A Comparative Study of Therapeutic Efficacy between Intralesional Steroids and Cryotherapy in the Management of Keloids

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Abstract

Introduction: Keloids and hypertrophic scars are abnormal response of body to skin injuries. Keloids develop as a result of abnormal proliferation of dermal collagen tissue following skin injury. In our study the result of treatment of keloids with intralesional steroids is compared with cryotherapy.

Material & Methods: It’s a Prospective & Interventional study done among patients with a clinical diagnosis of keloids. A total of 30 patients were selected for the study over a period of 6 months by convenient sampling technique. In each patient, two interventions were done. One lesion with Intralesional corticosteroids and another with cryotherapy. Follow up was done to determine the effectiveness.

Results: Out of the 30 study participants, mean age was 25.2±4.8 years with majority belonging to 20-30 years age group (n=14, 46.7%) followed by 31-40 years (n=7, 23.3%). There was a male preponderance with 63.3% (n=19). Family history of keloid was found only in 3 patients. In more than half the proportion of the cases (53.3%), keloid lesions were present on the chest with size being less than 5 cm in majority (70%). The mean scar height in initial stages among cryotherapy group was 3.62 mm which reduced to 0.85 mm after first month and completely resolved by 6 months. In the ILS group, mean scar height was 1.18 even after six months of treatment.

Conclusions: There was a statistically significant reduction in the scar height, thickness, surface area, scar volume & consistency in the lesions where cryotherapy was done compared to intralesional steroid (ILS) therapy.

Keywords: keloid, collagen, intralesional steroids, cryotherapy, efficacy

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1. Introduction

Keloids and hypertrophic scars are abnormal response of the body to skin injuries. Overproduction of compacted fibrous tissue is basic cause of these lesions. Keloids are characterised by increased collagen and glycosaminoglycans content as a result of increased collagen turnover.

Keloids develop as a result of abnormal proliferation of dermal tissue following skin injury. The pathophysiology of disease is still under obscure, but it has been suggested that combination of high prolidase activity (up to four-fold compared to normal skin) and increase in type I procollagen and type I collagen concentration in the tissue (especially the latter) are involved. There is hereditary or racial predisposition. The common sites are the presternal area, ear lobes, shoulders, ankles and/or face.[1,2,3]
Keloids may cause itching, discomfort, pain, movement limitation (if very large), and other physical and psychological problems.

With regards to treatment of keloids, no single approach is uniformly effective in the patients and many require multiple treatment options[4].

(i) Intralesional corticosteroids (ILS)
(ii) 5-Fluorouracil (5-FU) intralesional injections
(iii) Cryotherapy
(iv) Surgical excision
(v) Pressure therapy
(vi) Silicone products

Among the most common treatments are intralesional corticosteroid injections and cryotherapy as well as a combination of these two modalities.

Intralesional corticosteroids (ILS) is the frequently used modality, the steroid most commonly used, being depot preparation of triamcinolone acetonide (40 mg/ml). It is important to inject the steroid in mid-dermis, otherwise it may lead to irreversible atrophy of the epidermis. Injections are repeated once in 3–4 weeks depending on the bulk of keloid. The total number of injections depends on the clinical response which varies in each patient. Pain during injection is an important limiting factor[5].

Based on the extensive review of the studies and literature, Cryosurgery with liquid nitrogen leads to total or partial response in almost three-fourth of keloids after at least three sessions[6,7]. Hypopigmentation, blistering, delayed healing and infection are the major side effects[8]. A combination of liquid nitrogen cryosurgery and intralesional steroids seems to have a synergistic effect over liquid nitrogen cryosurgery alone[9]. Liquid nitrogen cryotherapy done prior to the intralesional injection softens the keloid and makes the injection more easier and leads to uniform dispersal of the drug into the tissue. Cryotherapy induces edema and cellular breakdown, causing a further decrease in the density of fibrous tissue so that the injection can be given easily.

The ultimate goal of treatment of keloids should be low recurrence rate, minimal adverse effects and significant cosmetic improvement.

Objective of our study is to compare the therapeutic efficacy of intralesional steroids to cryotherapy in the management of keloids.

II. Material & Methods

It’s a Hospital based prospective & intervention study done among patients with a clinical diagnosis of keloids presenting to OPD Dermatology Venereology and Leprosy in Gandhi Medical College and Hospital. Study period was from August 2018 to July 2019.

Inclusion criteria
All patients with keloids in accessible regions of body and who were willing to participate in the study. Keloids on similar site (location), size were selected for the comparison study.

Exclusion criteria
Immunocompromised patients such as HIV patients, patients on systemic steroids, Diabetes Mellitus, Pregnancy & lactation
Patients who were not willing and those who have already taken any sort of treatment for the keloids
Sample size & Study duration: A total of 30 patients were selected for the study over a period of 12 months by convenient sampling technique.

The study participants were selected after fulfilling the inclusion and exclusion criteria. Patients were enrolled after informed consent and a detailed clinical history taken, clinical examination and documentation was done. Routine investigations done including HIV I & II, HBsAg and CT BT. In each patient, two interventions were done, one lesion with ILS and another with cryotherapy. Followup was done at monthly intervals to determine the effectiveness.

Statistical analysis:
The data was tabulated and analysed. The quantitative data was summarized in excel sheet. Mean, median, standard deviation was estimated. Microsoft word and excel was used for preparation of graphs and charts. Appropriate statistical tests such as ‘t’ test was applied wherever necessary to determine any difference. In above test “p” value less than 0.05 was accepted as indicating statistical significance.
III. Observation And Results

Out of the 30 study participants, mean age was 25.2±4.8 years with majority belonging to 20-30 years age group (n=14, 46.7%) followed by 31-40 years (n=7, 23.3%). There was a male preponderance with 63.3% (n=19) with a male to female ratio being 1.7:1. The mean duration of the disease was 1.8±0.5 years. The commonest site being chest.

