Experience of surgical treatment combined with low-dose electron beam radiotherapy for keloid.

Hua Shen*

Department of Plastic Surgery, Shanghai First People's Hospital, Shanghai Jiao Tong University, School of Medicine, Shanghai, China

Accepted on 22 November, 2020

Commentary

Keloids which may result from acnes, wound, surgical treatment and even insect bites are often seen by plastic surgeons, the incidence rate of keloids in adult population in various countries ranges from 0.09% to 16%. Compared with white people, keloids are more likely to occur in highly pigmented skin races, such as blacks and Asians. Among the patients younger than 30 years old in the young group, patients between 10 and 20 years old are more likely to form keloids with the same incidence rate for men and women [1,2]. Keloids are mainly found in areas with relatively high tension, such as sternum handle, shoulder and lower jaw, and rarely undergo degeneration. The causes of the disease are complex, including genetic susceptibility, endocrine factors, infection, local hypertonia, and excessive inflammatory response and other factors. Keloid can occur in any population, which is generally considered as an hyperproliferative reaction of skin tissue. Its pathological essence is excessive and continuous proliferation of fibroblasts and synthesis of a large number of disorganized collagen fibers and excessive deposition of extracellular matrix.

Discussion

Previous studies have shown that the key link of keloid formation includes: inflammatory cells gather in the early stage of trauma, releasing a large number of cytokine inflammatory signals, causing fibroblasts and vascular endothelial cells to form microvascular proliferation, synthesizing extracellular matrix dominated by collagen to deposit in large quantities, forming scars. With the completion of re-epithelialization, fibroblasts and endothelial cells gradually undergo apoptosis, and collagen fibers are reshaped to the final scar maturity. The clinical manifestations are mainly protuberant plaques or papules, which exceed the boundary of the primary wound and are not easy to self-resolve. The treatment of keloid has long been one of the difficulties and hot spots in the field of plastic surgery.

At present, although there are many treatment methods for keloid, including surgery, radiotherapy, drug injection, laser and cryotherapythe, single therapeutic effect is not good due to easy relapse after treatment, and there is no specific treatment due to unclear pathological mechanism. There in no consensus of the most optimized management of this kind of skin lesion, surgical resection is the main method to treat keloid, the recurrence rate of simple surgery operation is very high, so it is often combined with other treatments, such as radiotherapy, drug injection and laser [3]. Radiotherapy has been used for more than a century as a treatment to prevent recurrence of keloid after operation. Radioactive sources include X-ray therapy machines, radioisotopes and megavolt electron beams generated by various accelerators, of which the electron beams generated by accelerators are most widely used due to their strong local effects and low side effects.

Radiotherapy has a strong killing effect on immature fibroblasts at the incision, reducing the synthesis of extracellular matrix and preventing recurrence after excision of keloid. Radiation can also inhibit the proliferation of vascular endothelial cells in scar tissue, thus inhibiting the regeneration of blood vessels and achieving the purpose of treatment, and there is no evidence to cause individual adverse reactions such as gene mutation or carcinogenicity. For the concern of the side effects of radiotherapy, according to our clinical experiences and review of literatures, we advise that radiation therapy is not recommended for pregnant women and children under 12 years of age for the safety reason. Further, keloids in areas sensitive to radiation, such as the thymus, are not recommended for radiotherapy. For patients with willingness to fertility, the scrotum should be avoided.

The keloids on the breasts of adolescent women are relatively contraindicated, radiotherapy is generally recommended to start 24 h after surgery, and the total dose should be controlled within 20 Gy. It is also necessary to decide whether radiotherapy and radiotherapy dose are needed according to the age of the patient and the location of keloid [4,5]. In our previous study, at a median follow-up of 22 months, there were no cases of second malignancies found during follow-up [6]. Even though it was a relatively short time for the observation of malignancy risk, with regard to the principles we applied during radiotherapy, the risk was reduced to its lowest level. In our further studies, we would prolonged the observation time and report any second malignancies related to our combined therapy.

References

1. Liu S, Liang W, Song K, et al. Keloid Skin Flap Retention and Resurfacing in Facial Keloid Treatment. Aesthetic Plastic Surgery. 2017;42:304-9.
2. Trace AP, Enos CW, Mantel A, et al. Keloids and Hypertrophic Scars: A Spectrum of Clinical Challenges. Am J Clin Dermatol. 2016;17:201-23.
3. Renz P, Hasan S, Gresswell S, et al. Dose Effect in Adjuvant Radiation Therapy for the Treatment of Resected Keloids. Int J Radiat Oncol Biol Phys. 2018;102:149-54.
4. Eng TY, Boersma MK, Fuller CD, et al. The role of radiation therapy in benign diseases. Hematol Oncol Clin North Am. 2006;20:523-57.

5. Ogawa R, Yoshitatsu S, Yoshida K, et al. Is radiation therapy for keloids acceptable? The risk of radiation-induced carcinogenesis. Plast Reconstr Surg. 2009;124:1196-201.

6. Wang Y, Ma J, Zhang Z, et al. Combined surgical excision and electron external beam radiation improves the treatment of keloids: A descriptive study. Dermatologic. 2020;33.