are similar to that of Ali et al⁽⁰⁵⁾ who reported 56.6% males suffered from burns. Furthermore, studies from the neighboring country India also demonstrate similar data.⁽⁰⁶⁾

In our study, younger people suffered the most from burn injuries. Almost 70% of our patients were aged between 11-30 years.

Similar findings have also been noted by Ali et al⁽⁰⁵⁾. Their 16-30 year age group made up 58.2% of the patient total. Gupta et al and Shanmugakrishnan et al have also reported similar findings in their studies on burn injuries.^(08,09) from literature and our own findings it can be surmised that people of younger age groups are more prone to burn injuries.

In our study, residential burns were the most common type followed by occupational or work related burn injuries. Ali et al⁽⁰⁵⁾ also reported similar findings. Moreover, Gupta et al. reported that of the 72% closed spaced fires more than half occurred in kitchen.⁽⁰⁸⁾ These findings highlight the fact that poor safety conditions exist and a lot is needed to improve health and safety of homes as well as workplaces. We believe that strict rules and safety regulations should be put into effect for preventing burn

injuries from happening. Educating the masses especially women working in kitchens, and laborers at their workplace can greatly reduce the incidence of burns. An almost 10% reduction in occupational burns due to improved fire safety and prevention has been reported in literature.⁽¹⁰⁾

Our patients suffered mostly from flame burns (64.74%), followed by scald and electric (almost 14% each), chemical (4.9%) and flash burns (1.7%). These findings are different from Song et al which demonstrated scald to be the number one cause of burn, the second being flame burns.⁽¹⁰⁾ There are, however, other reports by Ali et al and Gupta et al which have shown results similar to our study. Both these studies show flame to be the most common cause of burns.^(05, 08)

Accidental injuries (91.45%) were the most common in our study, followed by homicidal and suicidal burn injuries. Many studies in the previous literature demonstrate similar if not exactly the same trend.^(5,11,12) This clearly demonstrates the fact that health and safety measures are lacking and need to be improved to avoid fire accidents.

Mean percentage of total body surface area burned was 25.75% ($\pm 15.53\%$). This is less than that reported by Ali et al ($35.49 \pm 27.276\%$)⁽⁰⁵⁾, nevertheless, similar to that reported by Larietal (30.6%)⁽¹²⁾ more than half of our patients were 11-30% burned, and this finding is consistent with the findings of Ali et al.⁽⁰⁵⁾

Mixed thickness burns were most common in our study population and encompassed 80.6% of the total. Wani et al, in their study,

have also reported mixed thickness burn to be the most common type of burn (60.98%).⁽¹³⁾

Upper limb (31.81%) was the most common region involved in our study, and face was the most common sub region. This is matching the findings of Waniet al who have also displayed upper limb to be the most common site of burn injury (30.19%).⁽¹³⁾ Parts of upper limb and face are normally exposed, and thus are injured more frequently.

The mean length of hospital stay of our patients was 17.61 (16.64). This is similar to Ali et al 16.45 and Larietal 16.7 days.^(5,12)

A total of 104 patients expired (24.41%) during the period under study. Although this is less than the percentage reported by Ali et al 36.9%, it is more than that reported by Iqbalet al (14%)⁽¹⁴⁾. Also, in our study, males had a lower mortality rate as compared to females. This finding is consistent with the findings of Ali et al.⁽⁰⁵⁾

Mean age of patients, percentage of burn area and modified Bauxscore of deceased group was significantly higher than that of the discharged group ($p < 0.05$). We have found similar observations in previously published studies. Osler et al and Ali et al in their study demonstrated that patient's age is an important outcome determinant.^(05,15) Percentage of burn is another important factor, and while Shanmugakrishnan⁽⁰⁹⁾ demonstrated that all patients with 55% burned area and above could not survive, our own findings showed a similar 50% or above figure led to 100% mortality. 50% patients in the 31-40% group expired, while

this statistic rose to 66.67% for the 41-50% group in our study.

Inhalational injury, comorbidities and suicide were also found to be more prevalent in our deceased group ($p < 0.05$). Also, post stratification results showed that mortality rate in women may be higher as compared to men for certain age group. A study by Newburry et al highlighted inhalational injury, intentionality and gender to be associated with increased mortality.⁽¹⁶⁾

There are certain limitations in our study. First and foremost, delay in start of treatment was not taken into account. Next, detail of the exact causative agent is not presented in our study.

