Original Research Article

Spectrum analysis and outcomes of Plastic Surgery in rural government teaching hospital

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Abstract

Background: Scarcity of plastic surgeons, financial burden, social taboo, negligence and glory of plastic surgery forbids a common man to consult a plastic surgeon! Shri Bhausaheb Hire Government Medical collegeDhule is a government tertiary care referral centre in the north Maharashtra. **Aim and objectives:**The aim of this study was to characterize the spectrum of disease, operative procedures, understand the challenges and contextual relevance for training at a government teaching hospital.**Methods:** We analyzed the data of the patients requiring plastic surgery expertise in the department of surgery from 1st October 2019 to 31st March 2021.Evaluation of patients biodata, procedures, complications and outcomes was carried out.**Results:**Resources like equipments,personnel,perioperative services and infrastructure were insufficient. This resource gap makes the situation a "checkmate"The most common diagnoses for the 397 patients evaluated were burns (57.17%). Congenital abnormalities were noted in 1% of the patients. Of the 232 procedures performed, the majority were skin excisions (62), skin grafts (25) and major debridement for burns (24). Other plastic surgeries were soft tissue repairs in major trauma (17), cosmetic surgery (13),tendon repairs(6),major flap surgeries(12),malignancy surgeries (5), A-V fistula for dialysis(2),vascular repair (1) syndyctaly (2), cleft lip (2),brachial plexus injury (1) and post dog bite facial wounds management (3). Out of 227 burns patients 28 died due to sepsis from burns (12.33%).**Conclusion:** We observed a large burden of burns and plastic surgery procedures at district level. General surgeons should lead this to meet the escalating society demands. Basic techniques and art of plastic surgery should be a part in training of general surgery residents so that our minimum services should be universally available to anyone, anytime and anywhere.

Keywords: Burns, cleft lip, Contracture, Government, Plastic surgery, Rehabilitation, skin grafting.

Introduction

The divine body everybody we have is an unique identity and pride of everyone. Any disfiguring by mishap or disease is annoying. Few are in struggle science birth i.e. congenital anomalies. Some tries to adjust destiny by their own and others consult a plastic surgeon. Here is the beauty of a plastic surgeon to restore their feeling,sufferings and to help to overcome disabilities.

Sushruta was an ancient Indian physician and surgeon known today as the "*Father of Surgery*" and "*Father of Plastic Surgery*" for inventing and developing surgical procedures[1] His work on the subject, the *Sushruta Samhita* (Sushruta's Compendium) is considered the oldest text in the world on plastic surgery and is highly regarded as one of the Great Trilogy of Ayurvedic Medicine.[2]The highlight of Sushruta's surgical magnificence was the surgery of nasal reconstruction or rhinoplasty (repairing the disfigured nose with a flap of skin from the forehead) that he used to reconstruct noses that were amputated as a punishment for crime. The technique is practised almost unchanged to this day, the pedicled forehead flap being named the Indian flap.

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This knowledge of plastic surgery existed in India up to the late 18th century as can be seen from reports in the Gentleman's Magazine, London, October 1794.[3]The word "plastic" comes from "plasticus," which is a Latinization of the ancient Greek adjective"plastikos" ("πλαστικός," "fifit for moulding"[4]).[5,6] "Plastikos" stems from "plastos" ("πλαστός," "formed," "moulded"[4]). Two hundred years ago, the publication of Karl Ferdinand von Graefe's "Rhinoplastik"[7] ("Rhinoplasty") and its Latin version "Rhinoplastice"[8] brought the word "plastic" to the naming of reconstructive procedures, which eventually led Eduard Zeis to the titling of the specialty of plastic surgery ("plastische Chirurgie") in 1838.[9] Plastic surgery is a special branch of medicine that deals with correction of head-to-toe disfigurement and other anomalies in the physical form that are either congenital or acquired.[10]. Disabilities congenital or acquired are always displeasing and distressing.An estimated 11% of worldwide disability-adjusted life years are due to surgically treatable diseases, such as burns, trauma, and congenital anomalies[11]. Plastic surgery as a specialty started taking shape in the period after World War I, when war victims with complex problems required reconstructive surgeries. For the most part of the world, World War II brought a period of refinement in plastic surgery. Aesthetic surgery became popular in western countries in last few decades with changing socioeconomic conditions.[10]

Our goal was to characterize plastic surgery practices in rural government teaching hospital to understand the challenges in delivering plastic super-speciality care in rural set up and search for possible best outcomes.

