



ORIGINAL RESEARCH PAPER

Surgery

STUDY OF KELOIDS AND HYPERTROPHIC SCARS IN HADOTI REGION OF RAJASTHAN

KEY WORDS: Reliability engineering and assessment, COTS reliability, diversity

DR.YOGI RAJ NAINPURIYA	ASSISTANT PROFESSOR DEPARTMENT OF SURGERY JHALAWAR MEDICAL COLLEGE JHALAWAR RAJASTHAN INDIA
DR BHEEM KUMAR CHOURASIYA*	ASSISTANT PROFESSOR DEPARTMENT OF SURGERY JHALAWAR MEDICAL COLLEGE JHALAWAR RAJASTHAN INDIA *CORRESPONDING AUTHOR
DR SANJAY KUMAR PORWAL	PROFESSOR AND HEAD OF DEPARTMENT DEPARTMENT OF SURGERY JHALAWAR MEDICAL COLLEGE JHALAWAR RAJASTHAN INDIA
DR KULDEEP LODHA	JUNIOR RESIDENT DEPARTMENT OF SURGERY JHALAWAR MEDICAL COLLEGE JHALAWAR RAJASTHAN INDIA
DR PRADEEP PRAJAPATI	JUNIOR RESIDENT DEPARTMENT OF SURGERY JHALAWAR MEDICAL COLLEGE JHALAWAR RAJASTHAN INDIA
AYUSHI GUPTA	MEDICAL STUDENT SETH G.S. MEDICAL COLLEGE,MUMBAI MAHARASHTRA INDIA

INTRODUCTION

The word "KELOID" has been taken into medical science from Greek language (Cheloide) meaning thereby "like crab's claw". (alibert 1806 and modified by himself in 1817).

An abnormal proliferation of fibroblast collagen fibrils and immature blood vessels usually on a preexisting scar in dermis surrounded by normal tissues. It is a disease which is very difficult to eradicate, as the recurrence rate after surgery is very high and spontaneous regression is practically negligible.

A spontaneous keloids has no history of injury or operation and as such there is no scar. The fibroblastic proliferation starts spontaneously and leads to formation of a "Keloid" means claw like spread in normal skin tissue.

Hypertrophic scar is one in which there is proliferation of fibrous tissue within the limits of scar and this growth becomes inactive in due course of time.

Difference between Hypertrophic and keloid scar

Hypertrophic scar	Keloid scar
Male / Female is 1 : 1	Male < Female
Less related to race	Black / hispanic races
Age mainly < 20 years	Age particularly 10 - 30 years
Not affected by pregnancy / puberty	Increased risk in pregnancy and puberty
Related to poor surgical technique	Nil
Some immunological abnormalities	More related to immunological abnormalities
No genetic links	Have genetic relation
Site - Flexor surfaces	Site - More common on face, chest, ear lobes
Within wound borders	Outgrowth wound borders
Electron microscopy - thin, more organized collagen bundles	Electron microscopy - thin, disorganized collagen bundles

Several methods of treatment has been described but complete eradication has not achieved so far.

In the present study all the possible methods of treatment have been studied and compared in order to evaluate a definite practicable and economic methods of treatment. It also shows the appropriate ratio about the age, sex, size, color of the patient and aetiological factors.

Material and Methods

This study comprises a clinical study of 60 cases of Keloids and hypertrophic scars, who came as indoor or outdoor patients in various departments of S.R.G. Hospital Jhalawar. Detailed history was recovered and thorough clinical examination was done as follow :-

I INTERROGATION OF PATIENT Name;Case No.; Age; Sex; Religion; Address; Registration, No DOA, DOD ,Provisional diagnosis, Complaints with duration, Growth; Itching;P a i n ; cause; disfigurement; H/O present illness; H/O past illness, - Family History.

II General examination

III Local examination—as :- Number of lesion;site.;size;shape; colour of lesion; colour of patient's skin; surface; consistency; tenderness; mobility; spreading under the skin/ involving normal skin.

IV Investigation - blood Hb... Blood grouping... FNAC of lesion ... Histopathological examination. Of biopsy

V Treatment - Treatment has been given as follows :

1. Local intra lesional Inject of triamcinolone acetonide (Kenacort).
2. Excision, Closure and local intralesional injections of triamcinolone acetonide before operation during operation in wound and after 3 to 4 weeks of operation in scar margin
3. Excision, Split skin grafting and pressure.
4. Local Kenalogoint, Only.