Conclusion

Burn injury is a frequent problem in our part of the world, and leads to high mortality and morbidity. In spite of this, relevant legislation and their implementation at the highest national level; proper health and safety measures with burn prevention education programs and improved infrastructure; and proper management and total burn care can contribute to a dramatic decrease in burn incidence, morbidity and mortality.

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Our Experience with Revascularization and Replantation of Hand

Dr. Yusra Afzal, Dr. Shehab Beg, Dr. Sobia Yasmeen, Dr. Obaid ur Rahman

ABSTRACT

Background: Hand is the main functional unit of body. An amputation is a sum of vascular injury, an open fracture, a soft tissue injury and a nerve injury. Reattachments of amputated parts can result in severe morbidity both during and after surgery. Replantation of a limb continues to be technically demanding procedure. We share our experience of revascularization and replantation of complete and partially amputated hands.

Material and Methods: Two year retrospective study, which include patients with complete or incomplete amputation of hand. All patients underwent either revascularization or replantation surgery. Patient's demographics, mode of injury, level of injury, ischemia time and survival were studied. Outcome was assessed on the bases of patients' satisfaction.

Results: We studied 16 cases, with amputation of hand. 5 patients had crush injury while 11 faced sharp injury. 4 replantation and 12 revascularization surgeries were performed. The rate of survival was 62.5 %. Successful revascularizations were 66.6 % (8 of 12 patients) and replantations were 75% (3 of 4 patients). All the patients were satisfied with their results

Conclusion: The majority of the included patients exhibited good or very good function of the extremity, none of the replanted appendages regained normal levels of functionality. All participants were very satisfied with their outcomes

Introduction

Hand is the most important part of human body. Hand is a complex combination of different types of bones and joints. Loss of hand or part of it not only effect a man's working ability but it also has an impact on a person's psychology. Traumatic hand amputation is the most catastrophic event in young working individuals⁵. Depression occurs in about $\geq 30\%$ of amputees^{4,8}. Psychological morbidity, decreased self-esteem, and social isolation are also observed in short and long-term follow up after amputation^{9,10}.

Replantation surgery is now a standard approach to upper limb amputation around the world². The Quality of life of the patient is preserved by revascularization and replantation of traumatic hand injury⁵. The survival rate of replanted digits is 80 to 90 % in literature⁶⁻⁷.

Materials and Methods

This was a retrospective study conducted at department of plastic surgery at a tertiary care hospital in Karachi .After institutional review board approval, patients with hand amputation who underwent revascularization or replantation from July 2017 to June 2019 were included in the study. All these patients have either complete or incomplete amputation of any part of hand distal to the wrist level. Amputations above wrist joint

*Department of Plastic Surgery,
Liaquat National Hospital Karachi.
Corresponding author: Shehab Beg
Email: shehabbeg@hotmail.com*

and patients who had been operated in any other hospital and arrived for revision surgery were excluded from our study.

We reviewed our data base for revascularization and replantation and assessed it for demographic profile, mode of injury, level of injury, ischemia time, survival and follow up. Outcome was assessed on the bases of patients' satisfaction. Figure 1 shows demography, level of amputation ischemia time and procedure performed

Procedure

All the patients were assessed in emergency department and were planned. In operating

room, the amputee and stump were assessed and damaged tissue was carefully removed. Bone ends were shortened and rejoined with k wires to hold the bones in place and to allow the rest of the tissues to be restored without tension. Anastomosis of vessels and coaptation of nerves were done. Muscles and tendons were then repaired. In some patients grafts of skin, tendons and blood vessels were needed, too.

All patients had post operative splintage for 4-6 weeks followed by physiotherapy.



Figure1: Amputation of thumb & Replantation done

Sr. No.	Age	Gender	Mechanism of injury	Level of amputation	Ischemia time at arrival	Procedure
1	27	Male	Crush	Thumb Proximal phalynx	5 hrs	RV
2	31	Male	Crush	CMJ	2 hrs	RP
3	25	Female	Sharp	Proximal phalylx middle finger	3.5 hrs	RV
4	24	Male	Crush	Mid plalynx index	4 hrs	RV
5	35	Male	Crush	Wrist joint	5 hrs	RV
6	38	Male	Sharp	MPJ	3 hrs	RP
7	29	Male	Sharp	Distal phalynx	2 hrs	RV
8	33	Male	Crush	Metacarpal	1.5 hrs	RP
9	28	Male	Crush	Thumb IPJ	6 hrs	RP
10	40	Male	Sharp	Base of metacarpals	4 hrs	RV
11	48	Male	Crush	Wrist joint	5 hrs	RV
12	18	Male	Crush	Index and middle finger	6 hrs	RV
13	22	Female	Sharp	Rt index middle phalnx	2.5 hrs	RV
14	34	Male	Crush	CMCJ	8 hrs	RV
15	36	Male	Crush	Head of metacarpal	4 hrs	RV
16	38	Male	Crush	CMCJ	5 hrs	RV

