

Commentary

Commentary on the article, “Radiation dermatitis: An overview”

The authors have given a nice overview of the pathophysiology of effects of radiation on the skin and underlying tissues.^[1] They make a clear distinction between a thermal injury and radiation injury and explain that radiation dermatitis is not radiation burn. In thermal injury, the damage starts in the superficial layer and progressively affects the deeper layers with increasing severity and duration of the insult, with most of the damage occurring at the time of the accident. In radiation injury, however, the damage is initiated at the basal layer of skin. There is an imbalance between the normal production and destruction of basal cells months or even years after the insult.

Radiation injury challenges the plastic surgeon in two situations. Firstly when one has to operate through irradiated skin and secondly when the surgeon is called upon to manage a radiation ulcer. Wound healing problems and infection are the commonest complications. Bourget *et al.* in a study of 137 patients, who had free flap transfer in an irradiated field, found the overall post-operative complication rate to be 47% out of which 22% of the patients had reoperation and 28% had infection. The average radiation dosage received by the patients was 64.5 Gy. In spite of these complications there was an overall free flap success rate of 96.4%, which is comparable to the success rate of free flaps done under normal circumstances.^[2] Microvascular free flap transfer is often more reliable than pedicled flaps from adjacent area which may have suffered significant radiation damage. Sourcing of recipient vessels for free flap transfer can be a problem. Strategies like sourcing the contralateral neck or using long vein grafts may have to be used.^[3]

The authors have mentioned that the incidence of radio-necrosis presenting as a difficult-to-treat, long standing, chronic ulcerative lesion requiring plastic surgical reconstruction is a rare phenomenon in the current practice.^[1] It is true that while the incidence might be significantly lesser than what it was a few decades ago, unfortunately the effort required in the management of such a problem and the outcome has not changed much. We would like to illustrate it with our experience of the management of a patient who

presented with an excruciatingly painful radiation ulcer in the upper limb.

A 37-year-old male patient underwent wide excision and abdominal flap cover for a recurrent tumor of the elbow which was later found to be a myxoid variant of malignant fibrous histiocytoma. The affected area was subjected to radiotherapy (cobalt 60 gamma rays) 6 weeks after flap division. A total dose of 56 Gy in 28 fractions was given over a period of 37 days. At 20 months after the completion of radiotherapy, the patient developed a progressively increasing, non-healing, painful ulcer in the irradiated area. He presented 6 months after the onset of the ulcer [Figure 1]. Severe, excruciating pain in the ulcer was his chief complaint. The whole area was indurated with no active movement at the elbow joint and only a flicker of movement at the finger joints.

A wide excision of the ulcer was done and a microsurgical free anterolateral thigh flap was used to cover the joint. The artery was anastomosed to the brachial artery in an end to side fashion and the venae comitantes were used as recipient veins. No superficial veins were available due to radiation induced damage to the surrounding area. The flap survived in entirety and the patient was relieved of his symptoms [Figure 2]. The patient presented to us again after 8 months with a sinus and sloughing of the triceps tendons from underneath a healthy flap [Figure 3]. A debridement of the slough was done and a biopsy from the raw area taken did not show any recurrence. A month later the patient came back again; this time with severe pain and discomfort in the limb. The pain was probably due to ischemia of the tissues in the base of ulcer, due to obliterative endarteritis which occur secondary to radiation. The limb did not have any useful movement and the scope for further reconstruction in the indurated limb was very poor. The patient refused any further attempts at reconstruction and requested an amputation for pain relief. An above elbow amputation was done and the previous antero-lateral thigh flap was used to cover the stump. At 30 months follow-up, he was still comfortable and was using the above elbow prosthesis well.

Radiation ulcers need aggressive management by

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Figure 1: Radiation ulcer in the left elbow and forearm. Note the distal edema and the hand and forearm in a non-functional position



Figure 2: The involved area was excised widely and was covered with anterolateral thigh flap



Figure 3: Position at 8 months after flap cover with recurrence of ulcer at the margin of the well taken flap

excision of the ulcer, histopathological confirmation of lack of recurrence and a well-vascularized flap cover. This usually has to be from a remote area,^[4,5] whether it be a free flap or a pedicle flap.

High levels of complications particularly after radiation to the limbs has encouraged the thought that radiation should be judiciously used. Rohde *et al.* did a retrospective study of 55 patients with soft-tissue sarcoma of the hand treated by a single surgeon.^[6] With a median follow-up of 7 years, 19 out of 26 patients who had perioperative radiotherapy had a total of 29 complications. All 5 patients who received brachytherapy (2 received only brachytherapy and 3 received external beam irradiation in addition) and 14 out of 21 who received external beam radiation alone developed complications. In the group of 29 patients who had only surgery and no radiotherapy only 3 had complications and they were due to painful neuromas. In this study, there were 73% complications in the perioperative radiotherapy group. The authors have recommended that these findings require the treating surgeon to justify the use of radiation in the treatment of soft tissue sarcomas of the hand. Limited tissue volume, complex geometry, soft-tissue gliding requirements and the joint motion required for proper hand function need to be kept in mind while making the decision. Fibrosis that results could also result in stiffness of the joints and even cause distal ischemia.

There is a definite role of radiation in the management of soft-tissue sarcomas to reduce local recurrence, particularly in high grade tumors and in pre-operatively reducing the size of big tumors. However the increased incidence of complications and the difficulty in managing the post radiation related problems must prompt surgeons to consider the alternatives that achieve a wider margin, carefully including additional digit or partial amputation of the hand which might obviate the need for adjuvant radiation.^[6]

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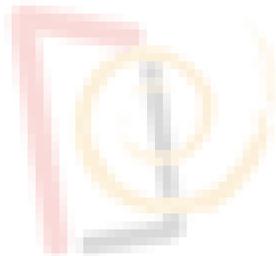
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