Pharyngo-vertebral fistula: A rare complication of pharyngeal irradiation

Tyler K. DeBlieux[1], Jonathan N. Young[1], Evan R. Reiter[1] ;
[1]Virginia Commonwealth University, Richmond, VA

Abstract

INTRODUCTION:

Radiation therapy is a mainstay of treatment for head and neck malignancies, with well described complications including xerostomia, mucositis, osteoradionecrosis, and soft tissue necrosis. Soft tissue necrosis may occur as a late effect of therapy, and may progress to fistula formation, which can serve as a nidus for infection. Pharyngo-vertebral fistula is a rare entity, and even more rare complication of head and neck irradiation, with most cases reported in association with cervical spine surgery.

OBJECTIVE:

Describe an unusual case of pharyngo-vertebral fistula occurring as a delayed complication of head and neck irradiation.

METHOD:

Case report, literature review.

RESULTS:

A 63 year old man presented with T3N1M0 squamous cell carcinoma of the hypopharynx, involving the posterior pharyngeal wall at the esophageal introitus. He was treated with chemoradiation, requiring tracheostomy and gastrostomy tube support. Six months after treatment he presented with pneumonia and increasing neck pain. Workup included neck CT and MRI C-spine which demonstrated a fistulous tract to C3-C4 vertebral bodies. Operative endoscopy showed a well demarcated fistulous tract with bone exposure, and friable tissue more inferiorly at the esophageal introitus, biopsy of which revealed recurrence. He underwent total laryngopharyngectomy with excision of the pharyngo-vertebral fistula, debridement of necrotic bone and reconstruction with tubed anterolateral thigh free flap.

CONCLUSION:

We describe a case of pharyngo-vertebral fistula complicating hypopharyngeal chemoradiation therapy. This is the first reported case describing these features, and highlights the diagnostic and treatment challenges for this entity.

Introduction

Radiation therapy is a mainstay of treatment for head and neck malignancies, with well described complications including xerostomia, mucositis, osteoradionecrosis, and soft tissue necrosis. Soft tissue necrosis may occur as a late effect of therapy, and may progress to fistula formation, which can serve as a nidus for infection[1]. Pharyngo-vertebral fistula is a rare entity, and even more rare complication of head and neck irradiation, with most cases reported in association with cervical spine surgery[2].

Case Report

A 63 year old man presented with T3N1M0 squamous cell carcinoma of the hypopharynx, involving the posterior pharyngeal wall at the esophageal introitus. He was treated with chemoradiation, requiring tracheostomy and gastrostomy tube support. Three months after treatment he underwent post-treatment operative endoscopy, which revealed a mucosal depression and ulceration of the posterior pharyngeal wall (Figure 1) as well as esophageal stenosis. Biopsies of this area showed no evidence of malignancy and finding were attributed to post-radiation necrosis. Two months later repeat operative endoscopy again demonstrated the mucosal depression and ulceration of the posterior wall of the hypopharynx, which was stable in size.

Six months after treatment he presented with pneumonia and increasing neck pain. Workup included neck CT and MRI which demonstrated a fistulous tract from the hypopharynx to C3-C4 vertebral bodies, and concerning for osteomyelitis (Figure 2). Operative endoscopy showed a well demarcated fistulous tract with 8 x 8 mm bone exposure, and friable tissue more inferiorly at the esophageal introitus, biopsy of which revealed recurrence (Figure 3).

He underwent total laryngopharyngectomy with excision of the pharyngo-vertebral fistula, debridement of necrotic bone from C3 and C4, and pharyngeal reconstruction with a tubed anterolateral thigh free flap.

Discussion

Radiation induced injury to surrounding normal structures is a common finding in many head and neck cancer patients. Symptoms such as xerostomia, mucositis, and laryngeal edema can occur and it is reported that 15-59% of patients develop edema following irradiation. In addition to delayed radiation changes, persistent edema may also be a sign of tumor recurrence or infections[3]. Post-irradiation esophageal stenosis is a less common delayed complication of radiation therapy occurring in 3.3 % of patients. Ischemia of the esophageal wall is thought to be the etiology for the stricture formation[4]. Focal ischemia may also lead to more severe complications such as radiation induced tissue necrosis (i.e. chondroradionecrosis or osteoradionecrosis). Pharyngo-vertebral fistulas carry a high mortality risk reported between 20 to 65%[2], thus, prompt accurate diagnosis and correction of the fistula is important.