Material and methods

Patients requiring burns and plastic surgery care were included in the study. All the data and information were recorded from department of general surgery on standard proforma during the period from 1st October 2019 to 31st March 2021. Ethical approval prior to study taken from Ethical committee.Retrospective data including patient age, sex, residence, admission date, diagnosis, treatment, operative record and discharge date were recorded. Only admitted patients were included in the study. We analyzed this data regarding type of patients, patient care, different procedures and their outcomes. Shri Bhausaheb Hire Government Medical college Dhule is a government tertiary care referral centre in the north Maharashtra. This area caters surrounding four districts Nandurbar, jalgaon ,Nashik and Dhule itself. This study would highlight the relevant observations, limitations, outcomes and suggestions for better plastic surgical care for North Maharashtra.

Results

Total 397 patients were admitted for plastic surgery treatment in department of surgery. All these patients were from small villages and towns of Dhuleand neighbouring Jalgaon, Nandurbar and Nashik. districts. Out of these 397 patients, 227 were acute burn patients (57.17%) and 170 general plastic surgery patients (42.82%).

Age and gender

Analysis of these 397 patients revealed gender distribution as 42.06% males (167) and 57.93% females (230). In males age range was 2 to 62 years and in females it was 4 to 72 years. For males the mean age (±SD) was 32.25 (±11.41) years and 31.08 (±15.32) years for females ($P > 0.05$). The most common age group of males was 31 to 40 years and for females it was 21 to 30 years which was significantly more than the other age groups ($P < 0.05$). Table no 1 illustrate the distribution of cases in relation to the age groups and sex. Table no 2 represent the age groups and total body surface area burnt (TBSA). Highest TBSA burnt was noted in 25 to 34 years' age group and the mean (±SD) was 41% (± 34) which was statistically significant ($P < 0.01$).

Table 1: Age and sex distribution

Age groups	Sex				Total	
	Male		Female		n	%
	n	*%*	*n*	*%*		
<15	14	8.53	32	13.73	46	11.58
15-24	25	15.24	95*	40.77	120	30.22
25-34	61*	37.19	45	19.31	106	26.70
35-44	31	18.90	28	12.01	59	14.86
45-54	16	9.75	20	8.58	36	9. 06
>55	17	10.36	13	5.57	30	7.55
Total	164	100	233	100	397	100

[Significant Chisquare test *$P < 0.05$]

Table 2: Age group and distribution of TBSA* of burns [n=227]

Age group (in years)	Mean ± SD TBSA in %	Median TBSA in %
<15	21 ± 14	23
15-24	33 ± 20	30
25-34	41 ± 34	52
35-44	37 ± 21	24
45-54	35 ± 30	29
≥55	36 ± 31	22

[$P < 0.01$, Significant]

*TBSA=total body surface area

Operative management

Total 232 operations were done including plastic surgery 134 (57.75%) and burns 98 (42.24%) respectively. Indications for plastic surgery operations were trauma (10.34%),aesthetic surgery (10.77%),flap surgery(5.17%), contracture repair(3.44%),amputations (3.44%),tendon repair (2.58%),congenital deformities(2.15) and others. Operative procedures for burns included skin excisions (26.72%), major debridement surgery(10.34%), skin graft(10.77%) and flap surgery(5.17%).Total 129 (56.82%) burns patients treated conservatively (n=227). Study patients had mean age of 27 years on admission. Hospital stay of operated patients was significantly more than those patient managed conservatively (55 versus 25 d, $P < 0.001$). Burns and burn complications were the most common cause for admissions 57.17% (n=397). Patients in this burns category include those with acute burns, contractures and healing or non healing wounds with or without sepsis.Upper limbs (n = 116) are most commonly involved in burns then abdomen (n = 89), face and neck (n=76) followed by lower limbs(n= 67)and back (n=59). Most of the burns are treated conservatively. Operated patients of burns had mean hospital stay of 35 days. Post-burn contractures of neck, axilla and elbow noted in 6 patients. These patients required contracture release, skin grafting and corrective surgery.

