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Postoperative Radiotherapy of Keloid Earlobe at Dr. Kariadi Hospital

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ABSTRACT

This study aims to determine the radiation therapy procedure in postoperative cases of keloid earlobe at Dr Kariadi Semarang. Postoperative radiotherapy for keloid earlobe is very effective to prevent recurrence and treat keloid because it can suppress fibroblast activity but is still rarely used. The results showed that there was no specific preparation in postoperative radiation therapy for earlobe keloids. Earlobe keloid radiotherapy was performed within 24 hours postoperatively, using silicone as a bolus and using 6 MeV electrons. The total dose given was 16 Gy with 4x4 Gy fractionation

Keywords: keloid, radiotherapy, postoperative

INTRODUCTION

Keloids are benign raised scars that form by excessive tissue proliferation and excess collagen in the skin during healing. Although benign lesions, keloids can often have a negative impact on self-esteem and quality of life[1]. The etiology of keloid scar formation is not completely understood. Though some keloids can form spontaneously, most develop as a result of pathologic wound healing following trauma or surgery, sometimes forming years after the cutaneous injury [2]. Histologically, keloids are characterized by abundant, tightly packed but disorganized collagen. The epidermal layer may appear normal, but the dermis becomes persistently infiltrated with inflammatory cells and hypo-cellular collagen bundles, made up of large, thick, and wavy type-I and type-II hyalinized fibers. Hypertrophic scars are distinguished from keloids by the presence of finer, more organized collagen bundles that run parallel to the epidermal surface. Additionally, infiltration of inflammatory cells may be present in fresh hypertrophic scars but decreases as the scar ages [3].

Keloid and hypertroxy scars caused by skin injuries and irritations, including trauma, insect bites, surgery, vaccinations, skin piercing, acne, folliculitis, chicken pox and herpes [4]. Keloid growths are more likely seen on the chest, shoulders, upper back, back of the neck and earlobes, where larger skin tension should be noted. Notably, the earlobe is exceptional, which indicate lower recurrence rate under similar treatment. Therefore, this site-specific characteristic provides us the site-specific treatment algorithms, for example, to decide whether or not the lesion requires radiation therapy [5]. Excision surgery is one of the modalities in the treatment of keloids. However, excision surgery alone has a recurrence rate of 45-100%. Surgical excision followed by radiotherapy is a helpful treatment option for large and more difficult-to-treat keloids that cannot otherwise be treated by or have failed more conservative measures [6].

Re-excision of the scar tissue followed by performance in the area was reported to be effective

but uncomfortable because it had to be done for a long time. Apart from not always successful administration of corticosteroids, patients also complained about it because it caused pain when administering intra / subcutaneously. Various publications and journals report the success of treatment after re-removal of keloid tissue then radiation is given within 24 hours after surgery [7].

Different forms of radiation can be used to deliver dose to a superficial target, including electrons (less than or equal to 6 MeV), x-rays (70 to 150 kV), and iridium-192 brachytherapy with implants or surface applicators. The modality most commonly used to treat keloids is electrons. Electrons are generated and delivered by a standard radiation machine called a linear accelerator, the same machine that delivers photons that are used in a majority of radiation treatments. Electrons have a shallow dose penetration compared to photons and are ideal for treating superficial lesions while minimizing dose to normal underlying structures, making it ideal for skin lesions. Often a 1 cm bolus is placed over the lesion increase the dose at the skin while reducing the depth of penetration [8].

Treatment of keloids by providing radiation within 24 hours after surgery is very rare even though according to journal publications this has a very good impact so that there is no recurrence of keloids. Based on the data above, the authors are interested in raising the keloid case as a scientific paper considering that this rare treatment can give confidence in the treatment of keloids so that this paper can be used as a reference in the treatment of keloids.

METHODS

This type of research in is a qualitative research with a case study approach that aims to examine and analyze information about keloid post operation radiottherapy earlobe at Dr. Kariadi Hospital Semarang.As research subjects in this paper are Radiation Oncology Specialist, Medical Physicist, and Radiographers at Dr Kariadi Hospital Semarang.This research was conducted in the Radiotherapy Unit of the Radiology Installation at the Dr. Kariadi Hospital, Semarang.The research method used by the author is the observation method by observing directly during the examination process, in-depth interview method to obtain oral information from the respondents and the method of documentation study to document relevant data.

RESULTS AND DISCUSSIONS

Based on the results of observations and in-depth interviews with various related parties and reading some literature, the authors get the results that the procedure for electron radiation therapy in postoperative cases of earlobe keloids at Dr. Kariadi Hospital Semarang is as follows:

Patient Preparation

Preparation The patient is carried out in collaboration with the surgeon because the keloid radiation of the earlobe is performed postoperatively before 24 hours



Figure 1. Patient preparation for radiotherapy keloid earlobe using silicone bolus

Simulation

According to R.Susworo and H.Kodrat[9], simulator is one of the tools in radiotherapy, especially external radiation, with this fluoroscopy diagnostic radiology device determined the radiation field in the patient. The patient is positioned to sleep on his side to measure and print the shape of the earlobe using silicone with a thickness of 1 cm. This silicone is useful as a bolus. According to Beyzadeoglu, the use of a bolus can increase the effect of radiation on the skin surface. The secondary electrons produced by the bolus also increase the dose in the skin because the bolus is in direct contact with the skin. The surgical suture marks were wired as a marker. The immobilization tool in the form of a mask is attached to the keloid area to be irradiated. The angle of the radiation is perpendicular to the object.

