ORIGINAL ARTICLE

SUCCESS OF SUPRA-CLAVICULAR FLAPS IN TERMS OF FLAP SURVIVAL IN HEAD AND NECK DEFECTS

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ABSTRACT

Objectives: To determine the frequency of success of supra-clavicular flaps in terms of flap survival in head and neck defects

Methods: This is Descriptive, case series study and conducted at Plastic Surgery Department of BVH, Bahawalpur during 1st September 2019 to 31st March 2021. Total 62 patients fulfilling the inclusion criteria were enrolled through non probability consecutive sampling. After the approval from hospital ethical committee, written consent was taken from all the cases. All the patients underwent surgery by consultant plastic surgeon under general anesthesia. After the debridement of wound or tumor excision, supraclavicular flap was marked according to the defect size, raised and sutured over the defect. All the patients were discharged on 7th post-operative day and were followed up weekly basis for 1st month then two weeklies. Final outcome was assessed by the end of 3rd month after the surgery. The data of all the cases were collected and analyzed by using SPSS version 22.

Results: Mean age of patient was 32.44 ± 8.80 years. Out of 62 patients, 37 (59.60%) were males and 25 (40.32%) were females. Mean size of defect was 18.76 ± 3.42 cm. Success of flap in term of flap survival was seen in 56 (90.32%) patients.

Conclusion: Supra-clavicular flap is a reliable option in reconstruction of head and neck defects with high success rates.

Keywords: Flap survival, head and neck defect, post-burn, supra-clavicular flap.

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INTRODUCTION

Reconstruction of soft tissue defects in cervico facial region is a technically demanding and challenging task because of aesthetic concerns as well as high visibility[1]. These defects may result from burns and its sequale, trauma, ablative surgery of tumor and radiation therapy to this region that necessitates coverage with appropriate soft tissue[2,3]. Different methods have been applied for soft tissue reconstruction in head and neck region each with its own advantages and disadvantages[4].

Mathes and Nahai in 1982 popularized a systematic approach to choose suitable soft tissue coverage from skin graft to free tissue transfers commonly known as reconstructive ladder for the wound defect in head and neck region[5]. At basic level, a flap is a portion of tissue containing only skin and soft tissue or muscle or fascia and bone that can be harvested and inset into another position preserving its

vascular supply. These flaps may range from simple random pattern skin flap to free tissue transfer based on arterial perforator. Small local flaps or skin graft are usually not suitable for the reconstruction of complex or larger defects. Furthermore, there is a risk that skin grafts may not take well and local flaps may have compromised blood supply in radiated areas.[6] To overcome this problem, distant flaps or free tissue transfer flaps are valid options.

In modern era of micro vascular surgery, free flap is a suitable reconstructive option for the replacement of tissues that are removed during the radical surgery. However, in certain situations like lack of microsurgical expertise, availability of microsurgical instruments, patient with comorbidities and any history of coagulation disorder, free tissue transfer is not considered as first choice. In such cases soft tissue reconstruction is usually best managed with available loco regional pedicle flaps. Furthermore, in complex reconstruction combination of regional and free flaps can be opted for single stage reconstruction.[2, 7, and 8]

The supraclavicular flap is a loco regional fascio cutaneous flap which was first described by Lamberty in 1979[9]. It has been widely used to cover the head and neck defects with advantages of thin skin island tissue, color and texture match, wide arc of rotation, reliable vascularity, easy to harvest and less donor site morbidity because of natural redundancy of skin in head and neck region[10]. The vascular pedicle of this flap is based on supraclavicular artery which is branch of cervical artery. This flap can be used after tissue expansion which helps in reconstruction of larger tissue defects. Furthermore, the tissue expansion has advantages of modification in the morphologic characteristics such as tissue atrophy and capsule formation which led to an optimal neck reconstruction.[11,12] Furthermore, overall surgical time is reduced because microvascular anastomosis is not required and this flap requires a simple post-operative surveillance as compared to free tissue transfer and other pedicle flaps. This flap does not damage any other reconstructive bridge and leaves other free flap donor site and recipient vessels intact. In a study, success rate of supraclavicular flaps in terms of flap survival in head and neck defects was found to be 91.49%.[13]

Microsurgical facilities are limited in our area of south Punjab, Pakistan and there is no published data on success of supra-clavicular flaps in terms of flap survival in head and neck defects, so my study will set a baseline data in region of South Punjab, Pakistan. Moreover, the results of this study will set the base line data about the usefulness of this flap in the region with lack of microsurgical expertise and facilities.

OBJECTIVES

To determine the success rate of supra-clavicular flaps in terms of flap survival in head and neck defects

METHOD

This study was conducted at department of Plastic Surgery, Bahawal Victoria Hospital. A total of 62 cases were recruited through non probability consecutive sampling with confidence level of 95%, 7% margin of error and taking 91.49%expected percentage of success of supra-clavicular flaps in head and neck defects. Patients with 15-45 years of age, both genders, approximate size of defect 8 x 12 cm (post trauma, post burn wounds or contracture release and post tumor excision) defects were included in this study. Patients with uncontrolled hypertension, diabetes mellitus, bleeding diathesis and failed previous surgery were excluded. Written informed consent was obtained from all the patients after the approval from hospital ethical committee (ET/12540/P-298-PF). Patient's demographics and pre-operative photographs were taken to compare the results. Patients underwent surgery in general anesthesia by consultant plastic surgeon. After the debridement of wound, contracture release or tumor excision, supraclavicular flap was marked according to the defect size and vascular pedicle was marked. Flap was raised in subfascial plane from distal to proximal direction, islanded after being raised, rotated to cover the defect and sutured. The width of flap was ranged from seven centimeter to twelve centimeter. All the patients were discharged on 7th post-operative day and were followed up weekly basis for 1st month then two weekly. Final outcome was noted three months after the surgery. The data was collected and analyzed by using SPSS version 22. Quantitative variables like age, duration of defect and size of defect were presented as mean ± standard deviation and qualitative variables like gender, occupation, cause of defect (trauma/tumor excision/post burn scarring) and success (yes/no) were calculated as frequencies and percentage. Effect modifiers like age, gender and cause of defect (trauma/tumor excision/post burn scarring) were controlled through stratification and chi square test was applied to assess their effect on final outcome and p-value ≤ 0.05 was taken as significant

