

Original research article

Management of Hypertrophic Scar with Intralesional Fat and Triamcinolone Injection—A Comparative Study

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Abstract

Background: Hypertrophic scars are unique human dermal fibroproliferative disorder of injured skin, associated with ugliness, pain, itching and functional limitation. we compare the efficacy of these two treatment modalities for Hypertrophic scars.

Material and Methods: The settings of this study is at Patna Medical College and Hospital (PMCH), Patna. This is the largest referral hospital in Bihar. Study duration of Three years. The patients coming in Department of plastic surgery, PMCH for treatment of Hypertrophic scars. Selection of patients is from the point first seen at O.P.D and further proceed to respective ward prior to intervention.

Conclusion: This safe & feasible application together with low morbidity, makes the fat grafting a valuable new tool in the treatment of Hypertrophic scars. Although our results are encouraging, We suggest that further research is warranted to asses adipose cell properties, extracellular matrix composition and the essential requisites for routine clinical applications. This safe, & feasible application, together with low morbidity makes it a valuable new tool in the repertoire of every plastic surgeon.

Keywords: Low morbidity, Fat Grafting, Hypertropic Scars.

Introduction

Hypertrophic scars are unique human dermal fibroproliferative disorder of injured skin, associated with ugliness, pain, itching and functional limitation. It presents as nodular, firm & irregular lesions at the area of injury, most commonly at the chest, shoulder, earlobes and upper back. It occurs due to lack of control mechanism, that regulates the cell proliferation and tissue repair. It is primarily composed of abnormally thick, irregularly branched and septal disorganised type I & III collagen bundles and with excess myofibroblast & over production of multiple fibroblast proteins indicating the persistence of wound healing or even a failure to downregulate the wound healing cells¹. The histopathological findings, most commonly observed in HTS are flattening of epidermis & replacement of papillary and reticular dermis

by scar tissues, containing prominent vertically oriented blood vessels. The majority of individuals who developed Hypertrophic scars, are young, with age ranging from 10 to 30 years. The elderly rarely developed these lesions. This observation is partly attributed to the following facts:-

- *Young individuals are more prone to trauma.
- *Their skin generally possesses more elastic fiber, resulting in greater tension.
- *Rate of collagen synthesis is greater in younger individuals.

Hypertrophic scars are a common complication of burn injury. In developed world, approximately four million patients acquire scars due to burns each year and the incidence is even greater in developing countries². Previous studies have reported diverging incidences of hypertrophic scarring with incidence rate varying from 40% to 94% following surgery and from 30% to 91% following burns. There were no studies specifically isolating the Hypertrophic group of patients and thus quantitative data were completely lacking from literature. However, individuals cases were described, which had qualitatively encouraging clinical results by the use of fat grafting on Hypertrophic scar³. Combined with the current theoretical and immuno-histochemical understanding through other laboratory and animal studies, fat grafting may play a role in the treatment of hypertrophic scar. Fat grafting was first described by Neuber in 1893 for fully a retracted scar at the infraorbital rim. Since then; it has developed slowly over the next century and in 1992, Coleman described his technique, which improved overall adipose cell survival. Fat grafting has since been used increasing in wide spectrum for clinical applications. Currently it is widely used in breast reconstruction and augmentation. It has also frequently been used as adjunct procedure in the treatment of facial aging & facial reconstruction. The use of fat grafting as a treatment options for scars has recently been popularised and there is an abundance of evidence in the literature, which supports its application for the treatment of scars in general. Our goal is to systemically review the available literature regarding the use of fat grafting in treatment of Hypertrophic scar and compare it's result with the that of intralesional Triamcinolone injection. scar collagenous tissue via matrix metalloproteinase-expression. Fat transplantation decrease the density of type-3 collagen in Hypertrophic scars. Transplanted fat cell also increases the expression of prostaglandin E2 and epoxidase-2 and decrease the proliferation abilities of cluster of differentiation CD4 + and CD8+ T cell, thus avoiding the effects on Fbs of profibrogenic cytokines released by T cells and macrophages as well as the formation of scarring. Recent studies have indicated that expression of tumor suppressor gene P⁵³ in adipose cells is closely connected with the improvement of Hypertrophic scars⁴. Along with its above benefits, it has advantage above Triamcinolone that it has minimal local and no systemic side effects. Its only drawback is to face difficulty in injecting the fat particle in to dense tissue of scar. Other shortcoming is the availability of limited case studies regarding the use of Autologous fat grafting in comparison to Triamcinolone⁵.

