Southern Cross Dental

SCD

Case Study

Dry Mouth

This case study details a patient who has experienced xerostomia as a result of treatment for squamous cell carcinoma of the left tonsil involving surgery followed by deep x-ray therapy.

Background

Most malignant lesions of the tonsil are either lymphosarcoma or carcinoma.

TNM classification system for mouth and oropharyngeal cancer (tumour).

The most common system used is the TNM classification:
T – indicates the size and/or extent of invasion
N – indicates the extent of lymph node involvement
M – indicates whether there are metastases present

Different treatment options were presented and the following approach was adopted:

T stages
There are 4 main T stages:

- T1 means the tumour is contained within the epithelium of the mouth or oropharynx and is no larger than 2cm.
- T2 means the tumour is between 2cm and 4cm and is minimally invasive.
- T3 means the tumour is larger than 4cm and more invasive.
- T4 means the tumour is very large and/or invasive and has spread to adjacent organs.

N stages
There are 4 main lymph node stages in cancer of the mouth and oropharynx. One of these, stage N2, is broken down into 3 sub stages. The important points here are whether there is cancer in the lymph nodes in the neck and if so, the size of the node and which side of the neck it is situated.

- N0 means there are no cancer cells in the lymph nodes
- N1 means there are cancer cells in one lymph node on same side of the neck as the cancer, and the node is less than 3cm across
- N2a means there is cancer in one lymph node on same side of the neck and the node is between 3cm – 6m across
- N2b means there is cancer in more than one lymph node, but none are greater than 6 cm across. All the affected nodes are on the same side of the neck as the cancer
- N2c means there is cancer in nodes on the other side of the neck to the cancer, or in nodes on both sides, but none are greater than 6 cm across
- N3 means that at least one node containing cancer is more than 6 cm across.

M stages
There are 2 M stages:

- M0 means that the cancer has not spread (metastasised) to other parts of the body
- M1 means that the cancer has spread to other areas, such as the lungs.

The grades of mouth and oropharyngeal cancer

The grade of a cancer details what the cells look like under a microscope (cellular differentiation). The degree of differentiation describes how developed or mature a cell is. There are 4 grades of oral and oropharyngeal cancer cells:

- Grade 1 (low grade) – the cancer cells look very much like normal mouth or oropharyngeal cells and are well differentiated.
- Grade 2 (intermediate grade) – the cancer cells look slightly different to normal mouth or oropharyngeal cells and are moderately differentiated.
- Grade 3 (high grade) – the cancer cells look very abnormal and not much like normal mouth or oropharyngeal cells and are poorly differentiated.
- Grade 4 (high grade) – the cancer cells look very different to normal mouth or oropharyngeal cells and are undifferentiated.

X-ray therapy (irradiation)

Deep x-ray therapy is used to treat internal cancer with ionising radiation from an external source. Xerostomia is a common side effect of radiation therapy when used as the treatment for primary or recurrent tumours of the head and neck (Porter S. et al., 2004). The most radiosensitive gland is the parotid gland followed by the submandibular, sublingual and minor salivary gland.

The dose delivered is determined according to the radio-sensitivity, size, pathologic grade, and differentiation of the tumor; the tolerance of normal surrounding tissue to irradiation; and the patient's condition. Deep x-ray therapy often causes nausea, malaise, diarrhoea, and skin reactions such as blanching, erythema, itching, burning, oozing, or desquamation. Modern techniques beam the x-ray directly to the site, reducing side scatter, and the skin can be spared. Tumour cells are hypoxic and are more effectively eradicated when they are well oxygenated. The patient may breathe hyperbaric oxygen or atmospheric oxygen with 5% carbon dioxide during therapy.

Presentation

The original tumour was classified as T2N2b.
The patient is allergic to penicillin.

Medical history

- In 2002 when the patient was 57 years old she had surgery followed by deep ray therapy. Immediately post-surgery, she experienced xerostomia.
- In 2005, the patient had developed an intra-oral fungal infection.
- In July 2009, the patient developed progressive dysphagia and when she was examined under anaesthesia there was significant stenosis of the upper oesophageal inlet and a dilatation was performed which only provided symptomatic relief. On examination, no cervical or supraclavicular lymphadenopathy was found at the appointment.
- The relief from the dysphagia was short-lived and in December 2009, a repeated examination under anaesthesia was performed and another dilatation performed. In 2009, the patient was diagnosed with clinical depression.
- In 2010 the patient was diagnosed with hypothyroidism. She was treated with thyroxine sodium 50 mcg/day. The patient commenced using REFRESH TEARS PLUS Eye Drops 0.5% (5mg/ml) - 2 drops 3 times/day.
- The radiation oncologist last reviewed the patient in 2011 when she complained of dry mouth and discomfort over the lower jaw especially with the use of her dentures. On examination, no cervical or supraclavicular lymphadenopathy was found at the appointment. The tonsillar area revealed changes consistent with her treatment.
- In 2012, the head and neck surgeon again reviewed the patient. He reported that there were no signs or symptoms to suggest recurrence of her tumour and no suspicious lesions. The patient reported that she was troubled by the effect of her treatment with significant xerostomia and some dysphagia. There was no indication that it was time to consider further pharyngeal dilatation. The head and neck surgeon recommended annual reviews.
- In 2012, dental implants were arranged at the Sydney Dental Hospital to assist with the ability to eat a greater range of foods (Fig.1 and Fig.2).
- In May 2013 the patient's general medical doctor referred her for assessment to Dr Penn and Dr Sharp.

