CASE REPORT

Cryotherapy: A Successful Monotherapy for Earlobe Keloids

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Abstract

A keloid represents an excessive overgrowth of skin beyond the boundaries of an injury. Earlobe keloids usually follow ear piercing and can become large, sometimes producing remarkable disfigurement. Surgical excision, pressure dressing, intralesional corticosteroid injection, cryosurgery, radiation, and lasers have all been used to treat earlobe keloids. However, none has produced uniformly satisfactory results. Combinations of more than one modality have also been employed to yield successful outcomes. We describe cryotherapy as a single modality to treat seven-year-old, multiple earlobe keloids. Three cryotherapy sessions with two freezing-thawing cycles of 30-40 seconds' freezing time and two minutes' thawing time, undertaken one month apart, resulted in complete flatness of the keloids and no recurrence after 5 years. We also evaluate keloid-related and operational factors that determine the success of cryotherapy as a monotherapy for earlobe keloids.

Introduction

A keloid is an overgrowth of skin at a site of injury, surgical scar, burn or vaccination.[1,2] Predisposing factors include black race; female gender; family history of keloid formation; secondarily infected wound;[3] injuries to the presternal area, earlobes, shoulder girdle, face or ankle;[4] and injury during puberty or pregnancy, due to high fibroblastic activity.[5] Itching and pain are common symptoms of keloids.[1,3] Keloids can become of major cosmetic concern, particularly earlobe keloids if they grow to a large size. Earlobe keloids usually follow ear piercing.[6] Different treatment modalities have been employed, whether alone or in combination, including surgical excision, pressure dressing, intralesional corticosteroid injection, cryosurgery, radiation, and lasers, yet none of these options has consistently produced satisfactory results.[6-8] Cryotherapy is widely and safely used in dermatology: for instance, in the treatment of cutaneous leishmaniasis,[9] warts[10] and benign tumors such as pyogenic granuloma.[11] The use of cryotherapy alone was studied, and was found to be a promisingly effective and efficient method for treating earlobe keloids,[8,12,13] especially for small keloids less than 0.6 cm[8], and of less than 2 years' duration1.[3,14] We here describe multiple, seven-year-old earlobe keloids on both ears, which we successfully treated with cryotherapy alone. We selected the reduction in thickness and recurrence as indicators of improvement.

Case report:

A 20-year-old woman had a seven-year history of asymptomatic keloids on both earlobes, which had appeared a few weeks after piercing. Examination of the left earlobe revealed a skin-colored, soft, single, pedunculated keloid of 2 x 1.5 cm size and 0.8 mm thickness on the anterior surface. On the right lobe, there was a purple-colored, soft, single, sessile, 2 x 1 cm-sized keloid on the anterior surface, and three small, sessile nodules less than 0.5 cm in diameter on the posterior surface. We used a direct open spray technique and liquid nitrogen cryogen (LN) to treat all the keloids. LN from a Brymill (CRY-AC no. 593) cryogun, with nozzle size (B), set at 1 cm distance from the center of the keloid surface was sprayed on the lesion for 30-40 seconds, for two freeze-thaw cycles with two minutes' thawing time, until we achieved a snowball covering the whole keloid. To protect the surrounding normal skin, we used a Brymill open cone shield that covered the whole field except the targeted keloid. The treatment was well tolerated by the patient; no local anesthesia was required. Fucidin cream was applied twice a day after the session to prevent secondary infection. An inflammatory reaction appeared two days after the session and helped in the destruction of 50% of the keloid. A second and third session were subsequently held, after the signs of inflammation resolved. A total of three cryotherapy sessions, each one month apart, involving two freeze-thaw cycles of 30-40 seconds' freezing time were required

before the left earlobe keloid became completely flat (100% thickness reduction) (**Figure 1**). The keloids on the right ear also required three cryotherapy sessions, with two freeze-thaw cycles each session of 20-30 second' freezing time and 2 minutes' thawing. After the three sessions, there was 100% thickness reduction on the right-earlobe keloids, with mild induration only felt by deep palpation of the posterior surface of the earlobe (**Figure 2**). At a 5-year follow-up, there remained mild hypopigmentation, but no scarring and no recurrence.

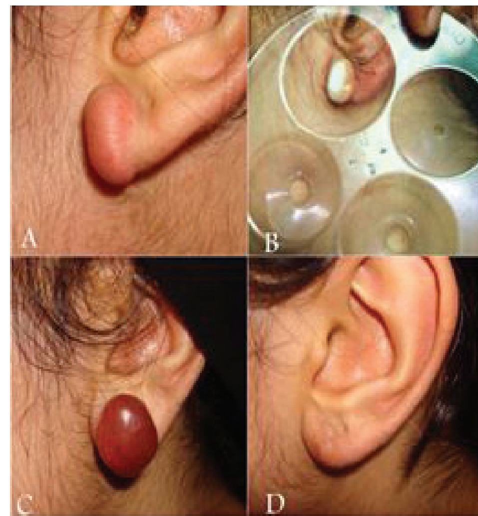

Figure 1: (Left earlobe keloid): a) Before cryotherapy, b) During the 1st session, c) Bullous inflammation 2 days after 1st session, d) complete flatness of the keloid 5 months after the last 3rd cryotherapy session.

