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Combination Therapy of Submandibular Keloids Electrosection and Cryotherapy

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ABSTRACT

Introduction: Keloid is an excessive formation of scar tissue (proliferative growth) that appears on the skin that has been traumatized or over a surgical wound and is not in accordance with the severity of the trauma, cannot heal spontaneously, and can recur after excision. Treatment of keloids on the face is difficult and challenging and has consequences for aesthetics. Various types of combination therapy, such as electrosurgery (radiofrequency) followed by frozen surgery (cryotherapy) are recommended to reduce the risk of keloid recurrence. ***Case Illustration:*** A 15-year-old male came with the chief complaint of a lump on his face. at the location of the submandibular region found a solitary tumor, with firm boundaries, oval shape, skin color, a diameter of 1 cm, and a smooth and shiny surface. On palpation, the consistency is firm and immobile. On dermoscopy examination, a purple vascular structure was obtained, and arborizing vascular structures were seen. A clinical diagnosis of keloid was given. The treatment was given by radiofrequency electrosection and was followed by cryotherapy for lesions in the submandibular region. ***Discussion:*** The combination of radiofrequency and cryotherapy was considered in this case because the location of the keloid lesion was located on the facial area which could reduce the risk of bleeding and also from a cosmetic point of view of the patient. The combination of the 2 therapies also functions to reduce the possibility of recurrence in patients. ***Conclusion:*** Radiofrequency and cryotherapy measures show significant clinical improvement; the lesions shrink and soften.

Keywords: keloid; electrosection; cryotherapy; radiofrequency

INTRODUCTION

Keloid is an excessive formation of scar tissue (proliferative growth) that appears on the skin that has been traumatized or over a surgical wound and is not in accordance with the severity of the trauma, cannot heal spontaneously, and can recur after excision. Keloids can also be defined as benign growths of dense fibrous tissue, which develop in response to an abnormal healing skin injury, that extends beyond the original boundaries of the wound or inflammatory response.[1,2]

The etiology of keloids is still not fully understood. No specific gene has been identified as the cause of the development of a keloid, although an increased prevalence of keloids associated with increased skin pigmentation suggests a genetic influence. Keloids are genetically related to HLA-B14, HLA-B21, HLA-Bw16, HLA-Bw35, HLA-DR5, HLA-DQw3, and blood type A. Transmission has been reported as autosomal dominant and autosomal recessive. Keloids can be caused by surgical incisions, wounds, injections of vaccination (BCG), burns, acne scars, after smallpox, insect bites, and wearing earrings. [1,2]

Keloids can be found in 5-15% of wounds. The incidence rate of keloids is 15 times higher in individuals with darker skin, with an incidence rate of 15-20%. The average age of people with keloids is 10-30 years with the highest incidence in the age range of 20-30 years. Keloids can also occur at the age of children.

Demographically, it is reported that Asian people are more at risk of developing keloids and tend to suffer from more severe scarring, with a more aggressive scar formation process, and a higher risk of recurrence.[2,3]

Treatment options for keloids aim to relieve symptoms and improve the appearance of the scar. The most commonly used treatment modalities are intralesional steroid injections, surgical excision, cryotherapy, laser therapy, radiotherapy, and silicone gel attachment. Treatment of keloids on the face is difficult and challenging and has consequences for aesthetics. Various types of combination therapy, such as electrosurgery (radiofrequency) followed by frozen surgery (cryotherapy) are recommended to reduce the risk of keloid recurrence.[4,5]

The following is a case of keloids in a male patient who was treated with a combination of electrosurgery (radiofrequency) followed by frozen surgery (cryotherapy).

Case Illustration

A 15-year-old man came to the Skin and Venereology Polyclinic at Sanglah General Hospital, Denpasar with the chief complaint of a lump on his face. The lump appeared about 2 years ago. The lump started from smallpox scars 2 years ago. Due to scratching, the scar enlarged. No pain or itchiness was reported. The patient self-medicated with an unknown ointment, but there was no change.

Physical examination was unremarkable. Dermatological status, in the location of the submandibular region, found a solitary tumor, well defined, oval shape, skin color, diameter 1 cm, smooth and shiny surface. On palpation, the consistency was firm and immobile (Figure 1). On dermoscopy examination, a purple vascular structure was obtained, and arborizing vascular structures were seen (Figure 2).

FIGURE 1: Tumor lesion in the submandibular region.

FIGURE 2: Dermoscopic examination of the patient.

The working diagnosis of the submandibular region keloid was given. The treatment was given, through radiofrequency electrosection and followed by cryotherapy.

Tools and materials were prepared (radiofrequency cautery machine, round loop electrode tip, ball electrode tip, cryogun along with liquid nitrogen content, long spray tip, sterile duk, clamp duk, 1cc syringe, sterile bent, sterile comb, 10% povidone-iodine, 0.9% NaCl solution, sterile gauze, 2% lidocaine, gentamicin 0.1% skin ointment), then the patient was asked to lie down in a supine position. Local anesthesia was used with 2% lidocaine intralesionally using the infiltration technique.