Objectives

It is also more safe, feasible and less morbid than surgical excision of scars. The morbidity related to this procedure is also minimal, similar to that for limited liposuction with acceptable safety. Due to these advantages of fat grafting for treatment of hypertrophic scar, we decided to add further study regarding treatment of the scars with fat grafting. Our goal is to systemically review the available literature regarding the use of fat grafting in treatment of Hypertrophic scar and compare its result to that of intralesional Triamcinolone injection.

Material and methods

This is hospital based, single centre prospective observational study. The settings of this study is at Patna Medical College and Hospital (PMCH), Patna. This is the largest referral hospital

in Bihar. Study Duration of Three years The patients coming in Department of plastic surgery, PMCH for treatment of Hypertrophic scars. Selection of patients is from the point first seen at O.P.D and further proceed to respective ward prior to intervention. Total 30 Patient After Admission in our department, a detail history of patients will be taken, and general condition of the cases was assessed .History and finding of clinical examination of the cases.

Inclusion criteria

- *Age above 15 years.
- * Patients having more than two scars.
- *Scar should be mature.
- *Patient should not have severe Co-morbid condition.
- *Informed and written consent must be given by patient.

Exclusion criteria

- *Patient with age less than 15 years.
- *Patient with single scar.
- *Patient with acute wound, contour deformity and non- hypertrophic scar.

Fat grafting instruments.



Results

Table 1: Age wise distribution of patients (n=30)

Age group	No of patients	Percentage
15-25 yrs	5	16.60%
25-35	10	33.30%
35-45	10	33.30%
45-55	5	16.60%
TOTAL	30	100%

Table 2: Gender distribution of patients (n=30).

Gender	No of patients	Percentage
Male	10	33.3%
Female	20	66.6%
total	30	100%

Table 3: Distribution of patients a/c to size of scars

Size of Scars	No of patients	Percentage of patients
<(10x5)cm ²	6	20%

(10x5)cm ² - (20x10)cm ²	12	40%
(20x10)cm ² - (30x20)cm ²	9	30%
>(30x20)cm ²	3	10%
Total	30	100%

Maximum no of pt. in this study was presenting with scar size between (10x5)cm² to (20x10)cm².

Table 4: Distribution of patients a/c to fat harvesting site

Fat harvesting site	No of pts.	Percentage
Abdomen	15	50%
Hips	6	20%
Inner thighs	3	10%
Outer thighs	3	10%
Waist /flanks	3	10%
Total	30	100%

Most common site for fat harvesting was abdomen in our study.

Table 5: Distribution of patients according to scars site

Site of scar	No of pts.	Percentage of pts.
Hands	9	30
Cheek	3	10
Forehead	3	10
Abdomen	12	40
Thigh	3	10
Total-	30	100

Most common site of scar in the patient included in this study was found at abdomen.

Table 6: Comparison of compliant of patient with intralesional fat grafting & Triamcinolone injection

Compliant with	No of pts.	Percentage of pts.	P-value*
Intralesional fat grafting	20	66%	
Intralesional Triamcinolone injection	27	90%	
None	3	10%	0.732

Most of the pts. in our study were compliant with intralesional triamcinolone injection.

Table 7: Comparison of regression of scar with intralesional fat grafting and Triamcinolone injection:-

Area of scars	No of pts.	Regression of fat grafting	Regression after Triamcinolone injection	P-value*
<(10x5)cm ²	6	70%	90%	
(10x5)cm ² to (20x10)cm ²	12	70%	80%	
(20x10)cm ² to (30x20)cm ²	9	60%	40%	
>(30x20)cm ²	3	50%	20%	0.732

P-value calculated using the chi-square test.

P-value <0.05 considered statistically significant

Small scars were regressed more with Triamcinolone injection and large scars were regressed more with fat grafting.

Table 8: Distribution of patients according to surgeon's satisfaction

Surgeon's satisfaction	With fat grafting		With triamcinolone inj		P-value*
	No. of pts.	% of pts.	No. of pts.	% of pts.	
Neutral	4	13.3%	6	20%	
Slightly satisfied	3	10%	5	16.6%	
Very satisfied	17	56.6%	16	53.3%	
Extremely satisfied	6	16.6%	3	10%	
Total	30	100%	30	100%	0.982

