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A case report of invasive candidiasis and fungal osteomyelitis mimicking oropharyngeal carcinoma recurrence in an immunocompetent patient following transoral robotic surgery

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ABSTRACT

INTRODUCTION: Transoral robotic surgery (TORS) for the excision of oropharyngeal tumour is increasingly considered for its lower rates of postoperative complications and better functional outcomes. However, we report a case of invasive candidiasis in an immunocompetent patient with previous radiation therapy years ago who underwent TORS recently.

CASE PRESENTATION: A 55 year old Chinese female with previous radiation therapy for nasopharyngeal carcinoma diagnosed in 1986 underwent wide excision of a newly diagnosed oropharyngeal carcinoma with TORS. From 4 to 8 weeks post-op, an enlarging exophytic lesion at the surgical excision site was noted. Initial biopsy did not show malignancy or fungal organisms. A repeat biopsy under anaesthesia was done as CT imaging showed suspicion of either infective or tumour recurrence. The patient was treated with long term antifungals as final culture results showed invasive candidiasis. The surgical site showed no further lesions 6 months post-op.

DISCUSSION: Previous radiation therapy to the oropharyngeal area predisposes a patient to colonization of fungal organisms. Despite TORS showing lower rates of infection, patients who have had previous radiotherapy may be more susceptible to infections as the dissection involves down to the pre-vertebral fascia. Hence, it is appropriate for such patients to have microbiological and fungal cultures performed for a lesion such as this and be treated according to the results of the culture.

CONCLUSION: This case serves as a reminder of the risk of invasive candidiasis requiring early investigation and treatment in an immunocompetent patient with prior history of both radiation therapy and recent TORS.

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1. Introduction

Oropharyngeal candidiasis is a common fungal infection known to occur in patients who are immunocompromised, receiving long term antibiotics treatment or have undergone radiation therapy. Specifically, radiation therapy reduces salivary flow which plays a role in cleansing the oral cavity and providing a rich source of IgA [1].

Transoral robotic surgery (TORS) is increasingly being considered for the excision of oropharyngeal tumours. To date, there are three retrospective studies comparing the functional outcomes

and complications between TORS and open surgery for primary oropharyngeal cancers [2–4]; and one publication for recurrent oropharyngeal cancers [5]. In terms of functional outcome, all publications reported shorter hospital stays, lower rates and duration of tracheostomy and gastrostomy use. Chung, Richmon and White also reported that TORS is associated with significantly fewer respiratory, bleeding and wound complications such as wound breakdown and fistula formation. Chung reported that none of the patients who underwent TORS had wound breakdown compared to 11.6% of patients who underwent open surgery. Only 1.0% of TORS patients compared to 5.1% of open surgery patients had fistula formation [3]. These are in line with other non-comparative studies which reported that TORS shortens the time to resumption of ambulation and speech functions and are related to lower rates of postoperative complications such as infections and fistula formation [6–9]. Despite these known advantages, we report a case

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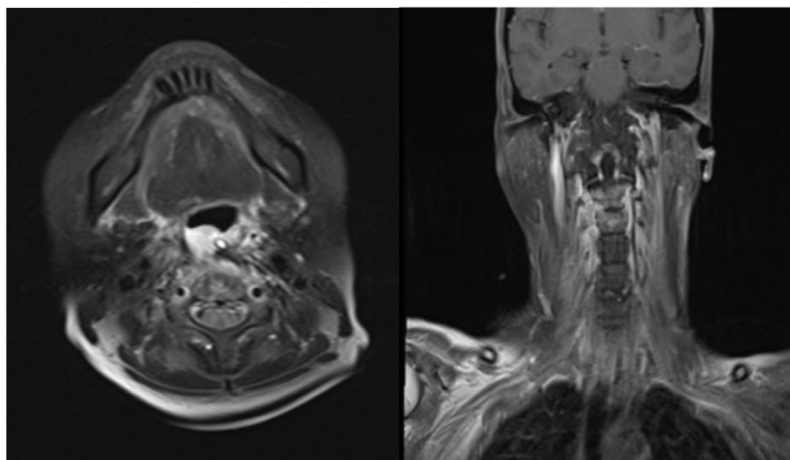


Fig. 1. MRI Images of patient 8 weeks post TORS Left: Enhancing soft tissue mass on right posterior oropharynx, T2 weighted axial MRI; Right: Abnormal marrow signal of C2 and C3, T1 weighted coronal MRI.

here to illustrate the possibility of invasive candidiasis in a patient who has undergone TORS.