After 3-5 minutes, then radiofrequency was performed in cut mode. Keloids were cut slowly layer by layer until healthy tissue was visible and bleeding spots appeared. The next step was spraying the former lesion with liquid nitrogen to form ice for 20 seconds carried out for 3 cycles of freeze-thaw. After the procedure, the antibiotic ointment gentamicin 0.1% is applied topically every 12 hours.

After the procedure, the patient was given education to keep the wound clean and dry for the next 5 days. Follow-up of the patient after 2 weeks showed no complication. Frozen surgical therapy with liquid nitrogen is planned to be carried out every 2-4 weeks for up to 3-4 operations to ensure the keloid has been completely destroyed.

DISCUSSION

Keloids are pathological scars that gradually grow over time or may develop years after initial onset, and extend beyond the original site of injury after impaired wound healing.[1-3] The annual incidence of keloids is high worldwide, but when compared racially, the incidence of albinism has the lowest incidence. Dark-skinned individuals of African, Asian, and Hispanic descent have a higher rate of keloid formation than Caucasians with estimates of keloid incidence ranging between 5% and 16%. This may be due to the high content of melanocyte-stimulating hormone (MSH). It was also found that the incidence of keloids varies, keloids resulting from burns are 91% and due to surgery between 40% and 70%, depending on the depth of the wound that occurs. A family history of keloid increases the risk of keloids and in the findings, it is noted that 50% of keloid patients have a family history of keloids.[6,7]

Several factors play a role in the formation of keloids, including genetic predisposition and some forms of skin trauma. Predisposed individuals may develop keloids after trauma to the skin, such as surgery, piercings, acne, tattoos, insect bites, burns, lacerations, vaccinations, and other processes that cause skin inflammation, but some keloids may develop spontaneously. Some other literature mentions the existence of a mechanical theory. The areas that most often experience scars are areas with high skin tension, such as the skin of the front of the chest which is often stretched horizontally by the pectoralis muscle, and the skin of the scapula and shoulders which is repeatedly stretched by movement of the extremities and the skin of the lower abdomen which is stretched due to changes in position such as sitting and standing. [6,7]

Keloid formation is theorized to be the result of an imbalance of increased collagen and extracellular (ECM) synthesis, as well as decreased degradation of this product. Increased ECM collagen synthesis is thought to be related to the overactivation of keloid fibroblasts through overexpression of an inflammatory mediator, namely, Transforming growth factor β1 (TGF-β1). Different production of the TGF-β isoform is thought to be responsible for the overproduction of collagen by pathological scar tissue fibroblasts. Another mechanism is immunology. Antinuclear antibodies against fibroblasts in keloids have been found, but their role in the pathogenesis of keloids is still unclear. The study of Placik and Lewis reported that there was a direct relationship between the rate of keloid formation and the level of immunoglobulin E in the blood.[6,7]

Electrosurgery is a technique that uses electrical transmissions to cut tissue, destroy tissue, and cauterize vessels. Variations in the wavelength of flow produce different biological effects on tissue.

For skin procedures, electrosurgery can be divided into 6 different treatment modalities: electrofulguration, electrodesiccation, electrocoagulation, electrosection, electrocautery, and electrolysis. Electrosection uses slightly damped or undamped sine waves, low voltage, and alternating electric current high enough to cut tissue with minimal peripheral heat damage. The "Bovie" blade combines a mixture of undamped and damped sine waves to allow cutting and coagulation at the same time. Electrosection is preferred in the management of keloid cases because it only cuts tissue which results in minimal tissue damage.[8,9]

Frozen surgery (cryotherapy) refers to the use of extreme cold to destroy abnormal cells or problematic tissue. Rapid freezing results in the formation of intracellular ice crystals which disrupt electrolytes and changes pH, whereas slow freezing results in extracellular ice formation and less cell damage. Therefore, tissue effects and cell death are frequently observed in rapidly frozen tissues. [8-10]

The combination of radiofrequency and also cryotherapy was considered in this case because the location of the keloid lesion was located on the facial area which could reduce the risk of bleeding and also from a cosmetic point of view of the patient. In addition, the combination of the 2 therapies also functions to reduce the possibility of recurrence in patients.[8-10]

In this case, electrosurgery therapy (radiofrequency) was performed 1 time and frozen surgery (cryotherapy) 2 times on the left submandibular lesion. The lesion was getting smaller and softened after 7 days and 14 days post-therapy. The patient was suggested to avoid trauma at the keloid site.

Post-therapy antibiotic was given to minimize the possibility of infection and analgesics were to reduce the possibility of pain. The prognosis in these cases is *dubia and bonam*. Follow-up after radiofrequency therapy and cryotherapy is necessary to see if there is a recurrence of keloids.

CONCLUSION

Radiofrequency and cryotherapy measures show significant clinical improvement, namely the lesions shrink and soften. Follow-up is needed to see if there are recurrences after the procedure.

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