Original Article

Comparison of Different Modalities of Treatment of Hypertrophic Scars and Keloids

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ABSTRACT

Introduction: Hypertrophic scars and keloids are extreme overgrowth of scar tissue.

Aims and objectives: To improve the cosmesis and symptomatology, to compare the results of different treatment modalities and to find out the most workable treatment option.

Study design: Prospective randomized clinical trial.

Place and Duration of Study: This study was conducted at the Allied Hospital, Faisalabad from April 2009 to September 2011.

Materials and Methods: In this study 72 patients were studied. Most of them were treated on outdoor basis while others in wards. Detailed history and physical examination were carried out and applied different treatment options and followed them up.

Results: In our study of patients of hypertrophic scars and keloids, 29 were males and 43 were females. There was 20 % recurrence rate in intralesional injections of steroid, 25 % in silicone gel sheeting, 25 % in surgery and postoperative intralesional injection, 50 % in case of surgery and postoperative irradiation and 20 % in surgery alone. In case of intralesional injections of triamcinolone acetonide 62.5% patients had excellent results. In both silicone gel sheeting and surgery with steroid injections 50% had excellent results. In 2 patients in whom we combined surgery with radiotherapy 1 patient improved while the other got recurrence. After surgical excision of hypertrophic scars 40% patients had excellent results.

Conclusion: Intralesional injections of triamcinolone acetonide had good results. In early lesions silicone gel sheeting was useful option while recurrent scars can be treated by combined modalities of treatment.

Key words: Hypertrophic Scars, Keloids, Intralesional injection, Silicone gel sheeting, Postoperative radiation

INTRODUCTION

Scar is the natural result of any wound; it closes the wound and imparts strength to it. As it matures, aesthetic appearance is attained though not completely. The patient's contribution to scar formation is far more important than that of the surgeon.[1]The contour deformity of scars exists either as positives that is scar overgrowth for example, hypertrophic scars and keloids or negatives that is creases, pits or atrophies. It is generally easier to improve negative deformities as compared to positive deformities related to scars.[2]

Hypertrophic scars and keloids are extreme overgrowth of scar tissue that result from an abnormal connective tissue response to trauma, inflammation, surgery, burns and occasionally seem to occur spontaneously. Keloids grow beyond the confines of original wound. The hypertrophic scars remain confined to the boundaries of original wound. These lesions are raised above the surface to a variable extent and may regress with the passage of time.[3, 4]

MATERIALS AND METHODS

We included 72 patients in our study, 29 males and 43 females with hypertrophic scars and keloids who came to outpatient department of Allied Hospital, Faisalabad from April 2009 to September 2011. The duration of study was 2 years and 5 months. We randomized the patients according to response adaptive randomization and applied different options of treatments in different patients and followed them up for improvement of their lesions and complications, if any, of our procedures.

Inclusion criteria: All those patients who came to outpatient department of Allied Hospital, Faisalabad with Hypertrophic scars and keloids were included in our study.

Exclusion criteria: All those patients unwilling for treatment were excluded from our study.

We treated most of our patients on outdoor basis by intralesional injections of steroid and occlusive silicone gel sheeting. We also admitted our patients in surgical wards for surgical and other treatments. We evaluated the patients on the basis of histories and physical examinations.

Preoperative investigations like hemoglobin, TLC, DLC, blood sugar and blood urea were performed for indoor patients. Five groups of patients were formed for the undermentioned modalities of treatments according to outcome adaptive randomization.

1. Intralesional injections of triamcinolone acetonide (Kenacort A).
2. Treatment by application of silicone gel sheeting.
3. Combination of surgery and application of steroid injections.
4. Surgery followed by radiotherapy.

5. Surgery alone.

We used insulin syringe with fixed needle to give intralesional injections of kenacort-A. The dosage range varied from 40 mg to 120 mg for these patients. We repeated these injections after 1 and 3 months intervals. Silicone gel sheeting was applied on 12 patients for 24 hours a day. It is washable and can be reused after washing. Application of dressing was recommended for six months in early lesions.

