

# Management of Head and Neck Tumours During Pregnancy: Case Report and Literature Review

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Ethical dilemmas arise in managing head and neck cancers during pregnancy. The timing of treatment is an important determinant on foetal wellbeing. Diagnostic and treatment modalities may harm the foetus, while delaying or choosing suboptimal treatment in order to preserve foetal health may worsen maternal outcome. A multidisciplinary approach should be adopted to enable parents and clinicians to make the best clinical decision. We report on two cases. Case 1 is a 34-year-old female who presented with squamous cell carcinoma of the tongue at 29 weeks' gestation. Partial glossectomy, selective neck dissection and posterior tibial flap reconstruction was performed at 31 weeks. She underwent induction and early delivery at 38 weeks prior to receiving radiotherapy. Case 2 is a 36-year-old female who presented with carcinoma of the cervical oesophagus complicated by tracheal invasion, thyroid and cervical lymph node metastasis at 13 weeks' gestation. Pregnancy was terminated at 16 weeks. She received a course of neoadjuvant chemoradiation. [*Asian J Surg* 2008;31(4):199–203]

**Key Words:** head and neck tumours, pregnancy

## Introduction

Cancer is the second leading cause of death in women of childbearing age.<sup>1</sup> One in 118 women diagnosed with cancer is pregnant at the time of diagnosis.<sup>2</sup> Oral cancer accounts for less than 2% of all cancers during pregnancy.<sup>3</sup> The most common pregnancy-associated head and neck cancers include larynx, thyroid, melanoma and lymphoma.<sup>4</sup>

The challenge in managing head and neck cancers during pregnancy is the potential counterbalance between maternal and foetal health. Diagnostic and treatment modalities may harm the foetus, while delaying treatment or choosing suboptimal treatment in order to preserve foetal wellbeing may worsen maternal outcome.

The aim of this article is to describe the principles of managing non-thyroid head and neck cancers during pregnancy. Two short case studies will be presented to highlight the fine balance between the optimal treatment of cancer versus the preservation of a healthy foetus.

## Case reports

### Case 1

A 34-year-old female, at 29 weeks of gestation (gravida 1, para 0), presented with a 6-month history of a non-healing ulcer over the right tongue edge. Antenatal history was uneventful. On physical examination, she was found to have a 1.5 × 2.5 cm ulcerative growth over the right tongue

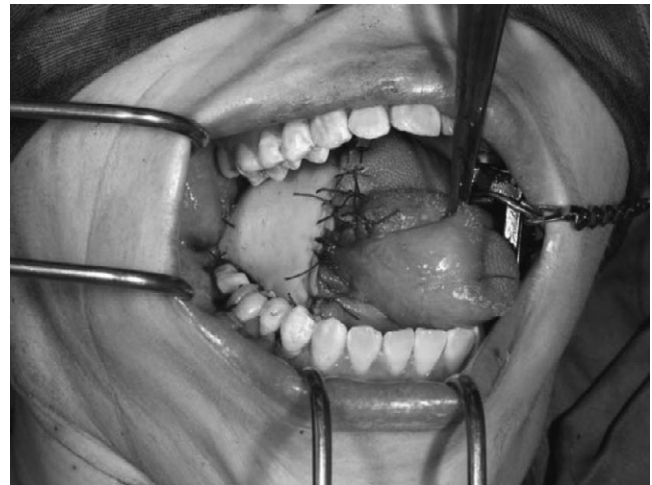
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**Figure 1.** Right tongue edge ulcerative tumour. Excision line is marked in ink: right lateral posterior portion of the tongue including the floor of the mouth with at least 1.5 cm margin around the ulcer.

edge. Biopsy confirmed squamous cell carcinoma. Panendoscopy showed no evidence of synchronous tumour and there was no cervical lymph node metastasis on ultrasonography of the neck region. Clinical staging of the tumour was T2N0M0.

Preoperatively, she was assessed by obstetricians and was given steroid prophylaxis 24 hours before the operation for foetal maturation (two doses of intramuscular betamethasone 12 mg Q12H) and 20 mg subcutaneous enoxaparin immediately before the operation. The pre-operative foetal heart rate was 140 beats per minute before incision. No intraoperative foetal monitoring was required. At 31 weeks of gestation, transoral excision of the right lateral posterior portion of the tongue together with the floor of the mouth was performed with at least 1.5 cm margin around the ulcer and a deep margin of 1 cm (Figure 1). Selective neck dissection with the removal of levels I to III cervical lymph nodes was performed. Meanwhile, a free posterior tibial fasciocutaneous flap was harvested by a second team of surgeons during tumour resection in order to shorten operative time. The flap measured 7 × 11 cm. It consisted of two perforators at 8 cm and 13.5 cm proximal to the medial malleolus, and an intact posterior tibial artery, vein and saphenous nerve. The flap was used to reconstruct the intraoral defect, inset with 3°O vicryl (Figure 2) after vascular anastomosis under operative microscope using 9°O nylon