VI Follow Up

As patient attended hospital and upto 1 year.

VII METHOD OF TREATMENT

- 1. Local injections:** Intralesional injection of triamcinolone acetonide (Kenacort) 10mg or 40mg or according to size of lesion was given through a 24 gauge needle syringe. The injection was given along the margins of lesion, to start with one end then in-side the lesion which was repeated after an interval of 2 to 3 weeks. We did not use local block anaesthesia.
- 2. Surgery :** under G.A., after cleaning and painting with savlon and spirit, the incision was given along the margins of lesion. The lesion was excised by leaving some part of it at the junction of it with normal skin (intra keloidal). A kenacort injection was given along the cut edges. Under complete haemostasis, subcutaneous stitches were applied with 4 zero chromic catgut and skin stitches with 5 zero monofilament nylon. A pressure bandage was applied after deassing. or aluminium clip pressure leaved on dressing. In some cases we used split skin grafting to cover the raw area. The S.S.G was taken from the thigh and a pressure bandage was applied over donor site. pre and post operative period kenacort injection also given in operating scar.
- 3. Local Kenalogoint :** We advise local application of Kenalogoint, in those cases in which we want only symptomatic relief.

Observation

The following observations are based on clinical examination, investigation, treatment and follow up of 60 patients of Keloids and Hypertrophic scars. These cases attended various department of S.R.G. hospital Jhalawar (rajasthan), as indoor and outdoor patients. Out of 60 patients, 44 were of Keloids and 16 of Hypertrophic scars.

No of Lesion In 60 patients:

Most of the patients i.e. 60% had single lesion. The Keloidal patients had attended the hospital more frequently than patients of Hypertrophic scars. The diagnosis was made on the basis of history clinical examination and behaviour of lesion to treatment. In all border line cases, the diagnosis was confirmed by biopsy or FNAC. The total number of lesions were 73 in 49 patients and multiple lesions were present in 11 patients.

According to this Observation shows that the ratio between male and female patients was 1:1.3 (Male 43.3%, Female 56.6%). The multiple lesions were also common in weaker sex.

Total number of keloidal patients = 44 (73.3 %) and the common age group for Keloids was 11 to 30 years, none of the patients was below the age of 8 or above 70 years.

Total number of Hypertrophic scar patients = 16 (26.6%).

The Hypertrophic scars were common in patients of 11 to 30 years of age. Multiple lesions were also present in same age of group.

According to religion : Out of 60 patients, 57 were Hindus and 3 were mohammedans.

This study also shows that most of the keloidal patients i.e. 72.5% gave history of growth lesion less than 2years, 3 patients were having lesions for 20 years but they did not attend the hospital because pain and itching were absent during this period.

The Hypertrophic scar patients rarely attended the hospital after 2 years of lesion. This may be due to that pain and itching may subside after 2 years and spontaneous regression may take place. Total no of patients = 60.

A combination of above symptoms like pain itching and disfigurement were present in most of the cases. Only disfigurement and growth was complained by 3 patients. Infection or ulceration was rare in Keloidal patients but may present in Hypertrophic scars.

In this study the commonest cause of Keloids and Hypertrophic scars was burn. Other common causes of Keloids were operations, lacerated wounds, injection, vaccination, ear piercing, trauma and skin graft (donor area). In one case, the Keloids over thigh occurred after split skin grafting but other lesions were spontaneous in origin. Recurrence of Keloid after surgery was found in 12 patients (20%). They were operated for Keloid-once, twice or thrice. Recurrence rate was negligible in hypertrophic scars Only two patients (3.3%) gave positive family history of Keloids. In case no.35 patient's mother had multiple keloidal lesions on different parts of body. In case no.40, patient's mother and younger brother had Keloids.

According to this the commonest sites for Keloids were presternal and deltoid region. Other common sites were abdomen, breast, thigh, leg, forearm, ear lobule, face and chest. Eleven patients had multiple lesions on different parts of body except palm, sole and external genitalia. Generally the contracture was associated with these multiple lesions. The commonest cause of lesions over- pre-sternal area was infection (Boils), on ear lobule was ear prick, on abdomen was operations and on deltoid region was vaccination.