Table 1:- Details of injuries to the patients





Figure 2: Amputation at wrist & Replantation (Late follow up)

Results

We treated 16 patients of hand amputation in two years. Male to female ratio was 7:1. Mean age group was 31.6 years (range 18 to 48 years). Out of 16 patients, our 5 patients (31.3%) had sharp injury and 11 patients (68.7%) had crush injury. 12 patients had revascularization while 4 had replantation surgery

Outcome

The rate of survival after revascularization of amputated limb was 66.6 % (8 of 12 patients) and after replantation was 75% (3 of 4 patients). Average of 62.5 %. The outcome of successful hand replantation and revascularization was assessed by subjective patients’ satisfaction. Three month follow up shows that 7 patients had good functional outcome and 3 patients had excellent outcome. However 1 patient was lost to follow up.

	Procedure	Ischemia time	Survival (48 hours)	Outcome 3 months
1	Thumb revascularization	7 hrs	Viable	Good
2	Hand replantation	4.5 hrs	Viable	Excellent
3	Finger revascularization	5 hrs	Viable	Excellent
4	Revascularization	6.5 hrs	Viable	Good
5	Revascularization	7.5 hrs	Non viable	——
6	Thumb replantation	6 hrs	Viable	Good
7	Digit revascularization	3.5 hrs	Viable	Excellent
8	Hand replantation	7 hrs	Viable	Good
9	Replantation	8 hrs	Non viable	——
10	Digit revascularization	7 hrs	Non viable	——
11	Wrist revascularization	7 hrs	Viable	Good
12	Finger revascularization	8 hrs	Non viable	Good
13	Fingers revascularization	6 hrs	Viable	Good
14	Hand revascularization	10 hrs	Viable	Good
15	Hand revascularization	7 hrs	Non viable	Good
16	Hand revascularization	8 hrs	Viable	Good

Table 2:- Details of Procedures undertaken

Discussion

In 1962, the first successful limb replantation was performed on a 12 year old boy after traumatic amputation², it was reported by Ronald Malt in 1964³. With the passage of time and advances in microvascular surgery, salvage of amputated limb has become a common practice in many centers around the world. Razana et al. described an overall success rate of 65.6%¹¹ in 1998. Now the success rate has reached upto 80-90%¹. Our success rate of replantation was 75%, that is at par with other tertiary care unit.

Following the high survival rate of replanted and revascularized post-traumatic hand amputation, recent emphasis has now shifted to functional recovery of the restored part rather than mere survival only. Although the functional outcome of replanted hands will never equal to that of the normal healthy counterpart, the aim of surgery is to produce major functional, cosmetic and psychological improvements in these patients.

In this study, analysis of patient demographic factors (age, sex) and factors related to amputation (level and type of injury) showed no significant influence in the overall survival rate. However, significantly better survival rates were observed in patients who were operated within 6 h compared to those who were operated after 6 h.

Conclusion

Mode and level of injury and ischemia time are important predictors of success rate of revascularization and replantation of upper limb. Multiple-level, diffuse crush, or avulsion injuries, even if the injuries were incomplete had less return of function.

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Outcome of Tissue Expansion for Reconstruction of Post Burn Scarring of Head and Neck Region

Muhammad Bilal Saeed, Ijaz Hussain Shah, Naheed Ahmed, Muhammad Akmal, Arif Baig Mirza, Saima Waris

ABSTRACT

Objective: The objective of this study is to evaluate the outcome of tissue expansion for reconstruction of post burn scarring of head and neck region.

Study design: Descriptive case series.

Place & Duration of study: Department of Plastic Surgery, Pak-Italian Burn center, Multan. two years from 01-08-2014 to 31-07-2016.

