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Electron beam radiotherapy adjuvant to recalcitrant giant keloid surgery in the ear

Radioterapia com feixe de elétrons adjuvante à cirurgia de queloide gigante recalcitrante na orelha

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ABSTRACT

Isolated keloid treatment has variable and often unsatisfactory results. The combination of therapies has proven to be an effective alternative mainly for recalcitrant cases. Surgical excision and immediate post-operative electron beam irradiation is an effective alternative in healing and reducing the recurrence rate of these lesions. The authors describe a patient with recalcitrant bulky keloid who had a good therapeutic outcome.

Keywords: Ear; Keloid; Radiotherapy

RESUMO

O tratamento isolado do queloide apresenta resultado variável e, muitas vezes, insatisfatório. A combinação de terapêuticas tem se mostrado uma alternativa eficaz, principalmente para os casos recalcitrantes. A excisão cirúrgica e a irradiação no pós-operatório imediato com feixe de elétrons é uma alternativa efetiva na cicatrização e redução da taxa de recidiva dessas lesões. Os autores descrevem um paciente que apresentava queloide volumoso recalcitrante que obteve bom resultado terapêutico.

Palavras-chave: Orelha; Queloide; Radioterapia

INTRODUCTION

Keloids are benign lesions resulting from a posttraumatic fibrous proliferation of the skin. They result from excessive deposition of collagen in the extracellular matrix during the healing process. Morphologically, they are characterized by cellular hyperplasia due to the presence of intrinsically normal polyclonal fibroblasts that respond to an abnormal extracellular signal. Such injuries can be disfiguring and cause physical discomforts such as pain, burning, and itching. Also, they can restrict movement and form local fistulas after repeated infections and, consequently, affect the patient's quality of life.^{1,2}

Isolated surgical treatment has a high recurrence rate, around 50-80%, which makes the use of adjuvant therapies necessary. The most used are cryotherapy, laser therapy, compression, and intralesional injection of corticosteroids, with variable results. Currently, a treatment established in resistant or refractory keloids is surgical excision followed by electron beam radiothe-

Case report

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rapy (RT). Recurrence rates for the first year are as low as 10% in some cases, and a typical protocol is excision followed by the first radiotherapy session, with ten or more subsequent sessions. Dosage and timing differ between teams and institutions.^{2,3}

The use of electron RT adjuvant to surgical treatment is based on the fact that, once the keloid is formed, it is not radiosensitive. Under these circumstances, the fibrous tissue will undergo little or no change with irradiation. However, fibroblasts from recent scars are highly radiosensitive.^{1,3} We report the case of a recalcitrant keloid in which surgical treatment with adjuvant electron beam RT was employed successfully.

CASE REPORT

A 31-year-old man presented a large keloid lesion, approximately 15cm in the longest axis, originating from the left auricle and occupying the entire ipsilateral retroauricular portion (Figures 1 and 2). The condition began when he was 11 years old after trauma. The patient reported that he had already undergone several treatments, including five primary closure surgical approaches, two electrocoagulation surgeries and secondary intention closure, and beta-therapy after one of the surgical approaches at 14 years of age. Among the surgical procedures, he performed infiltrations with intralesional corticosteroids, and, despite the numerous treatments, he presented recurrence with progressive growth. In April 2018, he underwent a new surgical approach with a total lesion excision (Figure 3).

We opted for therapeutic complementation with electron beam RT, which started in the immediate postoperative period. The parameters used were: electron beam generated by a linear accelerator, 9 MeV energy (millions of electron volts =

electron beam energy unit), 208 um/time, 100 source-to-surface distance (SSD), use of cone 10 for field delimitation, 100 cm source-to-surface distance, and daily dose of 200 centiGrays (cGy). Ten applications were performed, with a total dose of 2,000 cGy, and the sessions were distributed over two weeks, daily, except on weekends.

As an adverse event, the patient presented with beard and hair alopecia in the irradiated area, with complete repilation after the end of the sessions. The patient remains in follow-up, with good aesthetic and functional results and no evidence of relapse after 1 year of therapy (Figure 4).



FIGURE 2: Keloid injury in the left auricle



FIGURE 1: Keloid injury in the left auricle



FIGURE 3: Immediate postoperative



FIGURE 4: Result 1 year after surgical and radiotherapy treatment

DISCUSSION

There are several treatments available for keloids, and all of them alone have high recurrence rates, including surgical treatment that presents rates close to 100% in some studies. Among the adjuvant treatments employed, radiotherapy is highly effective, less likely to recur, and one of the primary forms used are brachytherapy and electron beam therapy.¹⁻⁵

The biological action of irradiation on fibroblasts is inhibition of proliferation and stimulation of differentiation of these cells.⁶

Adjuvant RT modalities for operated keloids are: conventional X-ray,⁷ beta-therapy,¹ single dose RT,⁸ and electron beam RT.⁹ Electron beam RT is superior to traditional X-ray irradiation for the treatment of keloids due to better tissue dose distribution.⁷

There is no consensus as to the best modality to be used or the total dose to be employed. Studies of meta-analysis and systematic review indicate that the most effective total doses of radiotherapy would be between 20 and 40 gray (Gy) (in the reported case the total dose was 20 Gy) and that there is proximity to recurrence rates between brachytherapy (12% in one year) and electron beam therapy (9% in one year), but this would have fewer adverse events such as hyperchromia and telangiectasia.¹⁻⁵

A comparative study between electron beam radiotherapy and beta-therapy following keloid surgery with 10-year follow-up showed better electron beam efficacy (77% good and optimal for electron therapy versus 46% for beta-therapy) and this result is attributed to better radiation dose distribution in the tissues with the electron beam.¹

Among the RT modalities, the electron beam is the only one that allows a more homogeneous distribution, considering the irregularity of the lesion depth. When the electron beam comes from linear accelerators, a better energy distribution occurs, being more suitable for each thickness to be irradiated.¹⁰

The association of surgery and radiotherapy with the electron beam in the immediate postoperative period proved to be a well-tolerated therapeutic modality, with minimal undesirable events, and no, corroborating some cases in the literature. ●

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