After burns,trauma was the most common indication for surgery 18.53% (n=43). Soft tissue repair for major trauma(n=24),amputations(n=8),tendon repair(n=6),craniofacial and maxillofacial trauma (n=4) and brachial plexus injury (n=1) were the indications. Aesthetic surgeries were performed in 10.77%(n=25) cases. Indications were cysts over face (n=8), facial injuries(n=6), scar excision(n=4),excision of nevus(n=3), basal cell carcinoma(n=2) and gynaecomastia(n=2).Infected wounds were present in 19.41 % (n = 33) of

all plastic surgery cases. These includes major soft tissue injuries, bed sores, chronic non healing wounds.These patients were significantly older than others (40 versus 27 y; P < 0.001). Apart from soft tissue injury, the most common infections were fournier's gangrene (n = 7) and necrotizing fasciitis (n = 4). Congenital deformities were accounted for 2.15% (n=5) of cases, these are cleft lip (n=2), syndactyly (n=2) and polydactyly (n=1). All cases corrected operatively. Flaps surgeries required in 5.17%(n=12) cases. Malignancy (n=5),bed sores (n=3), chronic wounds (n=2) and injury (n = 2) were indications for flap procedures. Reconstruction surgeries for malignancy(n=5) included abb- eslander flap (n=1) , scalp rotation flap (n=2), deltopectoral flap (n=1), and LD (Latissimusdorsi) Flap- Back flap (n=1). Magnifying loupes of 4.5x was used in these surgeries.Plastic surgery care was given by a plastic surgeon and respective unit of General Surgery depatrment. One separate burn ward of 20 beds was under the Surgery department. Burn ICU was not available.Burns care was given 24x7 by designated unit of surgery department with the plastic surgeon. No separate burn plastic unit was present. Specialityopd consultation for burns plastic patients was given by plastic surgeon two times a week. And operative work were done according to designated days of respective general surgery units. Operation theatre had enough equipment for general surgery operatives but speciality plastic surgery equipments were not available. Plastic surgeon used magnifying loupes of 4.5x but other equipments required for palatoplasty, microsurgery, or craniofacial surgery were not available.

Mortality

During the period total mortality reported was 30 (7.55% , n=397). Burn victims were mostly affected, 28 (12.33%, n=227).Uncontrolled sepsis was the leading cause of death. These included burns (n = 28), necrotizing fasciitis (n = 1), trauma causing soft tissue injury (n = 1). These patients were significantly older (40 versus 27 y, P < 0.01).

Table 3: Plastic Surgery patients distribution

Total number of patients	397	%
Acute burns patients	227	57.17%
Plastic surgery patients	170	42.82%
Total Operative procedures 1.Burns 2.Plastic	232 134 98	 57.75% 42.24%
Mortality 1.Total (n=397) 2.Burns (n=227)	 30 28	 7.55% 12.33%

Table 4: Plastic Surgery Operative procedures performed

Name of procedure	Number of patients	%
Skin excision for burns Below 20 % burns 20% to 40% burns Above 40 % burns	(n=62) 21 29 12	26.72 %
Skin grafts Upper extremity Lower extremity Trunk Perineum scrotum	(n=25) 8 12 3 1 1	10.77 %
Major debridements for burns Below 20 % burns 20% to 40% burns Above 40 % burns	(n=24) 4 17 3	10.34 %
Soft tissue repairs for major trauma Crush injury uppe extremity Crush injury lower extremity Bull horn injury Scalp avulsions Soft tissue lacerations	(n=24) 3 4 5 7 5	10.34 %
Aesthetic surgery Cyst excision over face Facial injury Scar excision Excision of nevus Basal cell carcinoma Gynaecomastia	(n=25) 8 6 4 3 2 2	10.77 %
Debridement and wound care Post operative soft tissue care Post operative grafts	(n=14) 10 3	6.03 %

Name of procedure	Number of patients	%
Post operative flaps	1	
Contracture repair Contracture neck Contracture axilla and elbow Contracture fingers Ectropion	(n=8) 2 3 2 1	3.44 %
Amputations Amputations electric burn Amputations for crush injury	(n=8) 3 5	3.44 %
Tendon repair Crush injury Sharp cut injury With vascular repair	(n=6) 3 2 1	2.58 %
Major flap surgery Malignancy Bed sore Chronic wounds Injury	(n=12) 5 3 2 2	5.17 %
Reconstruction surgery in malignancy Abbe estlander flap Scalp rotation flap Deltopectoral flap LD (Latissimusdorsi) Flap- Back flap	(n=5) 1 2 1 1	2.15 %
Pressure sores Gluteus maximus flap Tensor fascia lata flap	(n=3) 2 1	1.29 %
Craniofacial and maxillofacial Maxillofacial fractures Fracture skull bones with scalp loss Fracture mandible	(n=4) 2 1 1	1.72 %
Finger deformities Syndactyly Polydactyly	(n=3) 2 1	1.29 %
Dog bite facial wound	(n=3)	1.29 %
A-V fistula for dialysis	(n=2)	0.86 %
Cleft lip	(n=2)	0.86 %
Brachial plexus injury	(n=1)	0.43 %
Vascular repair	(n=1)	0.43 %