Material & Methods: 20 patients included in the study for tissue expansion of post burn scarring defect in head and neck region. Overall expanded flap survival, color matching, hypertrophic scarring and complications were studied.

Results: In majority of cases smooth texture, aesthetic outcome, color match, normal scarring was noticed. Only 1(05%) case showed complication.

Conclusion: Tissue expansion technique is a reliable, safe and versatile technique. It provides a good aesthetic outcome in terms of color matching, texture and scarring.

Key words: Tissue expansion, Head and Neck, Aesthetic, color match, texture.

Introduction

No other part of the body is as conspicuous, unique or aesthetically significant as the face. An individual's self-image and self-esteem are often derived from his or her own facial appearance – so any disturbance in this feature can lead to psychological trauma to the person.¹

The repair of skin defects in the head and neck region still poses a significant problem for many clinicians.²

Tissue expansion expands the tissue to attain an optimal aesthetic and functional result

*Department of Plastic Surgery
Nishtar Hospital Multan.
Corresponding author: Ijaz Shah
Email: drijazshah@gmail.com*

using local tissue when the primary closure is not possible.³ Tissue expansion for medical purposes was first reported in 1905 by Codvilla who attempted to lengthen tissue in the hip area. It was not until 1976 that another study concerning tissue expansion surfaced, when Radovan successfully expanded the tissue of the chest of a woman who had undergone a mastectomy.⁴

Tissue expansion relies on the ability of skin and soft tissue to generate in response to tension.⁵ Tissue expanders are balloons made of silicon and filler ingredients, molded into a pre-shaped prosthesis, which can be filled with saline through a valve system.⁶

Advantages of the expanded flaps are: (1) large flaps can be harvested because of the

expander; (2) extremely thin flaps can be safely employed; (3) texture and colour match are good.⁷⁻¹⁰ Motamed S. et al conducted a study using tissue expanders for post burn head and neck reconstruction in 72 patients out of which reconstruction of 68 patients were fully successful in the context of optimal aesthetic and functional reconstruction (94%)⁸

Ghanime G. et al conducted study using tissue expansion for burn sequelae in 14 patients where they used 22 expanders out of which only 3 showed complications.⁵

The rationale of this study is to assess the benefits of tissue expansion in terms of its aesthetic outcome in our local population.

Data Analysis

All the data collected was entered and analyzed by SPSS version 20.0. Numerical variable of interest like age has been presented as mean and standard deviation. Nominal variables like color match, texture, scar and successful outcome has been presented as frequencies and percentages.

Effect modifiers like age, gender, scar location and scar size have been controlled by making stratified tables. Post stratification chi square test has been applied to see their effect on outcome. P-value equal or less than 0.05 was considered as significant.

Data Collection Procedure

A total of 20 patients meeting inclusion and exclusion criteria of this study were registered. Out of these 20 study cases, 08 (40 %) were males and 12 (60 %) were females.

Majority of our study cases i.e. 16 (80%) reported with the history of flame burns

followed by Scald burns and chemical burns as shown in Table-1 and picture no.1 and 2

Table-1: Distribution of Etiology of defects among study cases. (n=20)

Etiology	Frequency	Percentage
Fire Burn	16	80
Scald burn	03	15
Chemical Burns	1	5
Total	20	100%



Figure 1:Preoperative Expander insertion scalp flame burn



Figure 2: Filling after insertion

Overall flap survival was observed in 18 (90%) of the study cases.

Facial region was the pre-dominant location of defect in these study cases i.e. 15(75 %), as shown in figure no.3 followed by Neck i.e. 03 (15 %). Color matching was comparable to that of recipient site in 18 (90%) of our study cases, while hyperpigmentation was observed in 02 (10%) of our study cases. (Table-2).



Figure 3: Facial burn scar reconstruction with expander flap.

Table-2: Distribution of study cases by color match (n = 20)

Color Match	Frequency	Percentages
Comparable	18	90
Hyper pigmented	02	10
Total	20	100

Smooth texture was seen in 18 (90%) while edematous in 2 (10%) of our study cases. Normal scarring was noted in 19 (95%) of our study cases while hypertrophic scarring was seen in 1(05 %) of our study cases. Aesthetic outcome was successful in 18 (90%) of our study cases while in only 02

(10%) aesthetic outcome remained unsuccessful. (Table-3)

Table-3: Distribution of study cases by Aesthetic outcome. (n = 20)

Aesthetic Outcome	Frequency	Percentages
Successful	18	90
Unsuccessful	02	10
Total	20	100

Complications were seen in 1(05%) of our study cases.