- The lesions ranged in size from 1/2 inch x 1/2 inch to 12 inches x 12 inch. Most of the lesions (65%) were between 1/2 inch to 4 inch x 1/2 inch to 3 inches.
- Shape was variable in each case but butterfly shape was present over pre-sternal area and coin or oval shape over deltoid region, postoperative lesions were generally elliptical or linear and post burn lesions were irregular in shape.

The colour of the lesion at the time of examination was pink or red or pale. Most of the lesions (56.6%) were pink.

Majority of patients i.e. 73.33% had brown coloured skin.

Most of the Keloidal lesions were firm and hypertrophic scars were soft to firm in consistency. Consistency varied according to the duration of growth. If the lesion was of short duration, it was soft and if duration was long, the consistency was firm. Only one patient had a hard lesion, who was operated upon Keloid twice.

TREATMENT AND RESULTS:

The Keloids and hypertrophic scars were treated in three different ways as shown in table No.2.

**Treatment chart:
Table No.2**

Mode of treatment	Keloids		Hypertrophic scars		Total	
	No. of lesions	%	No. of lesions	%	No. of lesions	%
Surgery	8	13.33	3	5.0	11	18.33
Local injections of corticosteroids	28	46.66	5	8.3	33	55.0
Kenalog ointment locally	8	13.33	8	13.33	16	26.66
Total	44	73.33	16	26.66	60	100.0

Most of the lesions (55% or 33 cases) were treated only intralesional triamcinolone acetonide (Kenacort) 10mg or 40mg Per c.c. A combined treatment in the form of surgery and postoperative pressure or pre and post operative local kenacort injections was given. When patient had mild itching or pain at the site of lesion without disfigurement, we advised local application of Kenacort or betnovate ointment. This corticosteroid local application helpful to relieve pain and itching to some extent.

Treatment chart:

Table No.3

Mode of surgical treatment	No. of pts	%	Response to treatment						Result			
			Subjective			Objective			cure		Recurrence of symptoms	
			Pain and itching			Growth			No of pts.	%	No of pts.	%
			+-	+	++	+-	+	++				
Surgery & pressure	4	6.6	0	1	3	0	0	4	3	75.0	1	25.0
Surgery & Kenacort injection & Pressure	4	6.6	0	0	4	0	0	4	4	100.0	0	0
Total	8	13.3	0	1	7	0	0	8	7	87.0	1	1.25

+- = no improvement
 += to moderate relief & 25 to 50% regression of growth.
 ++ = complete disappearance of symptoms and more than 50% regression.

Total number of patients = 60
 Total number of patients treated by surgery = 8(13.3%)

Out of 8 patients, excision and repair was done in 4 patients (50 %) and excision and split skin grafting was done in 4 patients (50%).

Postoperative pressure was applied in 4 patients to prevent recurrence and was kept for 3-6 months. In 2 patients, kenacort injections were given preoperatively and during operation, into the wound at the time of primary suturing.

The dose was variable according to the size of lesion (average dose 10 to 20 mg) and was given intralesionally. The dose was repeated at an interval of 2 to 3 weeks. In one case postoperative injections were given into the scar, started 2 weeks after the operation.

CORTICOSTEROID INJECTION AND RESULTS:
TABLE NO.4

Type of injection	No. of pts.	%	Response to treatment						Result				Loss of following
			Subjective			Objective			cure		Recurrence of symptoms		
			Pain and itching			Growth			No of pts.	%	No of pts.	%	
			+-	+	++	+-	+	++					
Kenacort	25	41.6	0	16	8	1	20	4	22	95.6	1	4.3	2
Wycort	3	5.0	0	2	1	2	1	0	1	33.3	2	66.6	0
Total	28	46.6	-	-	-	-	-	-	23	88.4	3	11.3	2

pts. = patients
 +- = no improvement
 += to moderate relief & 25 to 50% regression of growth.
 ++ = complete disappearance of symptoms and more than 50% regression.