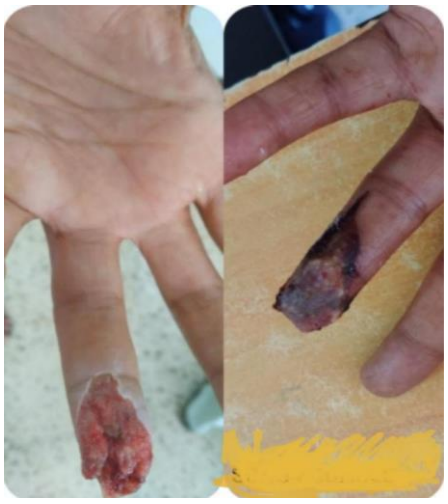

Fig 1:Split skin graft for finger pulp injury

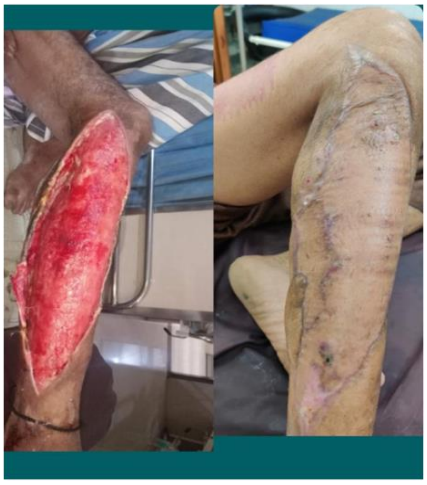

Fig 2:Traumatic wound complete healed after skin graft

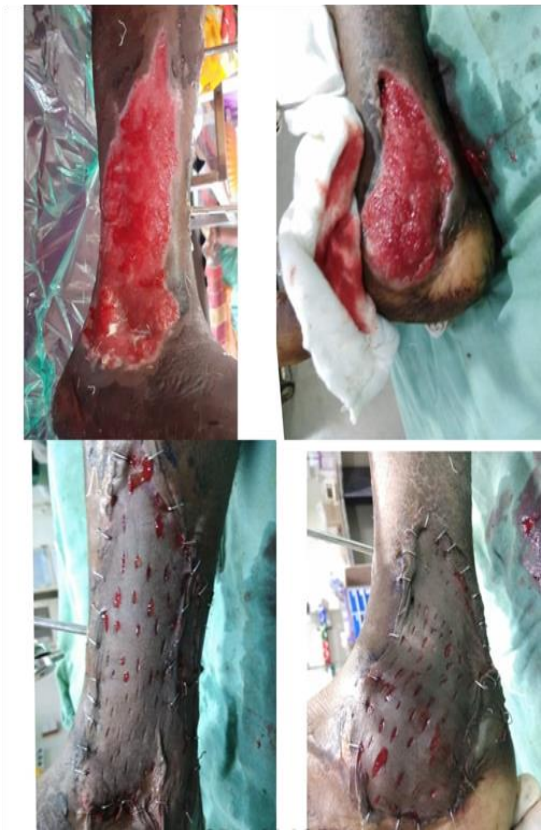

Fig 3:Deep burn wound healed after skin grafting

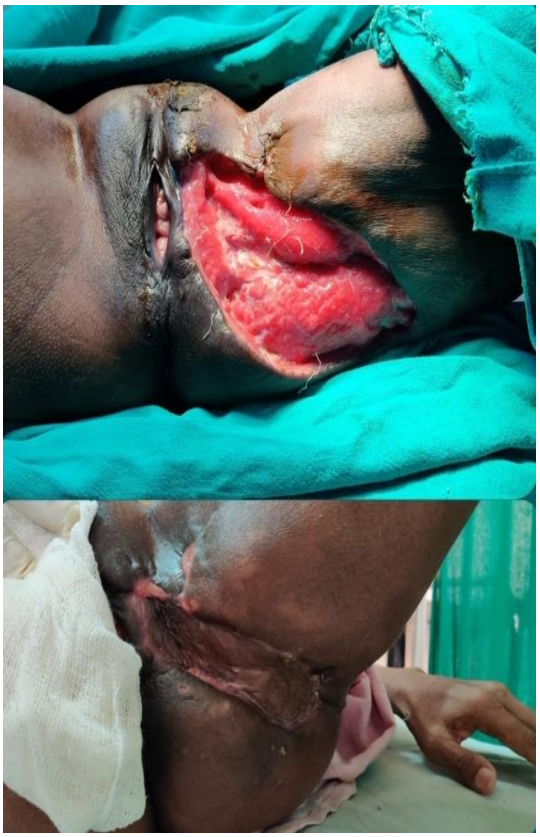

Fig 4:Non healing wound healed after skin graft

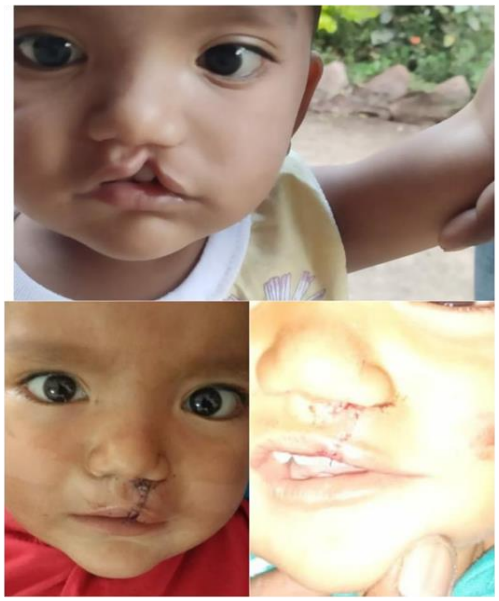

Fig 5:Ceft lip repair : Abbe-Eslander flap

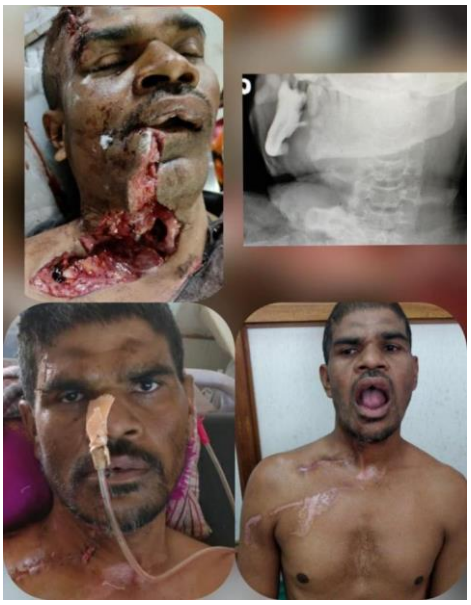

Fig 6:Fracture mandible with facial trauma. Mandible plating

Fig 7:Basal cell carcinoma : Wide excision with rotation flap

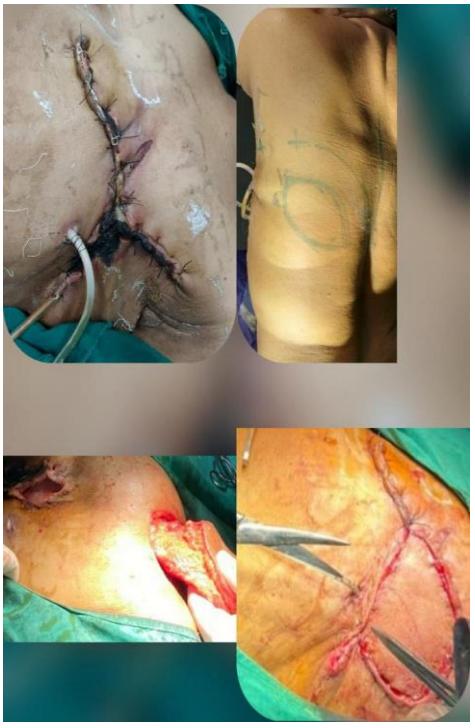

Fig 8:LD (Latissimusdorsi) Flap- Back flap

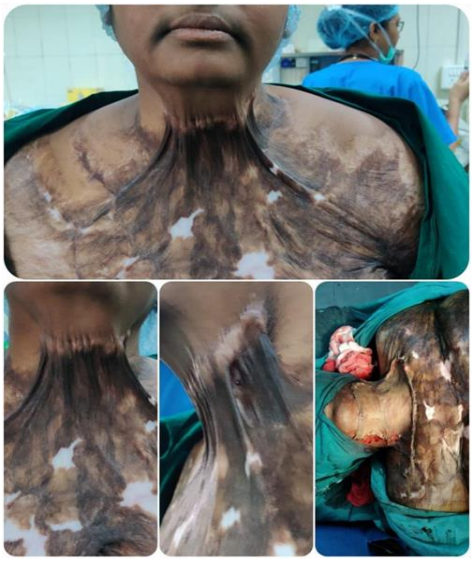

Fig 9:Post burn neck contractu

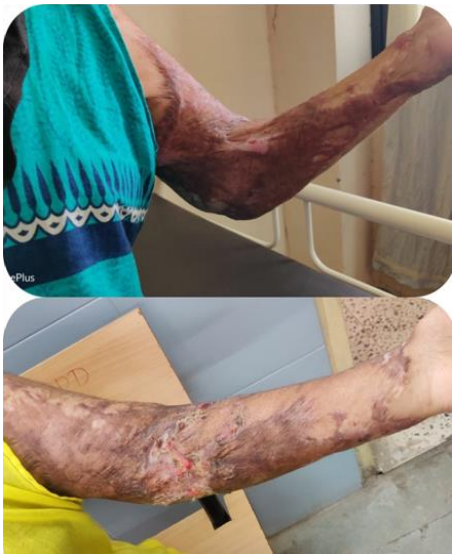

Fig 10:Post burn elbow contracture

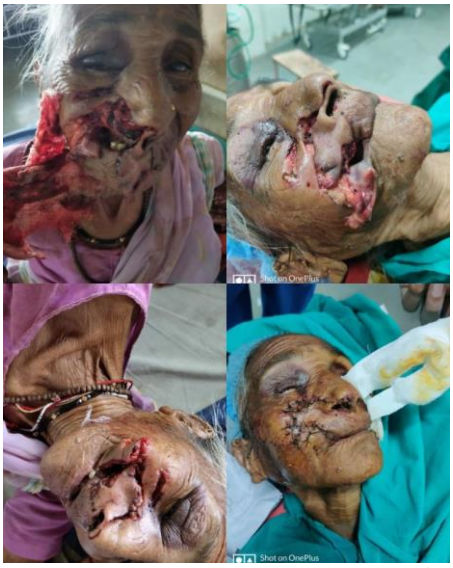

Fig 11:Basal cell carcinoma: Wide excision with rotation flap

Fig 12:LD(Latissimusdorsi) Flap- Back flap

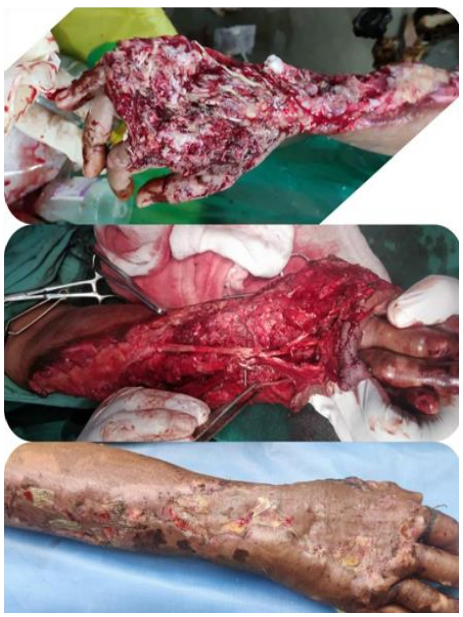