Family history of keloid was found only in 3 patients.
The major etiological factors for keloid formation were non-specific trauma (20%), acute folliculitis (16.7%) and truncal acne (10.5%).

Keloid characteristics:
In more than half the proportion of the cases (53.3%), keloid lesions were present on the chest with size being less than 5 cm in majority (70%).

With regards to symptomology, most patients presented with cosmetic problems (83.3%) and others with discomfort, pruritus, pain, tenderness etc.

Table 1: Comparison of the Qualities of surface area, height and volume of scar in the two therapy groups at different stages

<table>
<thead>
<tr>
<th>Scar height (mm)</th>
<th>Cryotherapy</th>
<th>ILS</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original size</td>
<td>3.62</td>
<td>3.12</td>
<td>0.2</td>
</tr>
<tr>
<td>After 1st month</td>
<td>0.85</td>
<td>1.67</td>
<td>0.00009</td>
</tr>
<tr>
<td>After 6 months</td>
<td>--</td>
<td>1.18</td>
<td>0.0000001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scar surface area (mm²)</th>
<th>Cryotherapy</th>
<th>ILS</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original size</td>
<td>125.17</td>
<td>110.54</td>
<td>0.3</td>
</tr>
<tr>
<td>After 1st month</td>
<td>18.94</td>
<td>98.71</td>
<td>0.0000001</td>
</tr>
<tr>
<td>After 6 months</td>
<td>--</td>
<td>56.15</td>
<td>0.0000001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scar volume (mm³)</th>
<th>Cryotherapy</th>
<th>ILS</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original size</td>
<td>425.78</td>
<td>410.34</td>
<td>0.5</td>
</tr>
<tr>
<td>After 1st month</td>
<td>34.94</td>
<td>286.37</td>
<td>0.0000001</td>
</tr>
<tr>
<td>After 6 months</td>
<td>--</td>
<td>110.49</td>
<td>0.0000001</td>
</tr>
</tbody>
</table>

For each patient, on one lesion cryotherapy was given and for another with ILS and patients were followed up till 6 months. The results of both the interventions were compared over a period of time for scar height, its surface area and volume.

There was a statistically significant reduction in the scar height, surface area and scar volume in the lesions where cryotherapy was done compared to intralesional steroid (ILS) therapy as mentioned in the table 1.

The mean scar height in initial stages among cryotherapy group was 3.62mm which reduced to 0.85 mm after first month and completely resolved by 6 months. In the ILS group, mean scar height was 1.18 even after six months of treatment.

With regards to scar surface area, the mean area was 125.17 mm² and 110.54 mm² respectively in the cryotherapy and ILS groups. In the cryotherapy, there was significant reduction in surface area to 18.94 mm² and then complete resolution compared to ILS group.

And lastly with scar volume, there was again a statistically significant reduction in the scar volume from 425.78 mm³ to complete resolution in cryotherapy group.

Side effects in the ILS group included hypopigmentation (2 cases), telangiectasia and atrophy in 1 case each. In cryotherapy, the only side effect noticed was temporary scar hypopigmentation in 3 cases which disappeared in the follow up of 6 months.

IV. Discussion

The present hospital based prospective & interventional study was done among 30 patients to compare therapeutic efficacy of intralesional steroids vs cryotherapy in the management of keloids. Present study found a significant reduction the scar height, scar surface area and scar volume in the keloids which were subjected to cryotherapy.

Similar kind of findings were seen in HamidehAzimiAlamdari et al (2018) where a significant decline was found in surface area, height and volume of the scars with cryotherapy after the first session compared to other 2 methods. The decline in surface area, height and volume after the sixth session was 52.9%, 61.37%, and 78.06% respectively with steroid injection and 32.16%, 58.07%, and 60.67% with 5-FU injection. Side effects were permanent hypopigmentation, telangiectasia and atrophy in the steroid group; surface wound, hyperpigmentation and increased pain in the 5-FU group; and temporary hypopigmentation in the cryotherapy group. And their study concluded stating that intralesional cryotherapy accelerates keloid healing and has fewer side effects than other treatments.

A comparative study of intralesional injection of triamcinolone acetonide alone versus combined cryotherapy and triamcinolone acetonide by Punit Kumar Singh and Mani Kant Kumar (2015) found that combination of cryotherapy followed by intralesional injection of triamcinolone acetonide (40mg/ml) required
lesser number of procedures (3-5) for excellent (76-100%) flattening of the lesions, reduction of complain of pain /tenderness (100%), pruritus (90%), restricted mobility (70%) and cosmetic problems (84%). Recurrence rate was comparatively much less with cryotherapy followed by intralesional injection of triamcinolone acetonide.

V. Conclusions

With regards to treatment of keloids, no single approach is uniformly effective in the patients and many require multiple treatment options. Among the most common treatments are intralesional corticosteroid injections and cryotherapy as well as a combination of these two modalities. When compared to intralesional steroid (ILS) therapy, there was a statistically significant reduction in the scar height, thickness, surface area, scar volume and consistency in the lesions in the present study where cryotherapy was done.

References

FIGURES:

Figure 1: A patient with Keloid treated with cryotherapy after each sitting
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Figure 2: Patient regained pigmentation during 6 months followup after cryotherapy

Figure 3: Pictures of a patient with Keloid treated with ILS over subsequent sittings