

HISTOLOGY AND HISTOCHEMISTRY STUDY OF KELOID FOLLOWING INTRALESIONAL STEROID INJECTIONS

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ABSTRACT :

In the present series, Intra keloidal injections of steroid are given to alleviate symptoms and to promote regression. The present study also highlights natural history of keloids, results after intrakeloidal injection of hydrocortisone and histochemical changes in the keloid after the injection therapy.

INTRODUCTION

Articles dealing with the management of keloid customarily conclude with the word "recurrence", a nightmare for the surgeons. In recent years, new methods are tried to control the recurrence after surgery on keloids such as intra-keloidal excisions with or without skin grafting, pressure treatment by regular use of elastic garments, post operatively, and application of silicon pads But none of these guarantee success.

MATERIAL AND METHODS

1. 52 cases of keloids (less than 6 months old) were selected from Keloid Clinic who complained of distressing symptoms.

2. 31 of these cases having less than 3" diameter keloid were injected with 25mg of Intra-articular Hydrocortisone (Roussel) intralesionally, at weekly intervals for 12 weeks. The injections were pushed intralesional as per device made by Ghose & Ganguly, 1978. Biopsies were taken from these 31 cases after the 5th intrakeloidal injection of Hydrocortisone.

3. 21 cases of keloid of more than 3" diameter had intrakeloidal excision and skin grafts followed by intrakeloidal perigraft injection therapy with steroid, weekly for 12 weeks, starting on 7th day after operation. This excised keloid was used as keloid control for histochemical study.

4. Biopsy of normal skin from 7 otherwise normal subjects served as normal control for keloid.

5. Biopsies were also studied from a) 6 cases of recurrence after 3 months; b) 2 cases without recurrence after 3 months.

The study recorded clinical profile as well as the histological and histochemical changes in keloid after the injections.

OBSERVATIONS

Age and sex distribution of the keloid series, reveals that the incidence between the males and female show a close parallel and that keloids are more frequent in the 2nd and 3rd decades of life.

The brunt of the process is borne by the skin of the chest wall (26 cases, 50%), and upper limb is the next site to be involved (15.38%). Keloid

Table No. 1

SITE OF KELOID IN THE STUDY SERIES:
RELATION WITH SEX

SITE	MALE	FEMALE	TOTAL	PERCENT
Neck and Face	-	4	4	7.69
Chest	18	8	26	50.00
Deltoid region	2	2	4	7.69
Abdomen and Pubis	-	2	2	3.84
Upper Limb	-	8	8	15.38
Lower Limb	4	-	4	7.69
All over body	-	2	2	3.84
Pinna and Ear	-	-	-	-
Lobule	-	2	2	3.84
Sole of foot	-	-	-	-
Total	26	28	52	100.00
Percent	46.15	53.85	100.00	

formation in the study cases, reveals that keloid has resulted spontaneously in 4 cases and in 48 cases has developed upon injury like burn, infection and trauma. History of hereditary or familial diathesis is noted in 4 cases. It is worthwhile pointing out that the spontaneous variety of keloid did not show any familial predilection. In the group of 4 patients with positive familial predisposition, there were 2 males who happened to be brothers and 2 female cases were mother and daughter.

The study was directed mainly to find out effect of steroid injections on keloid, clinically, histologically and histochemically and hence only 31 cases are assessed. Majority of the cases displayed definite improvement. Symptoms like pain and itching were alleviated after 3rd and 4th injections (13 and 10 cases respectively). Keloid started softening after 8th and 10th injections (10 cases each). It needs to be emphasised that in some cases softening of keloidal lesion is delayed and at least in 5 cases in the present series softening started after 6th injection. Keloid got flushed with the skin surface after 10th and 12th injections on an average. (13 and 12 cases respectively). Even after

5th injection, no significant clinical improvement was discernible in 6 cases.