Fig 13:Trauma : Brachial plexus injury

Fig 14:Trauma: Major soft tissue injury foot

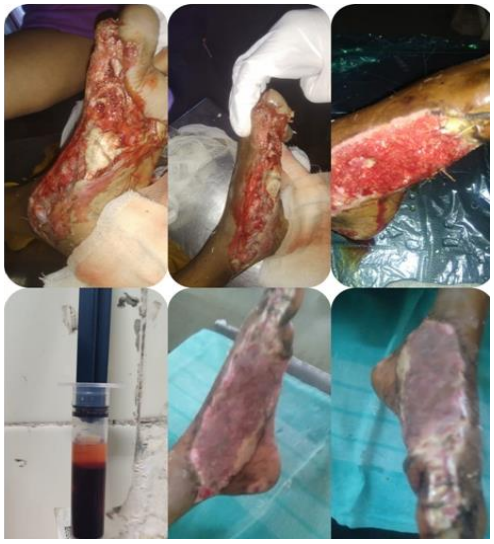

Fig 15:.Non healing wounds : skin grafting

Fig 16:Post burn wound : skin grafting

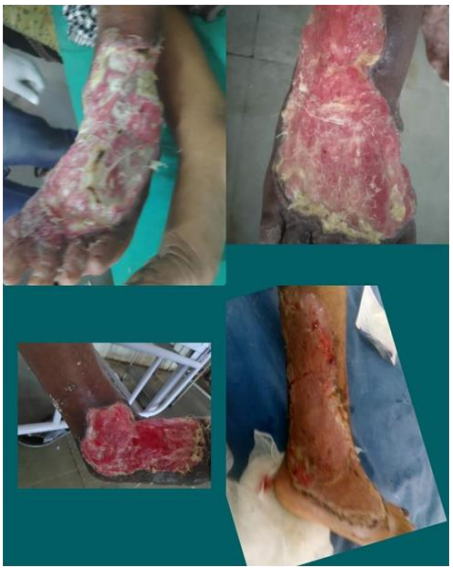

Fig 17:Chronic wounds : skin grafting

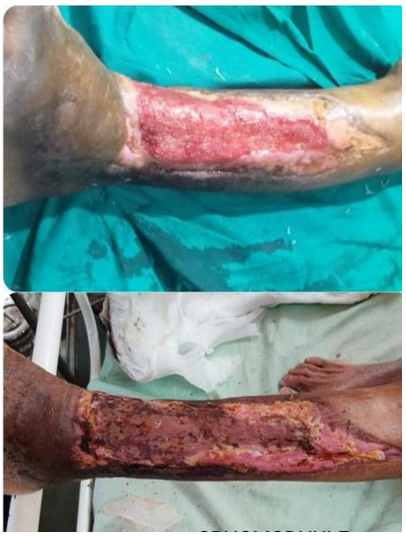

Fig 18.:Deep burns wounds : skin grafting

Discussion

Plastic surgery has been perceived as a "problem solving specialty". It was primarily meant to be reconstructive in nature with a goal to correct the "abnormal" to "normal".[16]Worldwide during World War I plastic surgery grown as a speciality, when there was need to reconstruct the war deformities and also needed for rehabilitation of war survivors. Plastic surgery in modern India owes a great deal to Sir Harold Gillies, Eric Peet, and BK Rank for developing this speciality. [17–22]This study outlines the spectrum of diagnoses and operative case volume of plastic surgery patients in a referral teaching hospital of North-Maharashtra.

