Postoperative Radiotherapy with High Dose Rate Iridium 192 Mould for Prevention of Earlobe Keloids

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Background: *A 50% to 80% recurrence rate of earlobe keloids can occur following a simple excision. Many modalities, including radiotherapy, have been suggested to reduce the postoperation recurrence.*
Objective: *The aim of the present study was to determine the efficacy of postoperative radiotherapy by a high dose rate Iridium 192 mould in the prevention of earlobe keloids recurrence.*
Material and Method: *Between March 1999 and March 2003, 22 patients with 24 earlobe keloids were treated by radiotherapy immediately following surgical excision. A dose of 15 Gray in 3 fractions was delivered at a point placed 5 mm from the axis of the Iridium sources.*
Results: *From the 22 patients with 24 keloids who were treated, 15 patients with 16 keloids were followed for a minimum of 6 months. Recurrence occurred in two* keloids *(12.5%). There were no severe adverse effects.*
Conclusion: *Postoperative radiotherapy by high dose rate Iridium 192 mould was an effective prevention of earlobe keloids recurrence. It was well tolerated and did not present any significant side effects.*

Keywords: *Keloids, Earlobe, High dose rate, Iridium 192, Mould*

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Keloid is an excessive proliferation of connective tissue of the skin that frequently develops secondary to a skin wound. Clinically, it presents as a reddish tumor that extends beyond a surgical or traumatic scar and generally increases in dimension over time. Surgical resection of the keloids results in recurrence in 50- 80% of the cases[1,2]. This has led to the use of adjuvant treatments, such as postoperative radiation[3,4], intralesional steroid injections[5], cryotherapy[6,7], laser excision[8], and topical silicon[9] to reduce the rate of recurrence of keloids. The results reported are highly variable. Keloids have occurred frequently after earlobe piercing (Fig. 1A) and caused cosmetic deformity and functional symptoms such as pain, pruritus or numbness. The incidence of earlobe keloids has been estimated at 2.5% from a survey of 1,000 nurses at an American teaching hospital[10]. Postoperative radiation is one of the treatment modalities that have been demonstrated to be effective in preventing recurrence of the keloids in the earlobe area[11-14].

In the present report, the authors described their experience with adjuvant high dose rate Iridium 192 mould in earlobe keloids patients.

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Material and Method

From March1999 to March 2003, 22 patients with 24 earlobe keloids underwent surgical excision followed by radiation. There were 8 males and 14 females. The mean age at treatment was 20.7 years, ranging from 14 to 43 years. The etiology of keloids was ear piercing in 20 cases and trauma in 2 cases. Keloid size ranged from 1-4.3 cm in diameter. Pregnant or breast feeding women were excluded. Two patients were previously treated by surgical excision. Two patients had recurrence after surgical excision and steroid injection. Four patients had recurrence after steroid injection. None of them received radiation.

In the first step, the surgical excision of all earlobe keloids was performed under local anesthesia. The surgical wound was primarily closed (Fig. 1B). Postoperative adjuvant radiation was given within 24 hours after surgery. The dose was 15 Gray at 5 mm from the axis of the Iridium sources, divided in 3 fractions (5 Gray/fraction) in 3 consecutive days. The high dose rate Iridium 192 mould was made of flaps or catheters attached to plastic tubes for Iridium 192 loading (Fig. 2). The margin of prescribed dose at the proximal and distal end was about 0.5 cm. During Iridium 192 loading, shielding to protect normal tissues with lead shield was performed whenever possible.

Patients were seen at day 7-10 of surgical excision to evaluate the wound and to remove the suture. In each follow up, the presence or absence of keloid recurrence and sequelae of treatment were observed. Recurrence was defined as evidence of mass or obvious return of keloid. Late effects were evaluated according to SOMA-LENT (Somatic Late Effects on Normal Tissue) scale of the EORTC[15].