Total number of patients = 60
 Total number of patients treated by corticosteroids = 28

According to table no.4 the kenacort injection was given in 25 lesions and Wycort injection was given in 3 lesions. Out of 25 lesions, 22 were Keloids and 3 were of Hypertrophic scars. The dose of Kenacort was variable according to size of lesion (average dose 10 to 20 mg.) And interval between two injections was 2-3

weeks. The dose and number of injections depends on size and duration of lesion. Better results were obtained by Kenacort injections than other preparations of corticosteroid. The above table also shows that some beneficial effect was noted in all cases. 33.3 % of lesions which were treated by intralesional Kenacort , flattened out completely and another 50% became much softer. Softening was first noted at 2-3 weeks after the first injection and progressed with each subsequent injection.

NO. OF DOSES GIVEN TO PATIENTS.
TABLE NO.5

No. of injections	No. of patients	%
1 does	5	20
2 doses	9	36
3 doses	9	36
4 doses	3	12
More than 4 doses	2	8

no. of patients 25
 Range of doses = According to size of lesion normally 10 to 40 mg. Interval between injections 2 to 3 weeks.

Table no.5 shows that most of the patients (72%) were given 2 to 3 doses at an interval of 2 to 3 weeks. The amount of triamcinolone acetonide was given in each dose was depend upon size of lesion 10 to 20 mg. 5 patients were given a single dose 2 of them did not came during follow up and another 3 had symptomatic relief and softening of lesion. Two patients had been given more than 4 injections at an interval 2 to 3 weeks till the growth regresses.

DISCUSSION:

In this study 44 patients (73.33%) of Keloids and 16 (26.66%) patients of hypertrophic scars were treated by various methods of treatment and followed up from 3 months to 1 year (sees table no.2). The keloid was diagnosed when the lesion was firm, raised, shiny. Smooth or corrugated, hairless growth developed on the scar with growth extending under normal skin. The symptoms like itching and pain were present from mild to moderate degree. The hypertrophic scar may have similar symptoms and signs except that it remains within the limit of scar and continuous to grow for several weeks or months, then becomes inactive and tends to regress. In this study incidence of keloid is more than hypertrophic scar because keloids developed symptoms like pain and itching which are persistent, while pain and itching in hypertrophic scars often subside spontaneously in due course of time.

SEX:

In this series 26 patients (43.33%) were males and 34(56.66%) were females. The male to female ratio was 1:1.3 .this has also been observed by other workers. The high incidence in females has been attributed to the relationship of keloid to female hormones (rayer 1935).

Griffith (1966) reported that keloids were common in females (58%) than males (42%),vallis (1967) found that most of the patient (75%) were females.

AGE:

In the present study 75% of the patients were between 11 to 30 years of age. Average age of patients was 26.06 years. The overall range was 8 years to 70 years. These findings are very much similar to findings of other wprkers. This indicates the hormonal factor as a main aetiological factor of keloids. Because hormonal stimulation is found high in second decade (grab and stone 1942). Cosmen, et, al, (1961) reported the average age incidence to be 20.8 years. Griffith (1966) reported the average age to be 20 years Where as vallis (1967) noted the average age of occurrence to be 20 years.

DURATION OF LESION PRIOR TO TREATMENT

In this study 65.9% (29) patients of keloids and 100%(16) patients of hypertrophic scars had the lesions for 2 years or less than 2 years. 6.8%(3) patients of keloids had the lesions over 20 years but

the symptoms and signs developed only during last 6 months to 2 years. None of the case of hypertrophic scars had complain beyond 2 years of duration. The average duration for keloids was 2 years 3 months and for hypertrophic scar was 9 months. Present observations are similar to be finding of Cosman et. al. (1961) who reported the average duration to be 4.9 years and Griffith (1966) has reported the duration of lesions from 6 months to 12 years.

SYMPTOMS

In this series 95% (55) of patients were having combination of symptoms like pain, itching with or without complaint in 5% (3) of cases, 4 (6.6%) lesions were infected or ulcerated. (see table no.7). These observations are nearly the same as of other workers. Griffith (1966) found that 76.8% patient had pain & itching with or without disfigurement but 12.8% patient complained disfigurement as major symptom.