Age and gender

Young women thewere most common sufferer in burn injuries.The triggering factors for burns were young age at the time of marriage combined with inability to cope with the physical and psychological stress of marriage,[23,24,25] harassment from parents-in-law, inadequate precautions during cooking and wearing of the loose Indian sari.[26]. In our study analysis gender distribution was males 42.06% (167) and females57.93% (230).Total burn patients were 227 which comprises 170 females (74.88%) and 57 males(25.11%). Females out-numbered males 3 times in burns incidence [sex ratio 3:1]. Overall in our study the mean age was 31.08 (±15.32) years for females ($P > 0.05$). The most common age group of females was 21 to 30 years which was significantly more than the other age groups ($P < 0.05$). In 2019 Jennifer A.N et al[27]also noted 65.6% (n=288) of women were sufferer and their median age was 30 years. Females were most commonly affected in fire injuries and this finding is similar to several other local studies.[28–33]

TBSA Burns

In the present study major burns injuries involving more than 40% of total body surface area(TBSA) were of age group 25 to 34. The mean TBSA was 41 ± 34 and median 52%. R B Ahuja[33] also noted the mean TBSA percentage 50.35 %. Several other Indian studies reported majority of the patients had major burns involving more than 45% of TBSA. [34,35]

Congenital anomalies

Congenital deformities were accounted for 2.15% (n=5) of cases in this present study. These were cleft lip (n = 2),syndactyly (n = 2) and polydactyly (n=1). All cases corrected operatively. Cleft lips were repaired using conventional Millard repair with nasal correction and majority of post burn contractures were treated by Z-plasty or by formal release and split skin grafting.These congenital anomalies form the bulk of patients in camps. The operations in themselves were very rewarding if only by changing a life due to closure of a cleft lip or making the post burn deformed hand fully functional.[36]