However, radiation induced changes of treated sites continue to prove challenging for clinicians to accurately monitor for tumor recurrence. Tissue changes associated with high dose radiotherapy such as edema, necrosis, and ulceration are also commonly hallmarks of tumor recurrence[3,6]. Patients often present with similar symptoms as well making it difficult to distinguish between the two entities.

Direct laryngoscopy with biopsy remains the standard for post-treatment monitoring for recurrence. However, several studies have shown poor sensitivity of this method due to presence of radiation changes, often requiring multiple biopsies and repeated trips to the operating room for correct diagnosis. In part, this may be due to sampling error and recurrences presenting with multiple foci.[6] PET/CT imaging has evolved to assist in accurate diagnosis of recurrence versus radiation induced changes. However, ongoing radiation induced inflammation or infection at the primary site, as in our patient, may present a diagnostic challenge.

Conclusions

We describe a case of pharyngo-vertebral fistula complicating hypopharyngeal chemoradiation therapy. This is the first reported case describing these features, and highlights the diagnostic and treatment challenges for this entity.

Monitoring for tumor recurrence in patients who receive high dose curative radiation therapy remains challenging. Despite vigilant post-treatment monitoring, biopsies, and imaging, tumor recurrence may go undetected especially in the setting of severe radiation induced changes.

Figure 1: Direct laryngoscopy two months following completion of treatment. Ulceration with fibrinous exudate at posterior wall hypopharynx.

Figure 2: MRI of cervical spine demonstrating pharyngo-vertebral fistula tract (red circle)

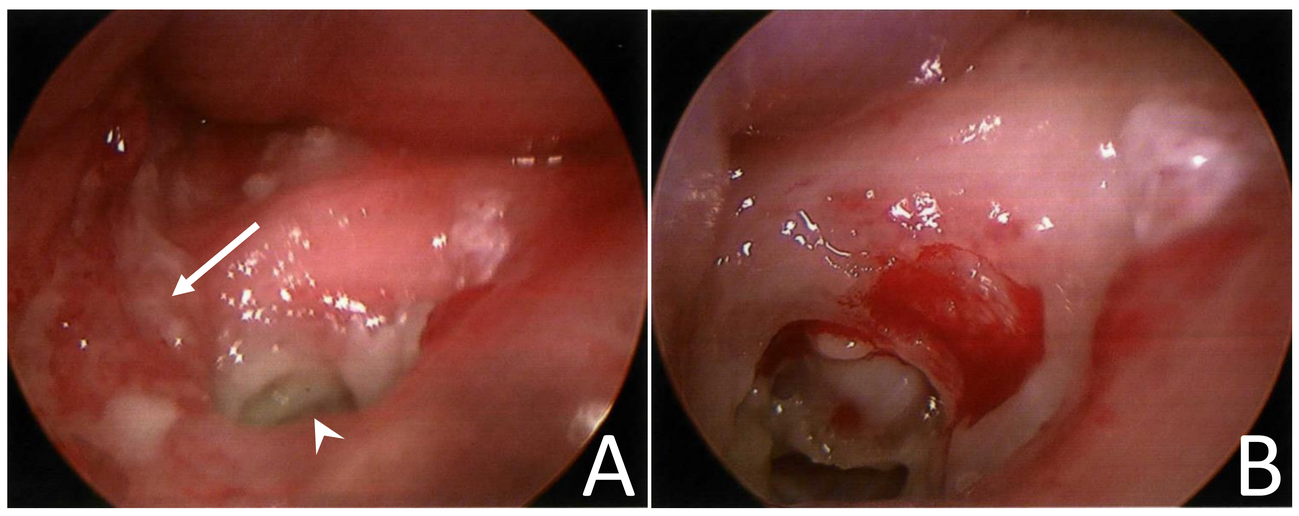

Figure 3: A. hypopharynx showing fistula (arrowhead) at posterior wall, and ulcerated mucosa, biopsy of which revealed recurrent carcinoma (arrow). B. Pharyngo-vertebral fistula, with visible tract extending into bodies of C3-4.

Contact

Tyler DeBlieux
VCU Health System
Email: tyler.deblieux@vcuhealth.org
Phone: 804-828-2785

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