RESULTS

A total of 62 patients were included in the study with age range of fifteen to forty-five years and mean age of 32.44 ± 8.80 years. Majority of the patients 41 (66.2%) were between thirty-one to forty-five years of age. Out of 62 patients, 37 (59.6%) were males and 25 (40.32%) were females with female to male ratio of 1:1.5. Mean duration of defect was 3.59 ± 1.63 months. Mean size of defect was 18.76 ± 3.42 cm**. (Table.1)** Success rate was seen in 56 (90.3%) patients while remaining 06 (9.7%) did not show the complete success with necrosis of distal flap, wound dehiscence and venous congestion as major complications managed conservatively as shown in **Figure1, 2.**

Stratification of success with respect to age, gender and size of defect had no significant difference among different groups were found. **(Table no: 2).**

Table no: 1 Socio demographic and Clinical characteristics of subjects

Variables n=62	Frequency	Percentage
Age (years) Mean ± SD = 32.44 ± 8.80		
15-30	21	33.8
31-45	41	66.2
Gender		
Male	37	59.6
Female	25	40.4
Duration of defect (months) Mean ± SD = 3.59 ± 1.63		
2-3	33	53.3
>3	29	46.7
Size of defect (cm) Mean ± SD = 18.76 ± 3.42 cm		
12-18 cm	27	43.5
>18 cm	35	56.5

Table No 2: Stratification of Success with respect to age, gender and cause of defect.

Variables (n=62)		Success		P-value
		Yes	No	
Age (years)	15-30	20 (95.4%)	01 (4.6%)	0.349
	31-45	36 (87.8%)	05 (12.2%)	
Gender	Male	35 (94.6%)	02 (5.4%)	0.166
	Female	21 (84.0%)	04 (16.0%)	
Cause of defect	Trauma	26 (96.3%)	01 (3.7%)	0.231
	Tumor excision	12 (80.0%)	03 (20.0%)	
	Post-burn	18 (90.0%)	02 (10.0%)	

(A)

(B)

Figure. No.1: A: Preoperative picture of post burn

neck contracture
B; post-operative picture after contracture release and supraclavicular flap

(A)

(B)

Figure No.2: A: Preoperative picture of Squamous cell carcinoma of lower lip
B: Post-operative picture after tumor excision and reconstruction with Supraclavicular flap

DISCUSSION

Over the last twenty years there is tremendous improvement in reconstructive surgery results with micro vascular surgery in Head and neck region as they offer excellent functional recovery and better quality of life. However, it needs a careful selection of patients for successful outcome. In certain conditions free flap surgery is not suitable for the patients with significant comorbidities and previous failed treatments with free tissue transfer. In such cases, soft tissue reconstruction with pedicled flaps is alternative opportunity with reasonably good outcome. Lamberty in 1979 described the pedicled supraclavicular fascio cutaneous flap with advantage of wide arch of rotation, good color match and low donor site morbidity[9]. Pallua et al. identified the vascular supply of this flap for use in head and neck reconstruction[14]. This flap has several advantages that full fill the basic plastic surgery principle of replace like with like with good color and texture match to the surrounding tissue, wide arc of rotation, easy and quick to harvest, longer vascular pedicle and reduced operative time [15,16].
In a study in 2012, success rate of supraclavicular flaps in terms of flap survival was found to be 91.49% which is comparable with our study results (90.3%) [13]. Sandu et al used Supra clavicular flap in fifty patients for the reconstruction of head and neck defects. Forty-four patients in this study demonstrated complete flap survival. 4 cases developed distal tip desquamation and were conservatively managed and there was complete necrosis of flap in 2 patients[17]. Granzow et al in his study concluded that supraclavicular flap can be used as first option for the reconstruction of head and neck defects as major complications were comparable between pedicled supraclavicular flap and free flaps with no significant differences.[18]
In another study there was complete survival of the flap with only five cases had marginal tip necrosis out of 71 patients [19]. Di Benedetto et al demonstrated 2 cases of marginal necrosis out of the 26 patients[20]. Zaki used supraclavicular flap from both sides for the treatment of post burn neck contracture and named this flap (Epaulet flap).[21]

In our study, we achieved good results with complete flap survival in 56 patients out of 62 flaps (90.32 percent), which is comparable with study results reported by Pallua and Machens (87.5%) and Vinh et al 86.7 percent of cases [4].
Limitations of our study is that it is a single center study with a smaller number of cases and multicenter randomized control trial with large sample size, validations of results can be more generalized.

CONCLUSION

Supra-clavicular flap is a reliable option in reconstruction of head and neck defects with high success rates and can be opted in our routine practice guidelines to reduce the morbidity of these particular patients

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AUTHOR'S CONTRIBUTIONS

AMM: Statistical Analysis, Interpretation of Data, Final Approval
HG: Concept, Design, Manuscript Writing
IA: Drafting, Literature research, review of result, revision of manuscript
MJA: Data collection, Literature research, drafting, Statistical Analysis