In 9 patients after surgical excision of keloids, postoperative intrawound injection of triamcinolone acetonide was given. In two patients we excised the keloids and applied superficial X-ray irradiation to the wounds. The radiation was given in fractionated doses to a total of 1600-1800 rads in 6 days at 300-400 rads /day. The beam was focused directly at the site of the lesion.

In 5 patients with hypertrophic scars we did excision and covered the raw area with split thickness skin graft. All of the patients were advised to pay regular visits to outdoor for follow up at one, three and six months intervals.

RESULTS

In our study, age of the patients varied from 10-55 years. Out of 72 patients 29 (40.27%) were males and 43 (59.72%) were females. 33 patients presented with keloids, 11 (33.33%) males and 22 (66.66%) females. 39 patients presented with hypertrophic scars and out of these, 18 (46.15%) were males and 21 (53.84%) were females. (Table No. 1)

Table No.1: Age and sex distribution

Range of Age (years)	No. of patients	Sex Distri-bution	No. of patients with keloids	No. of pts with hyper-trophic scars	Total No. of patients
1-10	2	Males	11 (33.33%)	18 (46.15%)	29 (40.27%)
11– 20	14				
21 - 30	21				
31 - 40	19	Females	22 (66.66%)	21 (53.84%)	43 (59.72%)
41 - 50	13				
51 - 60	3				
Total	72	Total	33	39	72

We also noted the sites of the lesions in these patients. Out of 72 patients, 16 (22.22%) had lesions on head and neck area, 15 (20.83%) on anterior trunk, 10 (13.88%) on shoulders and 14 (19.44%) on posterior trunk. 4 patients (5.55%) got lesions on arms, 6 (8.33%) on forearms and hands, 5 (6.94%) on thighs, and 2 patients (2.77%) had lesions on legs and feet. The size of the lesions ranged from 1cm x 1cm to 15cm x 7cm in these 72 patients.

Out of 72 patients, 21 (29.16%) had hyperpigmented, 15 (20.83%) had hypopigmented, 24 (33.33%) had white and 12 (16.66%) had pink to red lesions. Out of these, 35 (48.61%) patients had mildly elevated (1mm to 2mm), 30 (41.66%) had moderately elevated (3mm to 4mm) and 7 (9.72%) patients had severely elevated (4mm to 5mm) lesions. 25 (34.72%) patients had tenderness of their lesions and 47 (65.27%) had non tender lesions. 4 (5.55%) out of 72 patients had neck contracture associated with hypertrophic scars resulting in functional problems. The functional impairment ranged from mild to severe. 2 out of 4 patients had mild restriction of neck movements, 1 patient had moderate restriction of neck movements and 1 patient had severely restricted movements of the neck. 21 (29.16%) out of 72 patients had psychological upsets because of these lesions. (Table No.2)

We divided cosmetic impairment in these patients into mild, moderate and severe types. Out of 72 patients, 40 (55.55%) had mild, 11 (15.27%) had moderate and 21 (29.16%) patients had severe cosmetic problems.

We admitted 16 patients in the wards for surgery and other treatments and treated 56 patients on outdoor basis. We applied 5 different options of treatments according to our management plan. We injected kenacort-A intralesionally in 44 (61.11%) patients on outdoor basis. We applied silicone gel sheeting on 12 (16.66%) patients. We performed surgery and gave postoperative intralesional injections of kenacort-A in 9 (12.5%) patients. In 2 (2.77%) patients, we applied postoperative radiation therapy after excising their lesions. In 5 (6.94%) patients with hypertrophic scars we performed surgery without the addition of any other treatment.

In 44 patients who were treated by intralesional injections of steroid, we noticed hypopigmentation in 2 (5%) patients. There was recurrence of the lesions in 8 (20%) patients. Out of 44 patients only 40 patients came back for follow up while 4 patients did not return after application of first dose of Kenacort-A. We observed recurrence in 3 (25%) patients out of 12 patients in whom we applied silicone gel sheeting. 2 (16.66%) patients developed itching at the site of the lesions and one (8.33%) patient got superficial ulceration. We observed recurrence in 2 (25%) out of 9 patients in whom we combined surgery with steroid therapy. Hypopigmentation was observed in 1(12.50%) patient. 2 (22.22%) patients developed infection postoperatively. 1 patient did not turn up for follow up after first month interval. In 2 patients we applied superficial X-ray irradiation after surgery and recurrence was observed in 1(50%) patient. We performed surgery and split thickness skin grafting in 5 patients with hypertrophic scars. 2 (40%) patients developed infection at the recipient site. 1 (20%) patient got hematoma formation. 2 (40%) patients had displacement of grafts. 1 (20%) patient developed infection at the donor site. Recurrence was seen in 1 (20%) patient after this type of treatment. We did follow up of all these patients whom we treated on outdoor basis or in the surgical wards at intervals of one, three and six months.

