

ROLE OF BRACHYTHERAPY IN KELOIDS

Abstract

Radiation therapy is the last option in the treatment of resistant keloids. This puts a huge financial and logistical burden on both patients and the healthcare system. Radiotherapy has achieved good and cosmetic results at a lower cost. The ideal treatment plan consists of complete removal of the keloid followed by rapid administration of the first dose of radiation. The most commonly used techniques are external beam radiation, low dose rate brachytherapy, and high dose rate brachytherapy. Brachytherapy has fewer side effects and lower costs than external radiation. Although more studies are needed, an effective radiation dose (BED) 20-30Gy, such as 2x6Gy, appears to be sufficient in most cases. The most common complications are erythema, temporary and permanent pigmentation disorders, and telangiectasia. While mentioning the risk of secondary cancers occurring in the medical field, only a few cases have been identified, none of which resulted from brachytherapy.

Authors

Dr. Manraj Singh Kang

Associate Professor
Department of Radiation Oncology
GMC Amritsar, Punjab, India.
manraj.kang42@gmail.com

Dr. Taranjeet Kaur

Consultant
Department of Radiodiagnosis TMH
Mullanpur, Punjab, India.

Dr. Shubham Mittal

senior resident
department of Radiation Oncology
GGSMCH Faridkot
Punjab, India.

Dr. Pardeep Garg

Associate Professor
department of Radiation Oncology
GGSMCH faridkot
Punjab, India.

I. INTRODUCTION

Keloids are caused by minor trauma to the skin. Keloids are fibrous benign dermal growths. Hypertrophic scars should be differentiated from keloids [1,2]. Risk factors for keloid formation include skin pigmentation, family history, wound infection, chronic wound infection, and anatomical location [3,4]. The treatment of keloids is usually surgical, but the recurrence rate is very high, from 45% to 100%. It is widely reported that postoperative radiotherapy is the best treatment. Reported clinical response rates range from 67 to 98% [5]. keloid patients were treated with 30Gy of Biological effective dose (BED) and the recurrence rate was less than 10% [6,7].

II. LDR INTERSTITIAL BRACHYTHERAPY

Describes a method for the treatment of keloids by surgical excision followed by locally applied irradiation to the base of wound sutured edges with iridium 192 wire. Then after loading done into a plastic tube using the procedure described by Paine (1972). A dose of 2000 rad is given to a point 2.5 mm from the wire axis (opposite of midpoint). Thirty patients were treated. Patients followed for more than two years had five recurrences within six months, and one recurrence two years later. There were no complications. It has been suggested that this represents a lower recurrence rate compared to other methods and that the dose delivered to the surrounding tissue is lower than that of external radiation therapy, which is important in the treatment of scars. It is a benign disease of young people treated with radiation [8]. Retrospective study of 544 patients (855 keloids) in 1993. After surgical removal of keloids, 547 keloids underwent one season of brachytherapy treatment using Ir and 23 received two brachytherapy seasons of 10.14 Gy (average dose). It was reported that the recurrence rate was 21% after the first treatment and 30.4% after the second treatment. The mean follow-up of this study was 6.91 years [9]. Another case report of LDR brachytherapy with Ir 192 for keloids was published on June 3, 2009. Average dose of 17.9 +/- 2.2Gy at 5mm distance from the wire axis was used. The recurrence rate was 23.6% [10].

III. HDR INTERSTITIAL BRACHYTHERAPY

A seven-year prospective study evaluating the results of operative and non-operative HDR brachytherapy in the treatment of keloids. HDR brachytherapy was applied to 169 patients with keloids between December 1991 and December 1998. Keloid recurred in 8 patients (4.7%) after 7 years of follow-up. Five of them had undergone previous surgery and three had only HDR brachytherapy. The author concluded that HDR brachytherapy is more successful in patients who do not require surgery and has good results and is effective in the treatment of keloid (11). Evaluation of single dose 13Gy HDR brachytherapy after keloid excision. After a mean follow-up of 53 months, the recurrence rate was 24.1%. The recurrence rate is quite high. The advantage is a daily treatment [12].

IV. HDR SUPERFICIAL BRACHYTHERAPY

139 patients (66 keloids) were treated with a combination of excision and a ⁹⁰Sr-⁹⁰Y integrated surface applicator. Radiotherapy was administered at a mean dose of 14Gy within 48 hours after surgery. The relapse-free remission rate was 80%; there was variability between different body regions; lowest in the face and neck (2%) and highest in the chest (49%, P<0.001). In addition, burn-related keloids appeared to be worse (P<0.001) compared

with keloids caused by any type of surgery or trauma. Regarding side effects, erythema occurred in 24% of patients and hypo pigmentation occurred in 11% [13]. Ir 192 moulds were used in 22 patients with 24 keloids and 15 Gy was given in 3 doses after excision. These included two patients who had undergone previous surgery, two patients who had undergone surgery and had received steroid injections, and four patients who had received only steroid injections. The recurrence rate of 16 keloids after 6 months is 12.5%. After treatment, one patient had residual keloid, one patient had grade 1 hypo pigmentation and one patient had grade 1 fibrosis. The conclusion of this study is that postoperative high-dose iridium 192 mould radiotherapy can prevent recurrence of ear keloid [14].

