

A case report of application of posterior pharyngeal flap in resection and reconstruction of posterior pharyngeal wall carcinomas located at the level of the cricoid cartilage

Lianhe Li, PhD^a, Liangyu Zou, MD^b, Jugao Fang, PhD^{c,*}

Abstract

Rationale: posterior pharyngeal wall carcinomas located at the level of the cricoid cartilage is a rare occurrence. Surgical treatment is a dilemma owing to the retention of laryngeal function

Patient concerns: A 56-year-old man underwent a “resection of left cervical tumor” at another hospital. Postoperative pathological report noted a left metastatic squamous cell carcinoma of the neck. Neck-enhanced computed tomography (CT) revealed thickening of the right posterior pharyngeal wall, and an image of soft tissue density was present on the posterior pharyngeal wall with a size of approximately 1.0 × 1.5 cm.

Diagnosis: Hypopharyngeal carcinoma (T1N2M0).

Interventions: We performed operation on a patient who suffered from posterior pharyngeal wall carcinomas at the level of the cricoid cartilage. The postoperative defects were repaired with posterior pharyngeal flaps.

Outcomes: The patient with posterior pharyngeal flap after operation survived without necrosis, the neck wounds of patient healed in 1 stage, and the phonation, swallowing and respiratory function was good.

Lessons: The application of posterior pharyngeal flap to repair defects due to posterior pharyngeal wall carcinomas that were located at the level of the cricoid cartilage after resection is an effective reconstruction method that is easy to use and has excellent repair effects.

Abbreviations: CT = computed tomography, PET-CT = positron emission tomography-computed tomography, SUV = standard uptake value.

Keywords: posterior pharyngeal flap, posterior pharyngeal wall carcinoma, reconstruction, surgery

1. Introduction

The incidence of posterior pharyngeal wall carcinoma is low. Revannasiddaiah et al^[1] reported that it accounts for 7% of all hypopharyngeal carcinomas, and a domestic report obtained a figure of 10.8%.^[2] The positions of posterior pharyngeal wall carcinomas are hidden and are difficult to find because of the lack of typical early symptoms. Such carcinomas mostly rapidly expand along with the posterior wall and can invade upwards to the oropharynx and nasopharynx or down to involve the

esophagus and can extend to the lateral wall in the advanced stage. However, a few involve the prevertebral muscles, and direct invasions of the skull base are rare. Due to the different sites and ranges of lesions, there are different surgical and reconstructive methods for posterior pharyngeal wall carcinomas^[2-4] that have great significance in terms of both the retention of laryngeal function and the prognosis for selecting a reasonable treatment protocol. Our Otorhinolaryngology center used posterior pharyngeal flaps in reconstructions of pharyngeal wall carcinomas that were located at the level of the cricoid cartilage. Study on application of posterior pharyngeal flap in resection and reconstruction of posterior pharyngeal wall carcinoma is not reported in the domestic and foreign. The postoperative result was good and is reported as follows.

2. Case presentation

A 56-year-old man who was admitted to the hospital after resection of a left cervical tumor that had been present for 3 months on September 17, 2012. Three months before, the patient's left cervical tumor underwent a “resection of left cervical tumor at another hospital. Postoperative pathological report noted a left metastatic squamous cell carcinoma of the neck. The results of a positron emission tomography-computed tomography (PET-CT) examination suggested a cervical lymph node metastasis of the hypopharyngeal carcinoma. An

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^a Central Hospital of Chaoyang, Liaoning, ^b Chengde Medical College, Hebei,

^c Beijing Tongren Hospital, Capital Medical University, Beijing, China.

* Correspondence: Jugao Fang, Beijing Tongren Hospital, Capital Medical University, Beijing 100730, China (e-mail: fangjugao2018@163.com).

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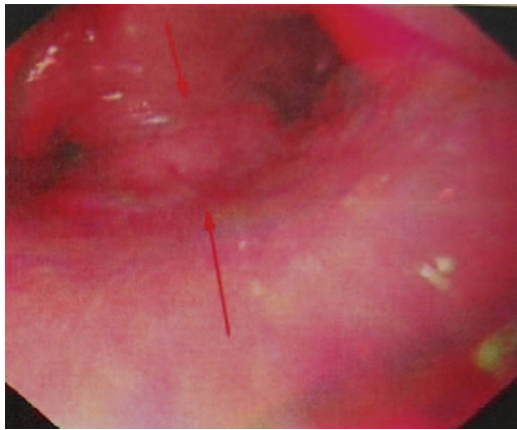