Discussion

there is currently no any study in literature, that focused on the comparative study of fat grafting and intralesional Triamcinolone injection in the treatment of Hypertrophic scars. However, there are many studies done separately. In these studies, intralesional Triamcinolone was established as most effective treatment, and intralesional fat grafting is still in its initial stage⁶. In our study we have compared the effect of fat grafting and intralesional Triamcinolone injection on Hypertrophic scar, in respect of scar appearance, contour, size, itching and pain. In present study, maximum number of patients who opted for intralesional fat Grafting and Triamcinolone injection were found between 25 to 45 yrs. of age, with youngest patient of 18 yrs. and oldest patient of 54 yrs. old. The mean age was 35 yrs⁷. In this study, comparison between both mode of treatment was done in 20 female and 10 male patients and this female preponderance was also shown by most of previous studies. This preponderance shows that women are conditioned to be concerned with their physical attractiveness through various beauty modification techniques⁸. In our study, Abdomen was the commonest site for fat harvesting. In 15 cases out of 30 cases(50%), fat harvested from lower abdomen(tummy), followed by hips in 6 cases then from inner thigh ,outer thigh and flank⁹. As rule, donor sites are selected that are easily accessible in supine position and heaving more subcutaneous fat. Although, there is no evidence of a favourable donor site for harvesting fat, because the viability of adipocytes within the fat grafts from different donor sites may be considered equal, higher concentration of adipose derived stem cells(ADSCS) is found in the lower abdomen and inner thigh¹⁰. In addition, in younger age group (<45yrs) fat grafting harvested from both lower abdomen and inner thigh have higher viability based on a single assay test as shown by Geissler PJ et al. Therefore, the lower abdomen and inner thighs should be chosen as the better donor

sites for fat Grafting. In our study, The coleman's technique was opted for fat processing in 25 (80%) cases and Decantation/filtration alone was done in 5 (20%) cases¹¹. The goal of post harvested fat processing is to eliminate contamination, including cellular debris, free oil and other nonviable components of the lipoaspirate such as haematogenous cells. These elements cause inflammation at the recipient site, which can be detrimental for the fat graft. Blood must be extracted because blood accelerates the degradation of transplanted fat. In our study, most common site for fat injection & Triamcinolone injection was upper limbs' Hypertrophic scars, followed by anterior abdomen¹². Patient with Hypertrophic scars at face, thigh, Neck and back were also included in our study. In our study, In almost all patients 40mg of Triamcinolone was injected at scar site, while volume of injected chyle fat varied according to scar size. In 40% of cases more than 40ml of fat chyle was injected. In 30% cases fat chyle between (30-40) ml was injected. In Rest of patients less than 30 ml of fat chyle was injected¹³. This variation of volume of fat was varied according to size of scar of pts. In present study, we compare the regression of Hypertrophic scar by injection Triamcinolone and fat grafting in same patient with two different scars of about equal area. After completion of full therapy, It was noted that patients with scar area <50 square cm, 90% regression occurred with intralesional Triamcinolone and 70% area regression occurred after intralesional fat grafting.¹⁴ In cases of intralesional fat Grafting by using visual analogue system (VAS), It was found that 16 patient (53.3%) were very satisfied with their treatment and by same therapy surgeon were also very satisfied with 17 patients' outcomes(56.6%).¹⁵ In the same treatment 5 patients (16.6%) were extremely satisfied and surgeon were extremely satisfied with 6(20%) patients. By fat grafting 6 patients (20%) were Neutral or non responder and observing surgeons were also Neutral in case of 4 (13.3%) patients. (46.6%) were very satisfied and observing surgeons were satisfied with 16(53.3%) patients, 1 patient (3.3%) was extremely satisfied and surgeon were extremely satisfied with 3 patients (10%).¹⁶ By this therapy (TAC) 9 patient (30%) were Neutral and observing surgeons were Neutral in 6 patient (20%). we have observed the appearance, size, symptoms relieve and complications with both mode of therapy and compared these finding in many ways in our study¹⁷.

Conclusion

In our study, result of scar treated with fat grafting was clinically as satisfactory as the result with intralesional Triamcinolone injection, an established mode of treatment. In smaller scar Triamcinolone treated scar show superior effect than fat grafted scars, but in larger & bulkier Hypertrophic scar results gone in favour of fat Grafting. Thus, fat grafting is effective alternative to Triamcinolone injection in larger Hypertrophic scar. It is also more safe, feasible and less morbid than surgical excision of scars. The morbidity related to the procedure is also minimal, similar to that for limited liposuction with acceptable safety. Although our results are encouraging, We suggest that further research is warranted to assess adipose cell properties, extracellular matrix composition and the essential requisites for routine clinical applications.

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