Table No.2: Types, colour, thickness of the lesions and their associated problems

Indoor/ outdoor patients	No. of pts	Types of lesions	No. of patients	Colour of the lesions	No. of pts	Thickness /elevation	No. of pts	Tender-ness	No. of pts	Associated problems	No. of pts	Cosmetic impair-ment	No. of pts
Indoor patients	16	HTS	39 (54.1%)	Hyperpig-mented	21	Mild 1 mm to 2 mm	35	Tender	25	Neck contracture with functional impairment a.Mild b.Moderate c.Severe	4	Mild	40
				Hypopig-mented	15	Moderate 3 mm to 4 mm	30	a. Mild b.Moderate c. Severe	12 10 3		2 1 1	Moderate	11
Outdoor patients	56	Keloids	33 (45.8%)	White	24	Severe 4 mm to 5 mm	7					Severe	21
				Pink to red	12			Non tender	47	Psychological upsets	21		
Total	72	Total	72	Total	72	Total patients	72	Total	72	Any other	Nil	Total	72

The patients in whom we applied intralesional injections of steroid, 40 out of 44 patients came back at one, three and six months intervals for follow up. In cases of surgery and postoperative intrawound steroid injections, one patient did not return at 3 and 6 months intervals. We divided our results into excellent, good, satisfactory and poor categories at 6 months interval for our final outcome.

In case of intralesional injections of triamcinolone acetonide 25 (62.5%) out of 40 patients had, excellent results. 6 (15%) patients had good results. 1 (2.5%) patient had satisfactory and 8 (20%) patients had poor outcome.

Table No.3: Final outcome

Sr. No	Treatment options	Results	No. of pts	Percentage
1	Intralesional Triamcinolone Acetonide Injection	Excellent Good Satisfactory Poor	25 6 1 8	62.53% 15% 2.5% 20%
2	Silicone gel sheeting	Excellent Good Satisfactory Poor	6 2 1 3	50% 16.6% 8.33% 25%
3	Combination Of surgery with steroid injections	Excellent Good Satisfactory Poor	4 1 1 2	50% 12.5% 12.5% 25%
4	Combination of surgery with radiotherapy	Excellent Good Satisfactory Poor	NIL 1 NIL 1	NIL 50% NIL% 50%
5	Surgery alone	Excellent Good Satisfactory Poor	2 2 NIL 1	40% 40% NIL% 20%

In silicone gel sheeting out of 12 patients 6 (50%) had excellent, 2 (16.6%) good, 1 (8.33%) satisfactory and 3 patients had (25%) poor results. In those patients in whom we combined surgery with steroid injections, 4 (50%) patients had excellent results, 1 (12.5%) patient had good results, 1 (12.5%) patient had satisfactory and 2 (25%) patients had poor outcome.In 2 patients in whom we combined surgery with radiotherapy 1 patient improved while the other patient got recurrence. After surgical excision of hypertrophic scars in 5 patients, 2 (40%) patients had excellent, 2 (40%) good, and 1 (20%) patient had poor results. (Table No.3)

DISCUSSION

Different treatments had been tried in different patients to achieve best cosmetic results. Mustoe TA, Cooter RD, Gold M, et al evaluated the use of intralesional trimacinolone acetonide and came to the conclusion that 64% of the lesions became completely flat and 72% of the patients became symptom free after the use of triamcinolone acetonide intralesionally.[5]In our study 62% of the patients treated by intralesional injections of steroid had excellent results that is they have appreciable improvement in their symptoms and flattening of their scars. It is comparable to above study and other studies conducted around the world.