Operative

Total 232 operations were done including plastic surgery 134 (57.75%) and burns 98 (42.24%) respectively. Most common indications for plastic surgery operations were trauma (10.34%) and aesthetic surgery (10.77%). Operative procedures for burns included skin excisions (26.72%), major debridement surgery(10.34%), skin graft (10.77%) and flap surgery (5.17%). Skin is the best dressing. [37]Skin grafts are indicated when simpler methods of wound closure will not suffice, such as healing by secondary intention, primary closure, or negative pressure wound therapy.[38]Considerations of proper skin graft selection should include graft take, contracture of skin graft, donor site morbidity, aesthetic match, and durability.[39]In camp surgeries whenever possible, Z-plasty or local pedicled flaps were the preferred method for contractures as they do not require vigorous physiotherapy and splintage.[36]

Complications

Complications were noted in 13.79 % of operated patients and these includes partial skin graft loss (n=4) , total skin graft loss (n=1) and superficial wound infection in n=27. Postoperative major wound infection noted in an elderly diabetic patient of delto-pectoral flap surgery and postoperative hematoma was there in a hypertensive patient of gluteus maximus flap for bed sore.

Mortality

Overall mortality was 7.55% (30, n=397). Among burn victims mortality was 12.33% (28,n=227). Burns sepsis was the commonest cause (n=28). All these patients were having TBSA above 40%. Necrotizing fasciitis (n = 1), trauma causing soft tissue injury and

sepsis (n = 1) was other cause of the cause of death (n=2). High fatality rate in burns involving above 40% TBSA is a well known fact and observed in many Indian and abroad studies.[27-34]

Plastic surgeon a need of hour

There are an estimated 7 million burn injuries in India annually, of which 700,000 require hospital admission and 140,000 are fatal.And presently, India has north of only 2000 practising plastic surgeons.In the United States, and in the developing countries shortage of plastic surgeons is well known. Their scarcity in the rural areas leads to denial of plastic surgery facilities to a very large population.This mis-match leads to loosing reconstructive and cosmetic operations to local non specialized surgeons.Deficiency of necessary and good quality surgical services in rural areas of developing countries is a major issue in global public health. There are an estimated 700 000 admissions annually for burns in India, but only 800–1000 beds in specialized burn units in the entire country.[41] Most of the Indian population does not seek plastic surgery services due to social or financial reasons. Moreover existing health system is also not efficient enough to meet the health demands of such vast population. Financial burden, social taboo, negligence and glory of plastic surgery forbids a common man to consult a plastic surgeon!

Burns society, government and non-government initiatives

The setting up of the BURNS Society in 1993 was the first recognition of the acute problem of burns in India.In 2010, the Government of India announced the National Programme for Prevention of Burn Injuries (NPPBI).The programme declared had three components i.e. preventive programme, burn injury management programme and burn injury rehabilitation programme. Another objective of the programme is to establish a central burn registry.

Global burden of the disease, vast population, social taboos and poor infrastructure were always major issues. To overcome this deficiency gap to some extent some non Government organization (NGOs), and cooperative organizations works hand in hand with local government bodies. Project Muskan is probably one of its kind in the field of plastic surgery in our country. It is unique because it is a perfect collaboration of government institutions, Non Government organization (NGOs),and cooperative organizations. From a single district when it was started in March 2005, Project Muskan now completely covers five districts (around 3000 villages and tribal areas) and many interior areas in western and northern Gujarat. Thousands of cleft lips and congenital anomalies were corrected through this project.

There is need for understanding of the disease spectrum and it's analysis, setting up priorities to develop infrastructure, to educate health providers and people and thus making availability of super-speciality to their doorstep !

Conclusions

Delivering a plastic surgical care for most of the people is a formidable problem of state and central government. The causes are multiple and complex, such as insufficient financial aspects, lack of organizational structure and scarcity of trained local plastic surgeons. Plastic surgical expertise is necessary and on high demand due to growing public awareness for better cure, less morbidity, limitation of deformity and rehabilitation. Accomplishing these demands is a herculean task and it is like a "checkmate" for health delivering system. Here comes a vital role of general surgeons who stands backbone of all surgical care management all over the country. Learning of the art and skills of plastic surgery should be incorporated in general surgery residency to a higher level. These budding general surgeons should be able to provide basic plastic surgery care to society. By sharing this vast health care on shoulder they can decrease the burden to some extent. Our goal should be burn care management and rehabilitation facilities by trained manpower in each and every district hospital and Medical College of the country. The development of a dedicated burn unit at these places would be the solution. If we succeed in these minimum goals, we will be in Win-win situation!

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