FAMILY HISTORY

In this series only 2 patients (3.3%) gave history of keloids in their mothers. One of them also gave the history of keloids in his younger brother. This has been noted by other workers. Heredity was blamed by rayer(1935) as a aetiological factor in the development of keloids

AETIOLOGICAL FACTORS

In the present study 18.3% (11) of keloids followed burns & 16.6% (10 cases) followed surgical operations. Infection and vaccination were the initiating factor in 11.6 (7) of lesions respectively. Lacerated wounds and trauma were causative factors in 15% (9) of lesions. Other causes were ear piercing, skin graft (donor area) and rarely insect bite. The main cause of keloids over ear lobule was ear piercing and over abdomen was surgery.

Cosmanet. al. (1961) noted tha initiation factors in decreasing factor as accidental trauma, surgical procedures, infection, burns etc, According to this study the commonest cause of keloid and hypertrophic scar was burn while in other studies burn comes at a low level. This may be due to high incidence of burn in rajasthan and poor post burn care. Most of our patents are illiterate and villagers. They do not have proper facility for dressings etc. therefore wound becomes infected and healing is delayed, resulting into hypertrophic scars or keloid formation. Above studies were done in foreign countries where incidence of burn is low and post burn care is good. There formations of hypertrophic scar or keloid is low.

SITE

In this study the commonest site for keloid was presternal area (20% or 12 lesions) and next common was deltoid region (15% or 9 lesions). The other common sites were abdomen, breasts, thigh, ear lobule, neck, arm, forearm atc. In decreasing order. No case of keloid was recorded over palm, sole or external genitalia. This is similar to observations of other workers. Cosman(1961) noted the common sites of lesions, in order of preference as ear, face, neck, abdomen, scalp and shoulder. In 1966, Griffith observed the common sites in order of sequence as presternal area, breast, arm, back, earlobule, abdomen, shoulder etc.

COLOUR OF LESION AND CONSISTENCY

In this study 56.6% (34) of lesions were pink in colour and firm in consistency. 21.6% lesions were red. Colour and consistency depend upon their pigment content, vascularity and duration of lesion. If the lesions is of short duration, the vascularity will be more and it will look reddish and soft. If the duration is more it will be pink in colour having less blood supply and form in consistency. But the symptoms like pain and itching will increases in character, so most of the patients have to attend the hospital at this stage. If duration is longer the colour of the lesion will be pale due to excessive fibrosis and loss of blood supply, symptoms regress to some extent.

COLOUR OF PATIENTS SKIN

In the present study 73.33% (44) patients were brown skinned, 20% (12) dark skinned and 6.6% (4) were fair skinned. This is due

to increased concentration of melanocyte pigment in brown and dark skinned patients. Mastas(1896) estimated the ratio of keloid in coloured to white patients as 9:1 and Fax(1909) as 19:1.

TREATMENT

The mode of treatment in all the cases was divided into four categories. One was surgery (18.3% of 11 patients) which included

- 1) Surgery and pressure
- 2) Surgery and corticosteroid injection locally.
The second category included 55% (33) of patients treated by local injection of corticosteroid.
- 3) In which included 16 (26.6%) cases were dealt by corticosteroid ointment locally.

Among the lesion treated by surgery 75% (3) were cured by surgery and postoperative pressure and 25%(1) showed recurrence of symptoms. The lesion 4 or 6.6 treated by surgery and local corticosteroid injections preoperatively during operation and postoperatively the cure rate was 100%. The postoperatively pressure was also applied in both cases.

Overall recurrence rate of surgically treated patients was 25% (1 out of 8). Better results were obtained when corticosteroid injections were used along with surgery & postoperative pressure was applied over the site of lesion for 3 to 6 months.

Neson , L.H.(1942) tresated 51 lesion in 49 patients. The treatment was divided in four groups as follows:- (a) excision and approximation, (b) excision and radiation, (c) radiation alone and (d) pressure alone. Most satisfactory results were obtained when patients were treated by excision and radiotherapy.

Conway, et, al, (1960) treated cases by intramarginal excision and closure or skin grafting. The methodes used by him were (a) excision alone (b) excision and local injections of cortison derivatives (c) excision and X-ray therapy, (d) excision and injections of crtison derivatives locally and X-ray therapy. Better results were obtained giving cortison derivatives locally and x-ray therapy.