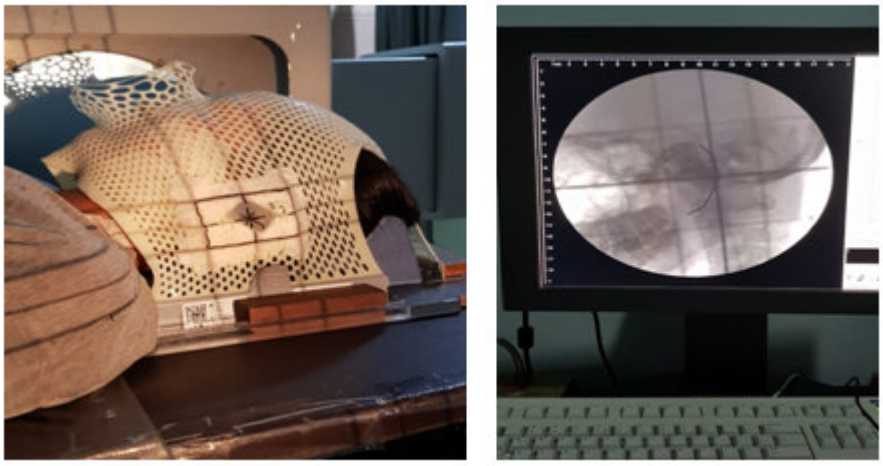

Figure 2. Simulation process of radiotherapy keloid earlobe

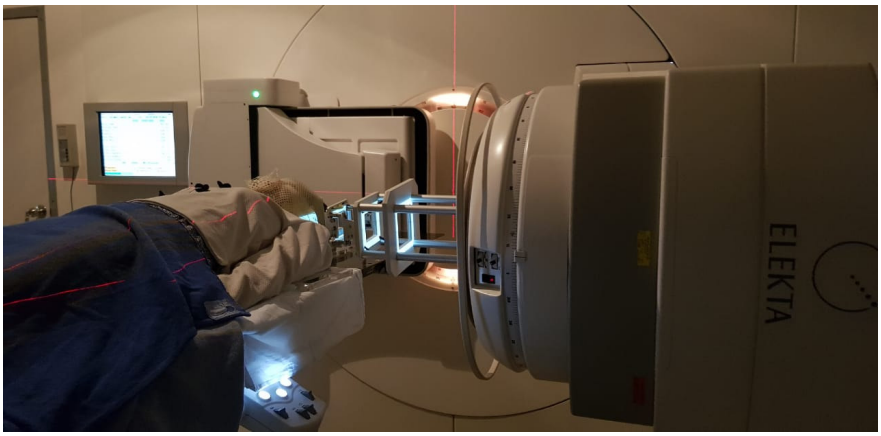

Figure 3. Radiotherapy keloid earlobe using Linac

Treatment Planning System (TPS)

According to R.Susworo and H. Kodrat [9], to obtain a homogenous radiation dose on the tumor mass or to avoid critical organs, radiation planning is required based on the curve of each radiation energy in a certain field area. Computer processing in radiation planning is very useful for obtaining good planning, which is then implemented in patients. According to Cheraghi [8], different forms of radiation can be used to deliver dose to a superficial target, including electrons (less than or equal to 6 MeV), x-rays (70 to 150 kV), and Iridium-192 brachytherapy with implants or surface applicators. The modality most commonly used to treat keloids is electrons. Electrons are generated and delivered by a standard radiation machine called a linear accelerator, the same machine that delivers photons that are used in a majority of radiation treatments. Electrons have a shallow dose penetration compared to photons and are ideal for treating superficial lesions while minimizing dose to normal underlying structures, making it ideal for skin lesions. Often a 1 cm bolus is placed over the lesion increase the dose at the skin while reducing the depth of penetration. In irradiating the keloid earlobe using an electron beam, with an energy of 6MeV and the calculation results obtained for postoperative keloid radiation irradiation of the earlobe was 436 MU with a fractionated dose of 4Gy and carried out within 4 days so that the total dose received by the patient was 16Gy.

Treatment Keloid Postoperative Radiotherapy Earlobe

According to Prihharsantiet.al. [8], keloid irradiation uses electron rays with the Linac modality and according to Gunderson [10], electron is an important modality used for surface tumor treatment, electrons have limits, travel distances then stop and their kinetic energy is zero and the existence of Linac is felt to be very efficient with multi-energies. both for photons and electrons.Treatment keloid postoperation earlobe radiation using an electron applicator, collimator lamp with field area x = 4.0 cm, y = 6.0 cm, gantry position at 90 ° perpendicular to the object and 100cm irradiation distance.

Radiation therapy is carried out within 24 hours after surgery to prevent the fibroblasts from forming tissue threads that will form keloids.

The reason for postoperative radiotherapy for earlobe keloid

According to R. Ogawa [4],compared to surgery or radiation therapy alone, surgical excision followed by immediate postoperative radiation therapy has been shown to be the most effective treatment, with a recurrence rate of about 20%. Radiation is often indicated for recurrent keloids, or for patients with a high-risk of recurrence, including marginal resections, wider spread, and unfavorable locations. Radiation starting on the same day after surgical removal of the keloid is most effective. This usually requires coordinated care between the surgeon and radiation oncologist to make sure the timing of the surgery and radiation can be optimal. Radiation therapy is carried out within 24 hours after surgery to prevent the fibroblasts from forming tissue threads that will form keloids.

CONCLUSION

There is no special preparation in postoperative radiation therapy for earlobe keloids at the Dr. Kariadi Semarang Hospital.Postoperative radiotherapy of keloid earlobe is done within 24 hours, with silicone as a bolus so that the dose distribution can be evenly distributed and uses electrons so that the distribution of the dose is only on the surface, so that other organs are still protected. The radiation dose was given a fractionation of 4Gy and carried out in 4 days so that the total dose received by the patient was 16Gy. Postoperative radiotherapy for keloid earlobe is very effective to prevent recurrence and treat keloid because it can suppress fibroblast activity.

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