Response rates have been highly variable with intralesional injection of triamcinlone acetonide with figures ranging from 50% to 100%, and a recurrence rate of 9% to 50%.[6] injections may be used alone or combined with other therapies, of which the combination with cryotherapy or surgery are the most widely used modalities in clinical practice.[7] There is 20% recurrence rate in intralesional injections of steroid in our study and response rate is 62%.The above mentioned study has fairly comparable results to our study.

Muneuchi G et al studied the long term outcome of treatment of triamcinolone acetonide in Asian patients. Improvement in subjective symptoms was seen in 82% patients while in objective symptoms, fair or better results were seen in 63%, and good or better results in 39% patients.[8]When combined with excision, postoperative intralesional TAC injections resulted in a recurrence rate of 0-100 percent, with 50 percent reported as the most common recurrence rate. [9, 10]As can be seen in our study 62 % of the patients had excellent results while 15 % of the patients showed good results with intralesional injection of steroid. In case of combination of surgery and postoperative intralesional injection of steroid recurrence was

observed in 25% of the patients in our study. These results are comparable to above mentioned study.

These studies indicate that intralesional injections of steroid in hypertrophic scars and keloids give good results after their repeated use in terms of symptomatic improvements, scar colour, texture and scar height. In many other studies people used intrawound injections of steroid during and after surgery.[11, 12]

Recurrence rates of keloids after excision, in contrast, range between 45% and 100 %.[13]Given this high recurrence rate, surgical intervention without adjuvant therapy, such as post-excisional corticosteroid injections or radiations, should be considered with caution. Excision may frequently result in a longer scar than the original keloid and recurrence in this new area of trauma may lead to an even larger keloid.[14]

In an open-label pilot study, Lacarrubba et al (2008) made assessment of the effectiveness and tolerability of a silicone gel in the treatment of hypertrophic scars. A topical self-drying silicone gel was applied two times a day on 8 hypertrophic scars. Six months later, all lesions revealed evident clinical and/or ultrasound improvement, with a mean scar thickness reduction of 37 % (range of 20 % to 54 %). The authors concluded that although larger controlled trials are needed, these findings might point to the fact that the self-drying silicone gel may represent a safe and effective treatment for hypertrophic scars.[15, 16]

Gold used an open labeled approach to see the effect of silicone gel sheets on hypertrophic scars and keloids secondary to surgical procedure and trauma. He concluded that moderate improvement was seen regarding scar colour and thickness in all those patients who underwent the trial.[17]Evidence supports silicone sheeting, pressure dressings, and corticosteroid injections as first-line treatments[16].In our study patients treated by silicone gel sheeting showed excellent results in 50 % of the patients and good results in 17 % of the patients and recurrence rate of 25%. These results are comparable to above mentioned studies.

Different studies using surgery followed by radiotherapy have been performed in different parts of the world. Veen RE et al came to the conclusion that HDR (high-dose-rate) brachytherapy after keloidectomy is quite effective provided that the total HDR (high-dose-rate) dose is sufficient. They used radiation at the dose of 3 × 6 Gy.[18] In a study conducted by Garg MK et al the salvage treatment consisted of excision of the keloid and wound closure followed by HDRB high dose rate brachytherapy (15 Gy in three fractions given on three consecutive business days beginning the day of surgery). At the time of last follow up, 88% (15/17) of the keloids were without any evidence of recurrence.[19]In our study there is 50 % recurrence rate and 50 % patients showed good results. Though it is different from above mentioned study but the results are fairly good. The difference in results may be because of different geographical situation, recurrent and intractable keloids we treated by this method and non availability of sophisticated equipment for X-ray irradiation in our set up.

Ideally surgical excision of keloid should be avoided as far as possible, because the failure rate is significantly high. Surgical excision of hypertrophic scars may be efficacious in selected cases but requires meticulous adherence to the surgical principles and adjunctive measures like radiation, intralesional interferon or topical imiquimod.[20]In our study 40 % of the patients showed excellent results and there is 20 % recurrence in case of surgery followed by application of split thickness skin grafts in hypertrophic scars patients.

CONCLUSIONS

After observing the final results we reached the conclusion that intralesional injections of triamcinolone acetonide had good results. In early lesions silicone gel sheeting was useful option while recurrent scars can be treated by combined modalities of treatment.

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