To our knowledge, this is a first known case of a patient with a long history of nasopharyngeal carcinoma treated with radiotherapy and recent oropharyngeal carcinoma treated with TORS who presented post-operatively with a progressive exophytic and invasive candidiasis of multiple non-albicans species mimicking recurrence of oropharyngeal cancer. This case report has been reported in line with the SCARE criteria [10].

2. Case presentation

The patient is a 55 year old Chinese female with a past history of cT3 cN2 cM0(AJCC Stage 3) nasopharyngeal carcinoma diagnosed in 1986. She underwent primary radiotherapy with complete remission. She remained under regular follow up with no signs of disease recurrence until July 2015 when she presented with a one month history of occasional globus sensation and vague irritation of the right side of her throat. There was no associated pain, odynophagia, dysphagia and other systemic symptoms such as loss of appetite and weight. A magnetic resonance imaging(MRI) of the neck showed asymmetric enlargement of the right lingual tonsil. A flexible nasoendoscopy showed an ulcerative mass arising from the posterior tonsillar pillar, extending posteriorly from the right lateral wall of the junction of nasopharynx and oropharynx to the tip of the epiglottis. Histology confirmed a p16 negative squamous cell carcinoma(SCC). After panendoscopy, ultrasound scan of the neck and computed tomography(CT) of the chest, she underwent a wide excision of the tumour via TORS as recommended by our multi-disciplinary head and neck tumour board. The tumour was excised en-bloc with a full thickness posterior oropharyngeal and hypopharyngeal wall down to the plane of pre-vertebral fascia with a one centimeter radial margin. The surgical bed was left to heal by secondary intention. A nasogastric tube(NG) was inserted for post-op feeding. The final histology showed a pT2 cN0 cM0(AJCC stage 2) moderately differentiated SCC with clear margins. Her post-op recovery was uneventful. She was discharged on post op day 4. However, she experienced significant oropharyngeal dysphagia and was continued on NG tube feeding on discharge. Regular outpatient surveillance and imaging was initiated.

During follow up, it was noted that her oropharyngeal wound did not heal completely and a persistent sloughy wound bed was visible. Overall, there was extensive tongue and oropharyngeal candidiasis. At four weeks post op, a 1 cm exophytic mass on the right posterior pharyngeal wall was noted. The clinical impression was

that of granulation tissue formation and decision was taken for observation. Because of the candidiasis infection, the patient was given two weeks of nystatin 100,000 units/ml suspension 5 ml four times a day. This was followed two weeks later by a 200 mg loading dose of fluconazole, 2 weeks of 150 mg fluconazole per day, 1 week of augmentin and metronidazole 400 mg twice a day. After 2 weeks, the oral and oropharyngeal candidiasis showed significant improvement with plaques now being limited to the tongue.

A fibreoptic evaluation of swallowing (FEES) 8 weeks post-op showed an exophytic lesion of the posterior pharyngeal wall at the site of surgical excision. The patient was asymptomatic at the time of the examination, with no stridor or dyspnea. To rule out any recurrence a biopsy was taken, which only showed inflamed granulation tissue with exudates and no malignancy. No fungal organisms were noted in the specimen.

Further workup included a CT scan of the neck which showed an exophytic enhancing soft tissue mass on the right posterior oropharyngeal wall, extending to the prevertebral space with abnormal marrow signal in the adjacent vertebral body and transverse processes of C2 and C3 vertebrae (Fig. 1). As this raised the suspicion of either an infective or inflammatory change with osteomyelitis or tumour recurrence with direct bone involvement, a decision was made for examination under anaesthesia(EUA) with a repeat biopsy.