By surgery our cure rate was 100% when treatment was accompanied by intralesional injections of triamcinolone acetonide and post operative pressure, results of other authers is also nearly the same with a variation of 10% or so. Which is insignificant.

LOCAL TREATMENT ACETONIDE (KENACORT) INJECTION

In the present series 46%(28) of lesions were treated by local injections of corticosteroids either kenacort (41% or 25 lesions) or Wycort (5% or 3 lesions). Patients receiving kenacort injections showed a cure rate of 95.6% (lesions with recurrence rate of symptoms 4.3%(1lesion) whereas those receiving Wycort injections had cure rate of 33.3% (1) and recurrence rate of symptoms 66.6% (2)

33.3% of the lesions which were treated by intralesional kenacort, flattened out completely and other 50% became much softer. Softening was first noted at about 2 - 3 weeks after first injection and progressed with each subsequent injection. In 44.4% of cases there was complete relief of symptoms but in another group of 44.4% cases symptoms like pain & itching reduced intensity. The symptoms recurred in one case (5.5%) and there was no changes in the growth itself. Two patients lost during follow up.

Griffith (1966) treated 37 patients of keloidal lesions by intralesional injections of triamcinolone acetonide (kenacort) and noted complete dissolution in 51% (19) of lesion, partial dissolution (softening) in 40% (15) of lesion. symptoms eliminated 59%(20), Symptoms reduced 41%(14)

Ketchum et.al. (1966) Treated Hypertrophic scars and keloids by triamcinolone acetonide and noted a definite regression in 88% of

the cases. Pruritis and paresthesia disappeared within 3 to 5 day following injection.

Griffith et. al. (1970) treated 61 patient only by intralesional kenacort injections of which 42 (69%) flattened out completely another 13(21%) become softer. In 5 patient (8%) there was no improvement and one patient was lost during follow up.

Intralesional injections of triamcinolone acetonide 3-5 injections at an interval of 2-3 weeks gave the cure rate of 83.3%. All patients had symptomatic relief. This variation is insignificant in view of the variation in the selection of cases.

Intralesional injections of triamcinolone acetonide gives fairly good result (83.3%), unless because of site and size of the lesions surgery is necessary. For symptomatic cure and regression, this method should be used.

Surgery should be done only as a last resort if the lesion sare of big size, multiple and unsightly situations. Surgery should be followed by postoperative local injections of triamcinolone acetonide and maintenance of pressure by dressing or splints.

SUMMARY AND CONCLUSIONS

44 patients of keloids and 16 patients of hypertrophic scar were treated by

- 1) Surgery
- 2) Local injections of corticosteroids
- 3) Local application of corticosteroids ointments

Follow up was done from 3 months to 1 year. The results of treatment of these patients with recurrence rate have been analysed. The relevant literatures have been reviewed.

Most of the patients studied, had single lesion but more than one lesions were not uncommon. The lesions were more common in female than males.

The average age of patients was 26.05 years. Most of the patients were hindus except 2 (Mohammedans).

The average duration for keloids was 2 years 3 months and for hypertrophic scars was 9 months.

Most of the patients had pain, itching and disfigurement. Only 4 patients had infections and 3 patients did not complain about pain and itching but of disfigurement.

Only two patients gave history of keloids in their family relations eg. mother and brother.

The commonest cause of disease was burn. Other causes were operations, lacerated wounds, infections, vaccination, ear piercing, trauma, skin graft(donor area) and insect bite, in decreasing order.

Commonest site were presternal and deltoid regions. Other common sites were abdomen, breasts, thigh, legs, forearm, ear lobules, face, chest, neck, arms and hands(dorsum) in decreasing order.

Size and shape was variable and the common colour of the lesion was pink or red. Surface was smooth or nodular. The consistency was firm or soft except one (hard). Lesion was movable with skin movement. It was not adherent to deeper structures. Keloids were involving the normal skin or spreading under normal skin.

Intralesional injections of triamcinolone acetonide gives fairly good results and recurrence rate is lowest.

Surgery should be done only as a last resort, if the lesions are of big size, multiple and unsightly situations. Surgery should be followed by postoperative local injections of triamcinolone acetonide and maintenance of pressure dressing or splints.

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