Dental examination and oral findings

After extensive review and assessment the patient was offered the opportunity to trial an appliance that had been certified overseas and that offered the possibility for electrical stimulation to her salivary glands. The patient agreed conditional to her waiving any expectations regarding efficacy.

The appliance consisted of a lower vacuum-formed base with componentry housed within it to emit and deliver electrical impulses to the nerves in the lower quadrant on the side of her cancer treatment. Impressions were taken and the appliance fabricated. The appliance was tried in the mouth, relined and issued. The circuitry and positioning of the stimulating electrodes was adjusted.

In July 2013, an updated version of the appliance was issued. The electronics were checked for function. The patient was given spare batteries for the hand-held activating device. The patient was advised that this was still a trial prototype device. Informed consent from the patient was again verified and it was reinforced to the patient that the device might take 4-6 months to start salivary stimulation.

Upon review in August 2013, the patient reported doing well. However, no more salivary flow was detected. The patient was using the appliance according to instructions.

The patient had an episode of pneumonia in November 2013 as a result of a throat valve not working and food had been aspirated into the lungs. The patient was advised to use a thicker in the food and beverages to try and prevent the problem occurring again.

In December 2013, the patient was again reviewed and the appliance was checked and noted to be working. The salivary improvement was marginal.

In early February 2014, some adjustments were made to the componentry, and the dental technician lined the appliance with Visco-gel (Dentsply), which improved the stability of the appliance in the mouth and the positioning of the two electrodes against the mucosa (Fig. 3 and Fig. 4).

By March 2014, an improvement in the amount of saliva was noted.

After a further 6 months, in September 2014, the patient noticed increased salivary function.

The patient returned for an assessment visit in February 2015 and reported improved sensation of saliva flow. The patient advised that she did not need to use as much water but nevertheless was still experiencing the sensation of having a dry mouth. On examination there were no findings of clinical significance and the patient was advised to attend for review in 6 months.

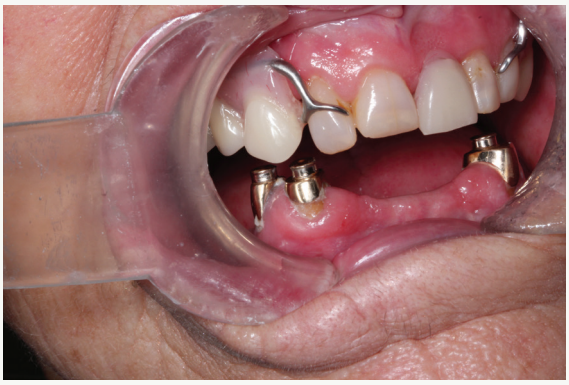

Fig. 1 Presenting clinical situation

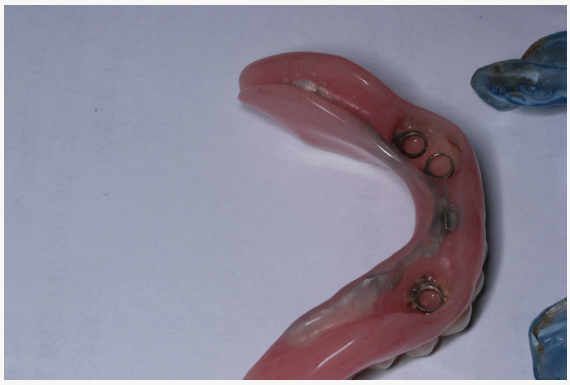

Fig. 2 Patient's current denture

Fig. 3 Tissue fitting surface of salivary stimulating appliance

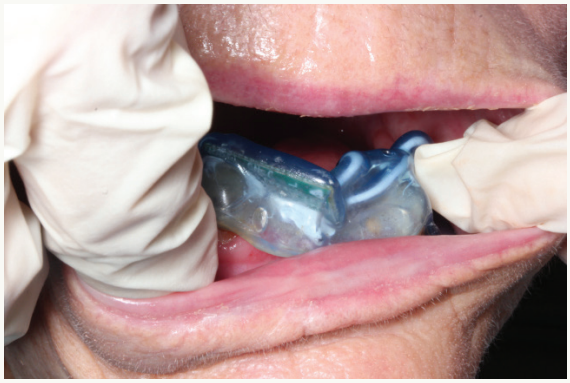

Fig. 4 Appliance in situ