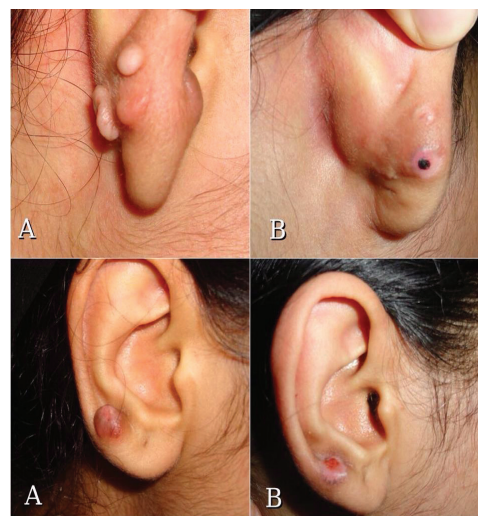

Figure 2: (Right earlobe keloid): Anterior: a) Before cryotherapy, b) 3 weeks after 3rd session. Posterior: a) before cryotherapy, b) 3 weeks after 3rd session.

Discussion

Cryotherapy alone has been reported by some studies to be effective in treating earlobe keloids. Keloid-related factors and operational factors are significant determinants for the success of cryotherapy. Cryotherapy is more effective when keloids are small and recent. In our case, although the earlobe keloid was both old and of considerable size, we were able to achieve a 100% reduction in thickness. This can be explained by operational factors that we considered during therapy, such as the cryogen used, freezing rate, freezing temperature achieved by the cryogen, freezing time (FT),[15] freeze-thaw cycle (FTC), and thawing time.[16] We used the cryogen liquid nitrogen because it is the coldest cryogen and creates high freezing temperatures, between -25 to -50, in 30 seconds,[16] which can destroy the keloid tissue. To achieve a high freezing rate, we used the open spray method (OS) and techniques recommended by Andrews for family physicians.[16] Accordingly, for keloids, the recommended method for cryogen application are either the open spray (OS) or the probe method, with FT for 20-30 seconds, one FTC, and 3 subsequent treatment sessions 8 weeks apart. However, in our case the FT was longer (between 30- 40 seconds), and we used more than one FTC: we used 2 FTC, with 2 minutes' thawing time in each session, and the time between subsequent sessions was only 4 weeks. There is evidence from the literature that lengthy application of the cryogen produces significant reduction in the thickness of the keloid.[15] The quick-spraying application using the OS method, the longer FT, and the very slow thawing time that we applied during treatment were successful operational dimensions for inducing the sufficient tissue destruction necessary to flatten the keloids.

Our results are consistent with those of Zouboulis et al. 1996, where cryotherapy alone reduced the thickness of keloids after three cryosurgery sessions, involving one freeze-thaw cycle of 30 seconds per session per lesion, one month apart. For patients refusing cryotherapy, other treatment modalities for earlobe keloids include the combination of more than two treatment modalities, such as surgical excision and corticosteroid injection,[17] but there is a 55% chance of recurrence after the keloids are excised.[17] In the trial of Aköz, et al. 2003, earlobe keloids were surgically excised, followed by intralesional triamcinolone injection; finally, pressure over the wounds was applied

using silicon-coated ear-ring sheets covered for four months after the keloid excision. This combination of four methods produced a 90% success rate, with only one recurrent case. It stands as a promising approach; however, it is costly, and produces considerable discomfort to the patient, as the silicone gel sheet is intended to be applied for at least 3-4 months. Another surgical innovation for treating earlobe keloids is the "keloid fillet flap," which does not need to be combined with steroid injection or compression, but which requires surgical skill including dissecting and removing the keloid from the overlying skin that will act as the "flap" used to cover the wound after removing the keloid.[18]

In contrast, cryotherapy is cheaper, easily applied, and does not require sophisticated preparation. All these factors make cryotherapy a cost-effective procedure for treating keloids.

In conclusion, cryotherapy appears to be a promising, effective, efficient, easy-to-perform and safe single approach to treat keloids.

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How does this paper make a difference to general practice?

- Cryotherapy can be used exclusively for treating earlobe keloids
- No need for compression using silicone sheet
- Cryotherapy is cost-effective if applied properly, by applying the appropriate freezing and thawing time and appropriate number of freeze-thaw cycles every session

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