**Figure 2.** Reconstruction of the intraoral defect with a free posterior tibial fasciocutaneous flap.

(right superior thyroid artery to posterior tibial artery; a branch of internal jugular vein to posterior tibial vein). A long saphenous vein was harvested as interpositional graft with cut ends of the posterior tibial artery. The donor site was closed with 3°O vicryl, 4°O prolene and a split thickness skin graft from the left thigh. The neck wound was closed with 3°O vicryl and 4°O nylon. The duration of general anaesthesia was 8 hours 42 minutes and blood loss was 250 mL. Pathological examination of the specimen confirmed squamous cell carcinoma with clear resection margins. In view of her young age and the general aggressive nature of tongue carcinoma, adjuvant radiotherapy was offered.

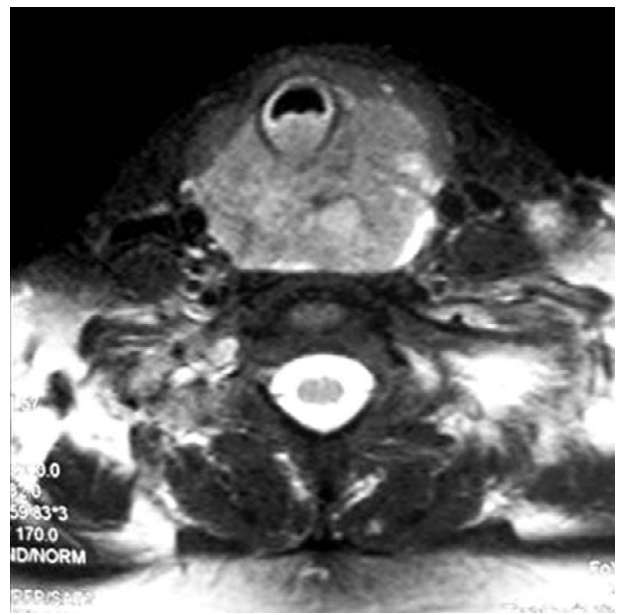
She underwent induction of labour and forceps-assisted delivery at 38 weeks' gestation. Both mother and baby were well post delivery (female, birth weight 2,445 g). Subsequently, she received 60 Gy of external radiation to the tumour bed and right upper cervical region. She was followed-up regularly at the outpatient clinic. There was no tumour recurrence and satisfactory speech and swallowing function returned after a period of rehabilitation.

#### Case 2

A 36-year-old female presented with a 2-month history of a progressively enlarging neck mass at 13 weeks' gestation. There was no shortness of breath, dysphagia or weight loss. On physical examination, she was noted to have a hard thyroid mass and a 1-cm left level IV cervical lymph node. Barium swallow showed a malignant oesophageal stricture at level C6–7. Panendoscopy showed an obstructive tumour growth at the cervical oesophagus



**Figure 3.** Magnetic resonance imaging sagittal section of the head and neck shows carcinoma of the cervical oesophagus with invasion into the trachea, thyroid cartilage and thyroid gland.



**Figure 4.** Magnetic resonance imaging transverse section of the head and neck shows tracheal invasion and the presence of cervical lymph node metastasis.

with evidence of invasion of the posterior tracheal wall. Biopsy confirmed squamous cell carcinoma. Endoscopic ultrasound revealed a full thickness tumour infiltration as well as multiple paratracheal lymph node metastasis. Fine needle aspiration was performed for the left cervical lymphadenopathy and cytology yielded metastatic carcinoma. Magnetic resonance imaging (MRI) and positron emission tomography-computed tomography (PET-CT) scans confirmed locally advanced carcinoma of the cervical oesophagus with extensive invasion of the trachea, thyroid cartilage and the thyroid gland as well as the presence of cervical lymph node metastasis (Figures 3 and 4). Surgical resection required total laryngectomy, manubrium resection, circumferential pharyngectomy, and radical neck dissection followed by gastric pull-up. This would result in loss of voice and impairment of swallowing functions, whilst the chance of curative resection was minimal. Therefore, after discussion with the patient, neoadjuvant chemoradiation was offered instead of surgery. Pregnancy was terminated at 16 weeks of gestation. She went on to receive three doses of systemic chemotherapy (taxotere 100 mg, cisplatin 100 mg, 5-fluorouracil 1,000 mg). Reassessment of PET-CT showed a good response with a marked reduction in glycolytic activity over the cervical oesophageal tumour mass; hypermetabolic cervical nodal metastases were no longer seen. There was no evidence of distant metastasis. She is currently well and is scheduled

for concurrent chemoradiation with weekly carboplatin infusion (200 mg over 30 minutes) using intensity modulated radiotherapy to give 2 Gy/fr at 97% intensity level, 5 fr/week to 66 Gy.