Discussion

Tissue expansion is a reliable method of providing additional cutaneous tissue, thereby optimizing contour and color match in a given reconstructive effort. The effects of expansion on skin, which include increased surface area and vascularity, allow coverage of a variety of complex wounds¹¹⁻¹⁸

Genesis of modern-day tissue expansion is credited to innovators such as Radovan and Austad¹⁹ the technique takes some of its roots from early lessons in distraction osteogenesis. In 1982, the first National Tissue Expansion Symposium was sponsored by Plastic Surgery Educational Foundation (PSEF), marking the recognition of a new advance and field in reconstructive surgery. Better understanding of expansion has allowed many modifications in flap design, increasing its worth as a reconstructive option^{20,21}

According to our study results, neck region was predominantly employed for the purpose of expander placement. Different studies have also reported that healthier skins of the

neck region have the increased similarity with that of the facial skin in terms of color matching and texture. Color matching was comparable to that of recipient site in 18 (90%) of our study cases, while hyperpigmentation was observed in 02 (10%) of our study cases. Smooth texture was seen in 18 (90%) while edematous in 02 (10%) of our study cases. Normal scarring was noted in 19 (95%) of our study cases while hypertrophic scarring was seen in 01(05 %) of our study cases.

Tissue expansion is associated with lower rate of complications. Our study results also support this finding as only 05% complication rate was observed. Similar findings have been described by different authors.^{8,22-25}

Different authors have reported satisfactory aesthetic outcome using tissue expansion technique in the post burn reconstruction of head and neck region^{8, 20-25}. Aesthetic outcome was successful in 18 (90%) of our study cases while in only 02 (10%) aesthetic outcome remained unsuccessful. Motamed S and others⁸ have reported 94 % satisfactory aesthetic outcome. Yamin et al²² reported 78 % satisfactory results. Similar results have been reported in another study²³.

Conclusion

Tissue expansion technique is a reliable, safe and versatile technique. It provides a good aesthetic outcome in terms of color matching, texture and scarring. Reconstruction of face with this technique had resulted in significant improvements in patient's appearance. Higher satisfaction level of the patients was noted. Not only Aesthetic outcome was excellent but

functional outcome in terms of neck rotation and extension was also up to the mark.

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The Menstrual Cycle and Skin Graft Take

Dr. Afaq Saleem, Dr. Shehab Beg, Dr. Moiz Sadiq

ABSTRACT

Background: Studies have concluded an association between menstrual hormone levels and skin grafting. In pre-ovulatory phase estrogen increases skin thickness and dermal water content, whereas progesterone levels in post-ovulatory phase may exhibit acne, psoriasis, atopic eczema, and possibly also erythema multiforme. The purpose of this study was to determine whether the timing of surgery relative to the menstrual cycle plays a role in split thickness graft take.

Objective: To compare the effect of menstrual hormones on split thickness skin graft take.

Method: It is a prospective study conducted at Liaquat National Hospital, Karachi. In this study patients with open wound were included who required split thickness graft to cover the wound. All patients were female under the age of 35 years admitted from September 2018 to October 2019, in all 40 patients were included in the studies. Surgical timings and menstrual periods were recorded. The pre-ovulatory phase referred to days 1 to 14 after the patient's last menstrual cycle, whereas the post-ovulatory phase referred to days 15 to 28.

Result: Total number of patients that were completely observed was 30. 5 patients lost to follow up and 5 patients denied participating in the studies later. 20 patients with surgery conducted at pre-ovulatory phase had complete graft take whereas 3 patients out of 10 patients who were grafted in post-ovulatory phase had some percentage of graft loss (100% vs. 70%).

Conclusion: Patients undergoing skin grafting during the postovulatory phase has some risk of graft loss as compare to pre-ovulatory phase.

Introduction

Skin grafts are standard option for closing defect that cannot be close primarily.¹ it is also the simplest way of reconstructing an area of skin loss. In this technique, piece of skin is completely detached from a donor site and transferred to cover the recipient site.² Wounds with tissue loss if allowed to heal by secondary Intention without skin grafting demonstrate greater degree of contracture and are more prone to hypertrophic scarring.¹

Skin graft requires a vascular bed and will seldom take in expose bone, cartilage or tendon devoid of their periosteal, perichondrium or paratenon. The major causes of skin graft loss are the result of the formation of seroma or hematoma under the graft that interferes directly with the imbibitions and revascularization process, and the infection of the graft that frequently leads to partial or total graft loss.^{1,3}

Graft loss causes significant stress for both patient and the surgeon. It not only increased the cost of the procedure and hospital stay but also causes skin loss which is vital for the patient.