V. METHOD AND DOSE

HDR brachytherapy is performed by placing two micro-catheters between the layers, by holding and holding two layers of mold on the operator's side. The distance between them is 1 cm. Securely attach the mold to the surgical site, such as a catheter placed 5 mm on either side of the suture. These catheters are connected to the HDR brachytherapy device close to the target (for example, at the sutures). Plant the iridium 192 seed using remote back-loading technology. A total dose of 20 Gy was given as 4 doses of 5 Gy, with an interval of at least 6 hours between each dose, starting from the 0th postoperative day, and the treatment was completed within 72 hours after the surgery. Each piece is delivered in 5 to 8 minutes. After the wound has healed, the sutures are usually removed between 7 and 10 days after surgery. All patients regularly wear clothes/earrings.

The patients were followed up weekly for the first 2 weeks, monthly for the first 3 months, then every 3 months for 1 year, then every 6 months if needed. At each visit, widening or hypertrophy of scar, wound-related complaints, skin condition, and recurrence of keloid at the surgery site were recorded.

Results

Brachytherapy is an effective and effective treatment for keloids. Cosmetic and relapse free responses are high in brachytherapy

REFERENCES

- [1] Chike-Obi CJ, Cole PD, Brissett AE. Keloids: pathogenesis, clinical features, and management. In *Seminars in plastic surgery* 2009 Aug (Vol. 23, No. 03, pp. 178-184). © Thieme Medical Publishers.
- [2] O'Brien L, Jones DJ. Silicone gel sheeting for preventing and treating hypertrophic and keloid scars. *Cochrane database of systematic reviews*. 2013(9).
- [3] Lee SY, Park J. Postoperative electron beam radiotherapy for keloids: treatment outcome and factors associated with occurrence and recurrence. *Annals of dermatology*. 2015 Feb 1;27(1):53-8.
- [4] ALHADY SM, Sivanantharajah K. Keloids in various races a review of 175 cases. *Plastic and reconstructive surgery*. 1969 Dec 1;44(6):564-6.
- [5] Ogawa R, Yoshitatsu S, Yoshida K, Miyashita T. Is radiation therapy for keloids acceptable? The risk of radiation-induced carcinogenesis. *Plastic and reconstructive surgery*. 2009 Oct 1;124(4):1196-201.
- [6] Kal HB, Veen RE, Jürgenliemk-Schulz IM. Dose-effect relationships for recurrence of keloid and pterygium after surgery and radiotherapy. *International Journal of Radiation Oncology* Biology* Physics*. 2009 May 1;74(1):245-51.
- [7] Duan Q, Liu J, Luo Z, Hu C. Postoperative brachytherapy and electron beam irradiation for keloids: A single institution retrospective analysis. *Molecular and clinical oncology*. 2015 May 1;3(3):550-4.
- [8] Malaker K, Ellis F, Paine CH. Keloid scars: a new method of treatment combining surgery with interstitial radiotherapy. *Clinical Radiology*. 1976 Jan 1;27(2):179-83.

- [9] Escarmant P, Zimmermann S, Amar A, Ratoanina JL, Moris A, Azaloux H, Francois H, Gosserez O, Michel M, G'Baguidi R. The treatment of 783 keloid scars by iridium 192 interstitial irradiation after surgical excision. *International Journal of Radiation Oncology* Biology* Physics*. 1993 May 20;26(2):245-51.
- [10] Arnault JP, Peiffert D, Latarche C, Chassagne JF, Barbaud A, Schmutz JL. Keloids treated with postoperative Iridium 192* brachytherapy: a retrospective study. *Journal of the European Academy of Dermatology and Venereology*. 2009 Jul;23(7):807-13.
- [11] Guix B, Henríquez I, Andrés A, Finestres F, Tello JI, Martínez A. Treatment of keloids by high-dose-rate brachytherapy: a seven-year study. *International Journal of Radiation Oncology* Biology* Physics*. 2001 May 1;50(1):167-72.
- [12] Hafkamp CJ, Lapid O, Fajardo RD, van de Kar AL, Koedooder C, Stalpers LJ, Pieters BR. Postoperative single-dose interstitial high-dose-rate brachytherapy in therapy-resistant keloids. *Brachytherapy*. 2017 Mar 1;16(2):415-20.
- [13] Wagner, Martin Alfrink, Oliver Micke, Ulrich Schäfer, Patrick Schüller, Normann Willich W. Results of prophylactic irradiation in patients with resected keloids: a retrospective analysis. *Acta Oncologica*. 2000 Jan 1;39(2):217-20.
- [14] Narkwong L, Thirakhupt P. Postoperative radiotherapy with high dose rate iridium 192 mould for prevention of earlobe keloids. *JOURNAL-MEDICAL ASSOCIATION OF THAILAND*. 2006 Apr 1;89(4):428.