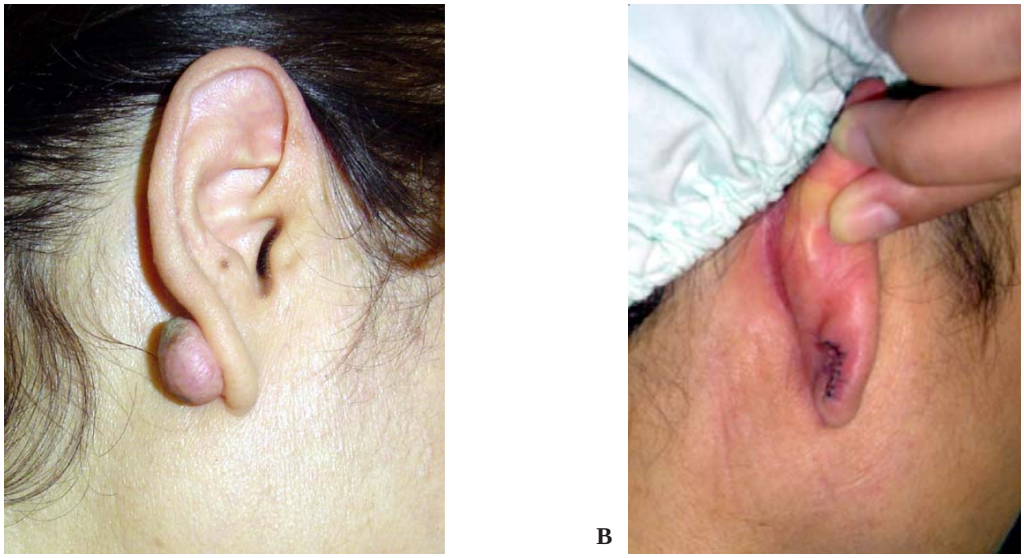

Fig. 1 A) Earlobe keloid occurred after ear piercing
B) After surgical excision and primarily closure was performed

Fig. 2 High dose rate Iridium 192 mould, made of flaps attached to plastic tubes

Results

Twenty two patients with twenty four earlobe keloids were entered into the present study. Seven patients with 8 keloids were unavailable for follow-up, the remaining 15 patients with 16 keloids were the basis of this report. The median follow-up was14.8 months (range 6-36 months). Two keloids (2/16 = 12.5%) developed recurrence within 6 and 15 months after treatment. One patient had residual keloid after treatment, one had grade 1 hypopigmentation and one developed grade 1 fibrosis. No patient experienced grade 3 or 4 toxicity.

Discussion

The efficiency of radiation as an adjuvant treatment in the management of keloid has been convincing. Following surgical excision, radiotherapy was more effective, independently of the modality used, superficial X-ray, electrons or beta ray. Table 1 reports the results of 9 series with recurrent rate ranging from 2.4-49%.

Experience with brachytherapy has demonstrated that it can substitute for external beam radiation (EBRT) as adjuvant treatment of keloids in some situations. Malaker et al[23] have reported a recurrence rate of 20% in 30 linear keloids after surgery followed by Iridium 192 wire low dose rate. Experience with Iridium 192 brachytherapy treated keloids has been reported by Escarmant et al[24] They treated 855 keloids with surgical excision followed by immediate interstitial implantation of Iridium 192 wire low dose rate, with a recurrence rate of 21%. Quix et al[25] have reported 169 keloids treated by high dose rate brachytherapy. A total dose of 12 Gy as postoperative radiation and 18 Gy were given to patients who did not undergo surgery. They found 4.7% recurrence after a follow up of 7 years. The results of brachytherapy are rather similar to superficial X-rays or low energy electron beams in keloid recurrence. The advantages of high dose rate brachy-therapy include: 1) it can be performed on an out patient basis; and 2) it provides a better selective deposite of radiation in tissues and lower degree of normal tissue radiation.

Keloids of the earlobes are more difficult to treat than those at other sites[11,19], and different treatment modalities have been reported with highly variable results (Table 2). Chaudhry MR et al[11], who reported postoperative radiation by 100 KV radiation

Table 1. Postoperative radiotherapy modality of keloids review of the literatures

Author	Number of keloids	Radiation modality	Dose (Gy)	Recurrent rate (%)
Borok TL[3]	375	superficial X-ray	4-12	2.4
Enhamre A[16]	62	superficial X-ray	10-15	12
Kovalic JJ[4]	113	superficial X-ray	10-20	27
Lo TC[17]	174	electron	2-20	10-18
Maarouf M[18]	134	electron	10-30	16
Ollstein RN[19]	68	superficial X-ray	10-30	21
Supe SS[20]	110	β-ray 90 Sr-90Y	20	4-27
Tepmongkol P[21]	137	superficial X-ray	3-5	30.6
Wagner W[22]	166	β-ray 90 Sr-90Y	7.5-28.5	2-49