Prior to EUA, the growth had enlarged to a 3 cm protuberant friable and vascular mass overlying the laryngeal inlet. Attempts to intubate using direct laryngoscopy, fibre-optic bronchoscopy, or other awake intubation methods were unsuccessful. Eventually, jet insufflation and intubation was carried out, followed by a tracheostomy to secure the airway.

During the operation, the lesion was removed to the level of the mucosa and multiple samples were submitted for frozen section, routine histology and dedicated cultures, including fungal cultures. As there was profuse bleeding at the site of biopsy, Argon plasma coagulation (APC) was used intraoperatively to achieve hemostasis.

Frozen section of the tissues intraoperatively showed abundant granulation tissue. No malignancy was noted. Periodic acid–Schiff(PAS) and Grocott's methenamine silver(GMS) stains again did not show any fungal organisms.

Final fungal tissue cultures revealed *Candida dublinensis* and *Candida Glabrata* complex. Bacterial culture revealed *Enterobacter Aerogenes* which was sensitive to ciprofloxacin. An urgent consult was arranged with the infectious disease consultant for the persistent fungal infection and likely fungal osteomyelitis. She was promptly started on ciprofloxacin 500 mg BD and PO voriconazole

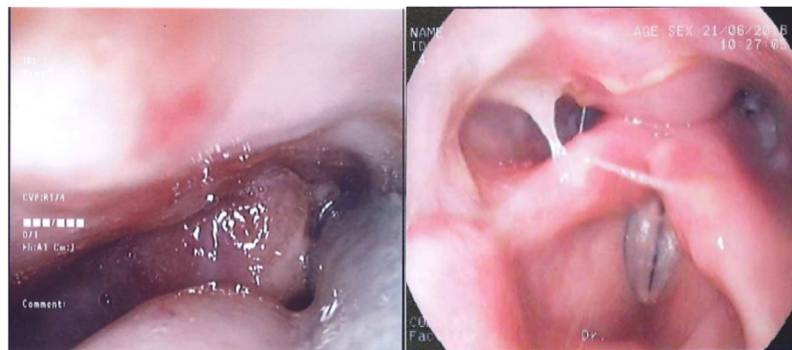


Fig. 2. Flexible nasoendoscopy images Left: Exophytic mass on posterior pharyngeal wall on flexible nasoendoscope. Right: Following surgical removal and long term antifungal treatment, the pharyngeal wall was flat with no observable lesion.

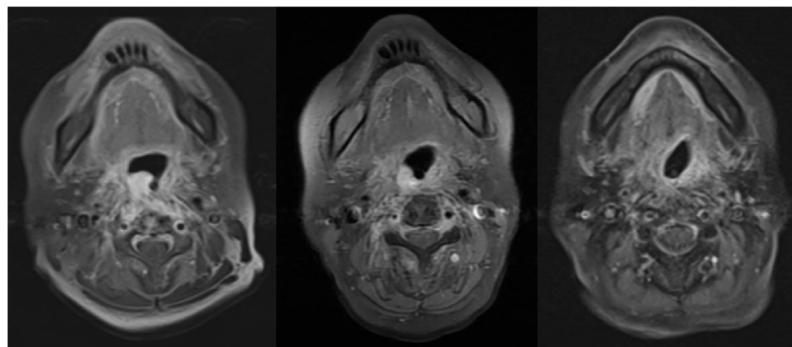


Fig. 3. Axial T1 weighted MRI scans of the patient's oropharynx over time. Left: MRI taken in October 2015 showing the exophytic mass. Middle: MRI taken in February 2016 post surgery. Right: MRI taken in May 2016 post antifungal treatment showing resolution of mass.

200 mg BD for about 16 weeks based on the sensitivities of the cultures.

She responded to the anti-fungal treatment and at 16 weeks post treatment, the oropharyngeal mass was no longer visualized on nasoendoscope (Fig. 2). MRI scans at 6 months post treatment showed complete resolution of the mass and the absence of abnormal marrow signaling of C2 and C3 (Fig. 3).

