Long Term Effects of Radiation to the Head and Neck

Long term and late effects of radiation for head and neck cancers are caused by healthy tissue being damaged by the radiation. Newer radiation techniques, including IMRT and proton therapy have reduced some of these side effects.

Dear OncoLink "Ask The Experts,"

I'm two treatments away from being done with 5 weeks of radiation treatments for head and neck cancer. I am wondering what the long-term effects of the radiation therapy to the head and neck area might be?

Erin McMenamin, CRNP in Radiation Oncology, responds:

The long-term effects of radiation depend on the technique of irradiation, the dose and the location that was irradiated.

Typically, most head and neck squamous cell cancers are loco-regionally advanced (meaning they have spread in the neck area), requiring treatment of both sides of the neck. In the past, this was accomplished with two large radiation fields on both sides of the neck, matched with a third field coming from the front to treat the lower neck. This resulted in a larger volume of normal tissues being irradiated and accounted for many long-term side effects. It is helpful to summarize the long-term side effects by considering the normal tissues in the head and neck that were included in the treatment field. This is also helpful to understand how newer techniques, such as IMRT and proton therapy can reduce the side effects of head and neck irradiation.

Among these side effects is injury to the parotid glands (salivary glands) on both sides of the neck, which can lead to xerostomia, or dry mouth. Dry mouth is a concern because it makes swallowing and speaking difficult when you can't properly lubricate the mouth and food. The absence of saliva and change in composition of any remaining saliva increases the risk of dental complications, because saliva helps to kill bacteria on the teeth. Both IMRT and proton therapy have resulted in most patients retaining some saliva production after treatment. Saliva recovery depends on the location of the treatment, pre-existing conditions affecting salivary function, and age.

Most patients receive a dose of radiation to the mandible (lower jaw bone), which raises concerns for most dentists that subsequent dental extractions may lead to problems with wound healing over the jaw bone. This is why most dentists want to evaluate patients before they start radiation therapy. A portion of patients require extractions before they begin radiation therapy if the dentist determines the tooth/teeth is/are at high risk for extraction in the future. It is important to continue nightly high(er) dose fluoride treatments after treatment ends to prevent the need for future tooth extractions.

Radiation, particularly when combined with concurrent chemotherapy, can result in edema (swelling) of the tissues in the mouth and throat. Patients who have undergone neck surgery such as a neck dissection to evaluate lymph nodes in the neck before radiation therapy commonly experience an impairment of the normal lymphatic fluid drainage of the neck. This persistent edema is called lymphedema. The presence of lymphedema also places the patient at higher risk for a soft tissue infection, called cellulitis, in the area of lymphedema. The risk for or development of lymphedema requires a specialized physical therapist trained in lymphedema therapy techniques to teach the patient how to move this fluid to an area with intact lymph flow.

Lastly, there can be fibrosis (scarring) that can affect various normal functions, depending on where it is located. If it is in the soft tissues of the neck, particularly if surgery is performed, then the range of motion of the neck can be limited, such as having difficulty looking over the shoulder while driving. During recovery from surgery and/or radiation (with or without chemotherapy), the ability to move food from the mouth into the throat can be limited, and patients can feel that they can't "get the food back" when swallowing. Most often, this is caused by a dry mouth. However, an uncommon occurrence post-treatment is a patient report of food sticking and not passing a point in their throat. Sometimes, a procedure that stretches the throat can help with this,
but may need to be repeated on several occasions. With the improvement in treatment techniques, it is very uncommon for the muscle of the swallowing tube to become scarred. However, in some cases, due to the location and/or size of the tumor the swallowing muscle is affected, and it may not be reversible. This is much less common now compared to radiation therapy using older treatment techniques.

Newer radiation techniques such as IMRT and proton therapy are improving the side effect profile of head and neck irradiation. Newer treatment techniques reduce the volume of the parotid glands that are radiated, as well as the dose that they receive. As a result, recovery of saliva is more common, whereas in the past, this was not possible.

Frequently radiation treatment for H&N cancers results in a dose of radiation to the thyroid gland. As a result, as many as one half of patients receiving radiation therapy to the neck experience an underperformance of their thyroid gland (called hypothyroidism). The thyroid function is monitored by your providers, beginning several months after the completion of treatment. If the thyroid gland is underactive, patients need to take thyroid hormone replacement daily and this is well tolerated.

After completing treatment, ask your care team about receiving a survivorship care plan or create your own with OncoLife.