*Department of Plastic Surgery,
Liaquat National Hospital Karachi.
Corresponding author: Shehab Beg
Email: shehabbeg@hotmail.com*

Women undergoing any surgical procedure during their late teens and early twenties have been shown to have female hormone levels that are at their lifetime peak. Specifically, base-line estrogen and progesterone levels are highest in this population and begin to decline as a woman approaches her thirties.⁷ during the menstrual

Cycle, these hormone levels fluctuate, allowing for ovulation and other physiologic changes. Specifically, a rise in estrogen during the preovulatory phase causes ovulation, whereas progesterone is the predominant hormone of the postovulatory phase.

Material

It was a prospective study conducted in Liaquat National Hospital, Karachi. In this study patients with open wound were included who required split thickness graft to cover the wound. All patients were female under the age of 35 years admitted from October 2018 to October 2019, in all 40 patients were included in the studies. Surgical timings and menstrual periods were recorded. The study population included women age 35 years or younger with a last menstrual period recorded in the medical record. All patients underwent skin grafting. Exclusion criteria included last menstrual period more than 30 days before surgery, concurrent hormone therapy such as oral contraceptive pills, tobacco use, and insufficient documentation. Surgical timing and postoperative complications relative to the patient's last menstrual cycle were then reviewed.

Method

The patients were divided into two groups. The first group included patients who

underwent skin grafting during the preovulatory phase of their cycle, whereas second group included patients who underwent surgery during the postovulatory phase.

Split thickness skin graft and skin mesher



Harvested split thickness skin graft, meshed



The preovulatory phase referred to days 1 to 14, with day 1 being the first day of the patient's last menstrual period. The postovulatory phase referred to days 15 to 28 of the cycle. The patients were placed into these groups based on how many days had passed since their last menstrual period and the day of surgery, and then split thickness skin grafting was done by a consultant. Split skin graft harvested using humbeys knife, which than meshed using a Derma carrier of

1x1.5. The Split skin graft secured to the recipient site using circumferential staples, followed by placement of a non-adherent dressing (bactigras). The dressings in both groups left in place until the 3rd postoperative day then the dressing was removed and the wound was evaluated by gross inspection for percentage of graft take with a ruler (in cm). Grafted area: Length (cm) × breadth (cm) = area (cm²). Then percentage of grafted area was taken by

dividing the grafted area by the total wound area multiplying by 100. Grafted area % : $\text{grafted area cm}^2 / \text{wound area cm}^2 \times 100$. Assessment of graft take was done by a consultant and only $\geq 95\%$ of graft take was considered as “effectiveness +ve”. All data was collected in pre designed proforma by the consultant To minimize bias all patients was examined by a consultant for graft take who was unaware of the study group of the patients.

The percentage of graft takes in pre-ovulatory phase versus post-ovulatory phase

Graft take Effectiveness+ve (>95%)	pre-ovulatory phase n=20	post-ovulatory phase n=10	Total n=30	P-Value
Yes	20(100%)	7(70%)	27(90%)	0.014
No	(0%)	3(30%)	3(10%)	

Results

We performed skin grafting in 40 patients in one year. All patients were female. Mean age group was 28.2 years (range 18 to 35 years). Out of 40 patients, our 20 patients (66.6%) had traumatic wound 8 patients (26.6%) and 5 patients (6.66%) post burn wound.

Discussion

In our patient population, undergoing skin grafting during the postovulatory phase of the menstrual cycle was associated with an increased risk of wound healing issues and graft loss. The postovulatory phase of the menstrual cycle consists of a decline in estrogen levels and a slow, steady rise in progesterone. Hormonal fluxes in the postovulatory phase may lead to changes in wound healing, scarring, and graft loss.

