Reconstruction for Osteoradionecrosis

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Introduction

Radiation is an effective head and neck cancer therapy but also can have adverse side effects thus leading to complications. This occurs because radiation decreases the delivery of oxygen to healthy tissues as well as the cancerous tissue. Complications are often noted after some type of trauma to the area [such as a dental extraction], as the wound may not heal leading to tissue breakdown or a chronic wound. This disease is referred to as osteoradionecrosis. [OSTEO = bone, RADIO = radiation therapy, NECROSIS = death of tissue]. Osteoradionecrosis is thought to occur in over half of patients who have radiation to the head and neck but not all patients will develop symptoms or need treatment.

How does osteoradionecrosis present?

Osteradionecrosis may initially present as an ulcer that does not heal after a dental extraction or a small area where bone is exposed. Severe disease can be a large area of exposed or dead bone with severe destruction or fracture of the bone. A fistula may also develop which is when infection and pus in the bone starts to drain into the mouth or out through the skin of the face or the neck. Some presenting symptoms include

- pain with or inability to open the mouth
- pain with swallowing
- sharp shooting pain
- an open wound that does not heal
- drainage
- foul breath

If there are changes in the bite or how the teeth come together, this may indicate a fracture in the bone even if there was minimal to no trauma.

Diagnosis and Workup

When signs and symptoms appear, your physician may use imaging including Xrays, CT scans or MRIs to diagnose how severe the disease is. In some cases, a biopsy can be used to help make the diagnosis.

Treatment

Initial treatment starts with keeping any area of exposed bone clean to allow the best chance for healing. This could include a combination of tools such as a strong mouthwash, antibiotics or removal of small amounts of dead bone. Medications may also be prescribed to improve the blood supply of the bone so that it has a chance to heal. Debridement, which is the cleaning and removal of infected or dead bone, can sometimes be done in the office or the operating room for more severe cases. If there is enough healthy bone to maintain the structure of the jaw, healthy tissue or mucosa can be borrowed from nearby to cover the bone and prevent further destruction. If there is not enough tissue nearby, the tissue can be borrowed from further away with a free flap. Free flap reconstruction is when tissue is taken from another part of the body and incorporated into its new home by connecting the artery and vein that supply the tissue. If the amount of remaining bone is not enough to support the structure of the jaw or if an entire segment of bone needs to be removed, the free flap can also transfer healthy bone from another part of the body to reconstruct the jaw, usually the leg [fibula] or the back [scapula].

What to expect after free flap surgery [fibula or scapula]

Free flap surgery for osteoradionecrosis is a complex and advanced surgery requiring significant rehabilitation and time for recovery. The swelling that patients experience after this major surgery is usually extensive but also temporary, taking several months to subside. Most patients experience relief of their prior symptoms such as pain, draining fistula and recurrent or persistent infections. If the alignment of the upper and lower jaw was already altered before surgery, the surgery may not completely correct the alignment and the alignment may possibly worsen. Weakness or asymmetry of the lip is also relatively common after this surgery. Speech is generally not affected by the surgery but as with any major head and neck surgery after radiation, patients may experience more difficulty swallowing after surgery. Hence, swallow evaluation and therapy should be prescribed after surgery and a swallow evaluation before surgery may also be helpful in predicting the amount of alteration that is expected. The donor site [area where the bone was taken from] usually heals reasonably well with good return to normal functions with the help of physical therapy. Physical therapy starts promptly after surgery as soon as the patient is able. [link to Physical therapy handout]

Prevention

The best prevention for osteoradionecrosis is taking good care of the teeth and gums and acting promptly on any signs of decay. This starts with regularly scheduled dental care. Patients who have had radiation are at higher risk of tooth decay because saliva production is decreased after radiation and saliva helps prevent tooth decay. Fluoride treatment and fluoride trays are often recommended once the patient has received radiation to the oral cavity and these should be continued for the patient's lifetime. At the first sign of dental decay, prompt treatment such as fillings or root canals or crowns can help prevent infection from spreading from the teeth to the bone. Keeping the gums healthy with diligent brushing and frequent cleanings will help support the teeth and prevent dental loss. Dental extractions [removal of teeth] need to be coordinated with the radiation oncologist as the amount of radiation that the area of bone received can predict whether the extraction site will heal. The entire treatment team needs to agree on the treatment plan before any dental extractions and if the extraction is necessary, hyperbaric oxygen may be recommended before the extraction to optimize healing.