Table - II

CLINICAL RESULTS AFTER INTRALESIONAL INJECTION OF HYDROCORTISONE -31 cases

Clinical Results	Injections											
	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	
Relief of Itching	5	13	10	-	-	-	2	*	-	-	-	
Relief of Pain	5	13	10	-	-	-	2	-	-	-	-	
Started Softening	-	-	-	2	3	-	10	-	10	-	-	
Flushed c Surface	-	-	-	-	-	-	-	-	13	12	-	

No Improvement After 5th Injection — 6 cases

Recurrence after 3 months of completion of Injection — 6 cases

21 patients were subjected to intrakeloidal excision and skin grafts followed by injection of steroid at the margins. The followup studies of these 21 cases for one year revealed recurrence in 2 cases only. Histological and histochemical changes in the keloid and of the tissue after injection revealed the following :-

Histologically, typical keloid shows changes in the connective tissue of dermis e.g. excessive collagenisation in the deeper dermis with accompanying whorled pattern at places, coupled with intense cellularity. The lining epithelium is conspicuously thin and is separated by normal connective tissue from the keloid tissue, almost in every case in the present series. Only few cases showed scanty inflammatory cell infiltrate extrinsic to the keloid tissue. 5 cases sowed inclusion cysts.

Histochemically, there is intense PAS positivity in the keloid tissue. With vanGieson staining, it is observed there is increase in the yellow material in the keloid tissue, the typical red colour of the collagen fibres is changed to yellowish red. With

Masson's trichrome staining the fibres appear stained greenish red rather than green which is the colour of normal mature collagen. The striking paucity or even absence of elastic fibres specially merits mention. Gordon's silver impregnation study displayed broad and coarse bands of reticulin.

Histochemically, after 5th steroid injection definite reduction in PAS positivity is evident and extra-fibril PAS positive material is seen to disappear almost completely. With VanGieson staining also the yellow material seems to be on decrease and with Masson's Trichrome staining the collagen fibres appear to fragment & show pinkish colouration instead of classical green of mature normal collagen.

The non-recurrent keloid, after a period of 3 months following 12th injection displays restoration to normal collagenous connective tissue of dermis.

Table - III

HISTOLOGICAL AND HISTOCHEMICAL RESULTS AFTER INJECTION

	Changes in Keloid			
	Before Injunctn	After 5th Injunctn	After 3 months	After Recurrence
Collagenisation	+++	++	+	++
Cellularity	+++	++		+++
PAS Positive material	+++	++	+	+++
VanGieson Staining	+++ (Yellow)	++ (Yellow)	+	++ (Yellow)
Masson's Trichrome	+	+	+	+
		(Green)	(Green)	
Reticulin	++	+	+	++
Elastic Tissue	-	-	+	+
Epidermis	Thin	Thin	Thin	Thin
Inclusion Cysts	+ In Some	+ in Some	Nil	+ In Some
Inflammatory Cells	+ In some	+ In Some	Nil	++

+— Indicate appearance in Normal Skin.

DISCUSSION

Intralesional injection of triamcinolone acetonide was tried with satisfactory results by Griffith, 1966 and Mastarde, 1971. Khanna, 1968 and Theogaraj & Mani, 1969; instead the authors in the present study have used hydrocortisone acetate (Roussel) for intra-lesional injection, with satisfactory results.

Satisfactory explanation relating to the mechanism underlying disappearance of large amounts of ground substance, cellularity and excessive collagenisation of deeper dermis, in the post-injection keloid, still eludes us.

As Organisers of extracellular matrix, proteoglycans which are intensely PAS positive and are deposited in the early phase of wound healing before collagen fibres deposition becomes obvious (Knapp et al, 1977). Excessive deposition of extracellular matrix results in keloid (Rubin et al, 1991). Also it is known that, in keloid, rate of collagen synthesis, ratio of type-III to type-I collagen and the number of reducible cross links remain high, a situation that indicate "maturation arrest" or block in the healing process (Harandez, 1988). This is evidenced by the hystochemical finding of intense PAS positivity and altered tinctorial property of collagen of keloid in the present study. This is probably due to abnormal function of local fibroblast who have become disarrayed due to injury or some unknown stimulus acting locally.

With injection of steroid, there is inhibition of the action of fibroblasts who are responsible for production of proteoglycans (Ground substance) and thereby formation of collagen fibrils (Dinerallo, 1987). Since inhibition of the function

of fibroblasts is achieved through the action of steroid on interlukin I (Lew et al, 1988), some immunological mechanism may be postulated active in the process of keloid formation.

CONCLUSION

The balance of evidence presented in this preliminary study conducted by the authors, prompts to conclude that the intra-keloidal injection of hydrocortisone not only depresses the fibroblastic activity but also helps in some way or other, hitherto unknown to the authors, in resorption of excess ground substance and collagen material present.

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