In vitro studies have shown that cultured skin cells are particularly sensitive to changes in

estrogen and progesterone, which then affect wound repair, collagen synthesis, and extracellular matrix composition. Skin with striae distensae has higher levels of progesterone receptors than normal skin, making the skin especially vulnerable to the effects of progesterone and subsequent development of striae.⁴ The effects of the menstrual cycle have been studied in multiple other specialties. There are numerous studies in the orthopedic literature supporting increased rates of ligamentous injuries during the preovulatory phase of the menstrual cycle of young women.^{5,6}

Conclusions

To our knowledge, this is the first study in the plastic surgery literature to demonstrate how skin graft is affected by the menstrual cycle. In this article, we show significantly increased skin graft loss in young women who had surgery after ovulation.

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Reverse Sural Artery Adipofascial Flap, A Reliable Variant

Dr. Aaqil Shah, Dr. Rida Shahid

ABSTRACT

Spoke wheel injury is frequently seen case and more than usual seen mismanaged. The general awareness regarding this injury and the depth of injury is lacking in most emergency care setup which leads to unnecessary delay and complication in management. We encounter spoke wheel injuries frequently and as faced by many plastic surgeons find its reconstruction difficult as no option is the best option. We recently did reconstruction of spoke wheel with reverse sural artery flap which is well known reasonably reliable option but with a variation; converting it to adipofascial variant we believe improves aesthetics, decrease its bulkiness and better patient satisfaction.

Introduction

One of the most commonly seen foot injuries by plastic surgeons is spoke wheel injury, especially in our country where motorcycles is a large source for travel for most population. Spoke wheel injuries occur when the feet of passengers get trapped in the rotating spokes of the wheels of a bi-wheeler. First time these injuries were reported in 1948.^[1] Children's are most commonly effected as their smaller feet get more easily trapped in the moving wheels.^[2] Most injuries are seen on right foot most probably due to left sided chain guard placement. Overloading, inappropriate footwear, and absence of spoke guards and foot rests is most common cause of these injuries.^[3] Appropriate initial treatment and timely reconstruction is associated with lesser morbidity and higher patient satisfaction.^[4] Spoke wheel injuries are classified in four grades, grade 1 being skin loss with no

exposure of bone or tendon. Grade 2 injuries are when with skin loss there is exposure or rupture of Achilles tendon. Grade 3 injuries are when there is skin loss with TA defect associated with exposed calcaneum either intact or fractured. Grade 4 injuries are mangled foot with damage to neurovascular bundle. Each grade has different management and reconstructive plan. Reverse sural artery flap is reliable option for reconstruction of these injuries but is associated with significant donor site morbidity and patient dissatisfaction due to its bulkiness.^[5]

Case

We had two young boys with grade two spoke wheel injuries with defect involving posterior heel. Both had presented to us 3-4 days after injury, initially wound wash with debridement was done later on the defects were covered with adipofascial reverse sural artery perforator flap according to the defect size. A straight vertical incision was given on posterior calf in midline. Skin flap were raise away from calf fat and transverse incision was given at proximal limit of the flap

*Department of Plastic Surgery
Patel Hospital Multan.
Corresponding author: Aqil Shah
Email: a4aqil@gmail.com*

ligating sural artery, saphenous vein and sural nerve. Flap raised taking the calf fascia with it. Peroneal artery perforator was identified septas broken around the perforator and flap transposed over the defect loosely. Donor site was closed primarily and

split thickness skin graft was placed over the flap and secured with absorbable sutures and dorsal back slab applied with nursing in lateral position. Graft check was done on day 4 with opd follow up at day 7 and 14.

Case 1:



Fig 1: left, Necrotic skin over the Tendo-achilles area, Markings made for an adipo-fascial flap, middle; Adipo-fascial flap has been raised after making a midline incision in the calf, right; skin flaps sutured in the midline and Split thickness skin graft applied over the adipo-fascial flap.



Fig. 2: Upper left; picture after wheel spoke injury, Upper middle; After debridement of dead & necrotic tissues, upper right; Adipofascial flap raised after the skin flaps were retracted, lower left; Adipofascial flap about to be folded on itself is shown, Lower middle Adipo-fascial flap has been folded on itself to cover the exposed Tendo-achilles tendon & Calcaneus bone. Lower right; skin flaps sutured in the midline and Split thickness skin graft applied over the adipofascial flap,