Table 2. Earlobe keloids: the range of reported outcome for treatment options

Author	Treatment	Recurrence rate (%)
Cosman B[2]	Surgery alone	66
Lawrence WT[26]	Surgery alone	50
Sclafani AP[12]	Surgery + steroid	33
Shons AR[5]	Surgery + steroid	5
Lawrence WT[27]	Surgery + Verapamil + Pressure	45
Stern JC[8]	Laser excision	74
Russell R[28]	Steroid + splint	50% reduction
Akoz T[29]	Surgery + steroid + silicone gel sheet and pressure	11

to 36 earlobe keloids, with a mean follow up period of 5.6 years, show a recurrence rate of only 2- 8%. A randomized controlled trial of earlobe keloids excision followed by either intralesional steroid injection or radiation[12], using either superficial 100 KV X-rays or electron beam, has shown that radiation has better patient compliance and lower recurrence rate than steroid injection. Ragoowansi R et al[13] have reported 35 patients for high risk ear lobe keloids, who failed to respond to prior treatment with massage, silicone, and corticosteroid injection. Patients have been treated by surgical excision, followed by one fraction of superficial x-ray 10 Gy. The cumulative probability of control at 5 years was 79.4%. There was no case of serious radiation toxicity.

The present study has shown a recurrence of 12.5% without severe complication, and this was comparable to other reports. However, there are only a few reports of earlobe keloids that compared recurrence rates. Besides, there are variable qualities of treatment series such as surgical techniques, timing between surgery and radiation, radiation dose fractionation and techniques, and follow up period. One of the difficulties that the present study and others[8,12] have encountered is poor compliance with follow up after treatment; in the present study, 7/22 patients were unavailable for the 6 months follow up, even though the authors had given preoperative education about the likelihood of keloid recurrence and the need for close follow up and early treatment of recurrence.

The potential toxicity of radiation in treatment of benign disease has been reviewed[30]. Although no radiation-induced cancer was found in the preceding studies, the long term follow up is necessary as well as discussion about this issue to inform the patients of these possible risks before treatment.

Conclusion

Postoperative radiotherapy by high dose rate Iridium 192 mould was an effective prevention of earlobe keloids. It was well tolerated and did not present any significant side effects. Further study with a larger number of patients and longer follow-up time are needed to further confirm the efficacy and safety of this technique as an adjuvant treatment in prevention of earlobe keloids.

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การป้องกันแผลเป็นนูนที่ใบหูด้วยการให้รังสีรักษาหลังผ่าตัดโดยการวางแร่อิริเดี่ยม 192 แบบ high dose rate

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***ที่มา**: การรักษาแผลเป็นนูนที่ใบหูด้วยการผ่าตัดอย่างเดียวมีผลเกิดแผลเป็นนูนซ้ำสูงร้อยละ 50 ถึง 80 ฉะนั้นจึงมีการใช้การรักษาเสริมหลังผ่าตัดเพื่อลดการเกิดซ้ำ ซึ่งรังสีรักษาเป็นการรักษาเสริมที่ได้ผลดีวิธีหนึ่ง*

***วัตถุประสงค์**: เพื่อนำเสนอผลการใช้รังสีรักษาหลังการผ่าตัดด้วยการวางแร่อิริเดี่ยม192 แบบ high dose rate ในการรักษาแผลเป็นนูนที่ใบหู*

***วัสดุและวิธีการ**: ทำการศึกษาในผู้ป่วยแผลเป็นนูนที่ใบหูที่รับการรักษาตั้งแต่ เดือนมีนาคม พ.ศ. 2542 ถึงเดือนมีนาคม พ.ศ. 2546 ด้วยการผ่าตัดแล้วตามด้วยรังสีรักษาโดยใช้การวางแร่อิริเดี่ยม 192 ด้วยปริมาณรังสี 15 Gy แบ่งให้ 3 ครั้ง ครั้งละ 5 Gy คิดปริมาณรังสีที่ 5 มิลลิเมตรห่างจากแร่อิริเดี่ยม*

***ผลการศึกษา**: ผู้ป่วยที่รับการรักษาทั้งสิ้น 22 ราย มีแผลเป็นนูนที่ใบหู 24 รอยโรค ในจำนวนนี้มีผู้ป่วย 15 รายมีแผลเป็นนูนที่ใบหู 16 รอยโรค ที่มารับการตรวจติดตามหลังการรักษานานกว่า 6 เดือน พบว่ามีผู้ป่วยที่มีรอยโรคเกิดซ้ำ 2 ราย คิดเป็นร้อยละ 12.5 และไม่พบภาวะแทรกซ้อนที่รุนแรง*

***สรุป**: การใช้รังสีรักษาหลังผ่าตัดด้วยการวางแร่อิริเดี่ยม192 แบบ high dose rate ในการรักษาแผลเป็นนูนที่ใบหูเป็นการป้องกันการเกิดแผลเป็นนูนซ้ำที่มีประสิทธิภาพดีและไม่มีภาวะแทรกซ้อนที่รุนแรง*