## Discussion

Cancer is generally a disease that occurs more commonly in men at a later stage in life.<sup>5</sup> In recent years, an increase in the incidence of younger females with head and neck cancers has been noted.<sup>6-8</sup> The incidence of head and neck cancers during pregnancy is also rising as women nowadays tend to delay pregnancy until their late reproductive years.<sup>9</sup>

The occurrence of cancer during pregnancy is of considerable interest in view of the resulting dilemmas in management, including the priority of maternal versus foetal health and the acceptable level of foetal risk for maternal treatment. Treatment of head and neck cancers occurring during pregnancy depends on the prognosis of the specific malignancy (type, site and stage), the course of the pregnancy, and the wishes of the patient and her spouse.<sup>5</sup> One must first decide whether there will be immediate termination of the pregnancy so as to eliminate this complicating factor in the treatment of disease, as in Case 2. If pregnancy is to be continued, one must consider the various options and timing of diagnostic and

treatment modality, taking into account the altered physiological parameters during pregnancy, the effect of general anaesthesia, and the risks of radiation and chemotherapy to both mother and foetus.

The surgical management of all patients with head and neck tumours involves long and technically demanding surgeries. Altered physiological parameters during pregnancy aggravate potential complications. For instance, the hypercoagulable state of pregnancy increases the risk of thromboembolic disease and anastomotic thrombosis. This is of particular concern when there is microvascular tissue transfer. As in Case 1, low molecular weight heparin (enoxaparin) may be used prophylactically since it does not cross the placenta.<sup>10</sup> The mass effect of the gravid uterus causes gastric displacement, which predisposes to aspiration and diaphragmatic compression, which in turn decreases functional residual capacity. Compression on the aorta and inferior vena cava together with the physiological increase in blood volume, heart rate and cardiac output means that close haemodynamic monitoring is crucial intraoperatively.

Obstructive head and neck tumours themselves may pose difficulties in intubation. General anaesthesia has an adverse effect on the foetus and the effect varies with gestational age: teratogenicity in the first trimester; spontaneous abortion in trimesters one and two; preterm labour in trimester three. The second trimester is the preferred time for surgery to take place since the physiological effects of pregnancy are less florid and the side effects of general anaesthesia minimal.<sup>5,11,12</sup> Some have advocated dividing head and neck tumour surgery into two stages to reduce anaesthetic time and minimize the risk of hypoxia.<sup>5</sup> However, there is no proven benefit. In fact, more harm may result from subjecting mother and foetus to repeated general anaesthesia with an additional risk of disease progression. In order to save time and minimize anaesthetic risks, a two-team approach may be adopted such that tumour resection and reconstruction surgery can take place simultaneously, as in Case 1.

Radiation exposure may result in structural malformation, organ dysfunction, growth retardation, teratogenesis and foetal death. It may also predispose the foetus to childhood cancers, germ cell mutations and sterility later in life.<sup>12</sup> Side effects of radiotherapy cause significant maternal morbidity, such as tissue stiffness, oral ulceration and osteoradionecrosis, impairing quality of life and caregiving abilities. Furthermore, there is an

increased risk of developing another primary tumour in later life.<sup>13</sup> Compared with CT scanning, MRI is the safer and preferred diagnostic modality in head and neck cancers during pregnancy since it does not employ ionizing radiation.<sup>14,15</sup> Abdominal and pelvic shields may be used to minimize foetal radiation exposure.<sup>16-18</sup> If feasible, it is best to defer radiotherapy until after delivery, as in Case 1.

The effects of chemotherapy vary with gestational age. Teratogenicity and spontaneous abortion may occur when chemotherapy is given in the first trimester; myelotoxicity, organ toxicity, intrauterine growth retardation, preterm labour and still birth may occur when given in the second and third trimesters.<sup>12,13</sup> In view of such potentially devastating effects, it is rarely administered during pregnancy. Indeed, some recommend termination of pregnancy for patients who have received chemotherapy during the first trimester.<sup>19,20</sup>

## Conclusion

The timing of treatment is an important determinant of foetal wellbeing. A multidisciplinary approach should be adopted to enable parents as well as clinicians to strive to achieve the optimal balance between cancer treatment and preservation of foetal health.

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