Discussion

Spoke wheel injuries has been dealt by every plastic surgeon over course of their career but there is no consensus on best reconstructive options. Reverse Sural artery flap has been described for lower leg and heel reconstruction considerably in literature but it is associated with significant donor side morbidity especially donor site graft loss, high incidence of flap failure and large size leading to difficulty in walking and wearing shoes.^[6] Fasciocutaneous sural flap are bulky and is difficult to inset with thin skin around the ankle causing flap dehiscence and multiple debulking surgery with suboptimal results.^[7] Adipofascial variant of reverse sural artery flap is reliable form of very commonly performed flap requiring minimal learning curve and aesthetically pleasing results.^[8] There is just a vertical scar in posterior calf, the child can wear shorts, and the flap graft site is easily hidden in shoes. There is no need for change of shoe size as associated with its fasciocutaneous variant. Patient satisfaction is high as there is no need of flap thinning and readjustments. Other options for lower leg and ankle reconstruction and limited by size, unreliable blood supply, difficult inset or transposition and significant donor site morbidity with little added benefit to the patient.^[9] This flap is advantageous because there is short learning curve and almost every plastic surgeon has done these flaps in their residency, there is no sacrifice of any of the foot major blood vessels.^[10] Graft at posterior calf is unsightly, associated with higher incidence of graft loss especially over the tendoaponeurotic part of the gastronemius.

Conclusion

In the end we like to summarise by saying that as motorcycles remains a common mean of transport for most of our population we all see spoke wheel injuries in our clinical practice, timely management and reconstruction save times, undue complications and financial strain on the family and medical setup due to prolonged treatments.^[11] Adipofascial reverse sural artery flap is a reliable, easy, fast and aesthetically pleasing variation to mainstay fasciocutaneous reverse sural artery flap

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Has Research become the Necessary Evil?

Mustehsan Bashir

The new Editorial team is delighted to publish its second issue. We are infinitely grateful to all our contributors and reviewers. Hopefully, our dream of producing a journal that would be a pride for our association shall soon be realized.

Medical writing has been termed the “necessary evil” to ascend the professional ladder. University rankings today depend upon the consistent churning out of research papers, much like flour from a grinding mill. While the task may be run of the mill for researchers in some other fields, we as prime care givers have clinical responsibilities that consume most of our work-place time and efforts. The single three- or four-day’s mandatory workshop for post-graduate trainees on research methodology is insufficient for any real endeavors in research. Making a dissertation or research paper mandatory to appear in a post graduate examination has not solved the dilemma. Many post-graduate trainees, frazzled by the enormity of the academic curriculum, and ill equipped to delve into a hitherto unexplored field resort to paying professionals to write the much-dreaded research thesis. Many others have not been able to appear in the examination on time due to unfinished research. Can we really blame them?

The lack of bio-statisticians attached with clinical departments is another major impediment for quality research. Many of us have had the somewhat humbling experience of chasing statisticians, inundating them with unanswered phone calls and texts with

pleadings for analysis of a study. Delays like these are discouraging and distract the focus of the researcher.

Analogous to sending a soldier into a nuclear battlefield unarmed, many clinical departments lack internet facilities and resource materials. Without a comprehensive literature search there is no research. The pressure of getting eligibility for an exam or a promotion in the face of these major hurdles fosters the culture of bogus or substandard research.

If we are to maintain pace in this ruthless and relentless rat race of producing maximum research publications, the solution does not perhaps lie in flogging a horse that has never learnt how to gallop. Changing our strategies and long-term vision is required. Considering that the undergraduate academic curriculum is already overwhelming, mandatory internship with biostatisticians or designated researchers could be introduced before the completion of house job certificate is given. Similarly, dissertations can be completed and handed over after a post-graduate examination is passed but should be a pre-requisite for the award of the final post-graduate diploma or degree. This would allow the students to focus on their curriculum and allocate more time for research once they are free from the burden of studies rather than hiring the “writing services”.

Since research is one of the prime yardsticks for the ranking of an institution, it is only

logical that special funds be dispatched to various departments for resource purposes and the necessary manpower be made available to facilitate and help in research. Medical literature should be an expression of

our professional creativity. It should be enjoyed rather than dangle over our heads like the sword of Damocles to prove our eligibility for some other task.

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The PJPS agrees to accept manuscripts prepared in accordance with the Uniform Requirements submitted to the Biomedical Journals as approved by the International Committee of Medical Journal Editors (ICMJE) guidelines, published in the British Medical Journal 1991; 302:334-41, printed in the PJPS, Vol. 3 No. 2, April & June, 1993, updated and reprinted in 2003, 2007, 2008 and September 2012, Vol. 22 (9).

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