3. Discussion

TORS is a relatively new surgical technique for the excision of oropharyngeal tumours. Its advantages include being minimally invasive, better functional outcomes and better infection control. These advantages are particularly relevant for patients with prior radiation therapy who has developed a recurrence or a second primary tumour. We determined that our patient is considered to have radiation-induced squamous cell carcinoma (RISCC) according to the definition set forth by Tay et al. [11]. In the same study, they reported that RISCC patients had the best prognosis when there was no residual disease after primary treatment. Therefore, TORS was a reasonable treatment mode to provide our patient with clear margins, enhanced functional outcome and lower postoperative complications.

This is to our knowledge the first known case of a patient with radiotherapy completed many years ago and recent TORS with post-operative invasive candidiasis of multiple non-albicans species that mimicked oropharyngeal cancer recurrence. It is also a first reported case of severe candida infection leading to osteomyelitis post TORS.

It is known that radiation therapy is a risk factor for the colonization and infection of *Candida* on the mucous membranes of the oropharynx for patients with head and neck cancers. Rossie et al. found that the percentage of patients colonized by *Albicans*

species increased after radiation therapy [12]. Fotos et al. also found that *Candida Albicans* is the most common colonizer of the oropharynx [13]. However, other species such as *Candida glabrata*, *Candida krusei*, *Candida tropicalis*, *Candida kefyr* and *Candida dubliensis* can also colonize the oropharynx [14]. The commonest treatment for candida infections is oral fluconazole as it can effectively treat *Candida Albicans*. However, non-albicans species of candida, such as *Candida Glabrata* are reported to be more resistant to fluconazole [15] and require either a higher dose of fluconazole [16] or other forms of antifungal treatment. It is known that non-*Albicans* species of *Candida* have increased resistance to oral fluconazole [17,18] and may also produce a biofilm on the mucous membranes of the oropharynx [16].

The excision of the oropharyngeal tumour, down to the plane of pre-vertebral fascia may have resulted in a deep tissue wound bed that was susceptible to infection, as these are often left to heal by secondary intention. Coupled with the high likelihood her oropharyngeal mucosa had been colonized with multiple species of *Candida*, including *Candida Glabrata* and *Dubliensis*. due to prior radiation therapy, there is a distinct possibility that any form of candidiasis may invade the pre-vertebral fascia. In this case, fungal osteomyelitis was also reported in the MRI scans. In our patient, the eradication of the *C. albicans* by oral fluconazole likely precipitated the growth of the other two species of *Candida*, which were only proven by tissue culture after surgical excision.

Therefore, it is appropriate for future patients who have a history of radiotherapy and recent TORS, to have fungal culture performed for a lesion such as this and be treated according to the results of the culture. Furthermore, given the patient's recent diagnosis of oropharyngeal carcinoma, there was also a definite need to consider tumour recurrence despite initial biopsy showing granulation

tissues with no neoplasia. There have been prior case reports of laryngeal candidiasis mimicking possible malignancy [19–21].

4. Conclusion

This case study serves as a reminder of the complexity and complications of invasive candidiasis in a patient with prior history of both radiation therapy and recent TORS. Firstly, the prior radiation therapy may make a patient susceptible to such invasive candidiasis due to the extension of the excision down to the pre-vertebral fascia. Secondly, it may mimic a malignancy and the exophytic mass may cause acute airway obstruction if not treated promptly.

Author contributions

Mr Tan HY did the literature research, data acquisition as well as manuscript preparation. Dr. Tan HK conceived of the study, participated in its design and coordination and helped to edit the manuscript. All authors helped in data acquisition, read and approved the final manuscript, and guaranteed the integrity of the study.

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Ethics approval

The ethics approval for this case report has been obtained under the Singhealth Centralised Institutional Review Board 2011/678/B.

Conflict of interest

The authors of the above article declare that they have no competing interests.

Informed consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Guarantor

Mr. Tan Hong Yu.
Dr. Tan Hiang Khoon.

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