Figure 1. Electronic gastroscopy displays a tumor of approximately 1.5 cm in diameter at the level of the arytenoid cartilage in the posterior pharyngeal wall.

examination revealed normal bilateral vocal cord activity and a suspected neoplasm in the posterior pharyngeal wall. A longitudinal scar of approximately 5 cm could be seen on the left side of neck, and multiple enlarged lymph nodes of approximately 1.0 to 3.0 cm in diameter were palpated. These nodes were hard and exhibited poor mobility, no tenderness, and no pulsation. The obviously enlarged lymph nodes in the right neck were not palpated. An auxiliary laboratory examination revealed routine blood results, and the coagulation and biochemical examination parameters were in the normal range. On biopsy, (Fig. 1) displays a tumor of approximately 1.5 cm in diameter at the level of the arytenoid cartilage in the posterior pharyngeal wall, the tumor was found to be tough, had not invaded the esophageal entrance, and the open state of the glottis was normal. Neck-enhanced CT (Fig. 2) revealed thickening of the right posterior pharyngeal wall, and an image of soft tissue density was present on the posterior pharyngeal wall with a size of approximately 1.0 × 1.5 cm. This density had an obscure boundary and was slightly enhanced relative to normal. Differently sized multiple lymph node shadows were present in the bilateral cervical region and were 1.0 to 3.0 cm in diameter on the left, partially fused into a cluster, and exhibited liquefied necrotic areas and slight strengthening after enhancement. The

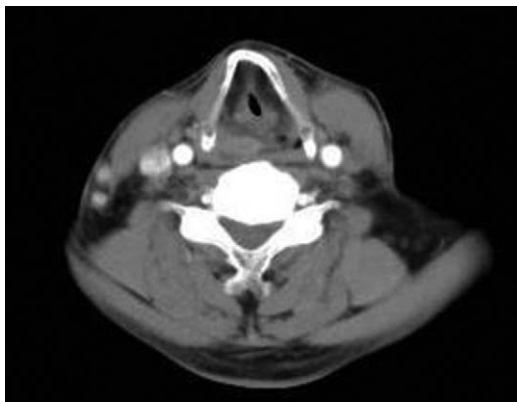


Figure 2. Neck-enhanced CT revealed thickening of the right posterior pharyngeal wall, and an image of soft tissue density was present on the posterior pharyngeal wall with a size of approximately 1.0 × 1.5 cm. CT = computed tomography.

anterior borders of the nodules and left common carotid artery were indistinctly demarcated. The nodules of the right neck were approximately 0.5 to 1.0 cm in diameter and exhibited clear boundaries. A PET-CT examination revealed thickening of the soft tissue of the right pharynx surrounded by fuzzy tissue space and with increased radioactive uptake and a maximum standard uptake value (SUV) of 7.5. The left cervical lymph nodes were enlarged in the deep middle upside of the left neck, and the largest was approximately 1.4 × 2.0 cm (on the deep upside of the left neck) and exhibited increased radioactive uptake and a maximum SUV of 8.0 (on the upside of left neck).

2.1. Diagnosis: hypopharyngeal carcinoma ($T_1N_2M_0$)

This new technology was approved by Central Hospital of Chaoyang, Liaoning, China. The patient agreed with surgical treatment and granted this consent as a voluntary contribution in the interest of public education. On September 21, 2012, the patient was treated with a tracheotomy, radical left neck dissection, regional right neck dissection, extended resection for the hypopharyngeal tumor, and reconstruction of the posterior pharyngeal flap under general anesthesia. The surgical procedures were as follows: First, a tracheotomy was performed under local anesthesia, which was changed to general anesthesia, and a radical left neck dissection and regional right neck sweeping were performed at level II, III, IV, VI. Second, approaching from the right side of the pharynx, the hypopharyngeal mucosa was incised, the pharyngeal cavity was entered, and the tumor was found to be located in the posterior pharyngeal wall at the level of the right side of the cricoid cartilage and was approximately 1.0 × 1.5 cm, cauliflower-like, and with clear boundaries. The mucosa and muscle layer were excised at a distance of 1.0 cm from the tumor to the prevertebral fascia, and the tumor was then completely resected. The pathological results from the margin were negative, and the area was cut up vertically from the posterior pharyngeal mucosa, through the pharyngeal spindle muscle, to the prevertebral fascia along the posterior pharyngeal wall wound edge, from which the posterior pharyngeal flap that formed the pedicle was separate at the shallow edge of the prevertebral fascia at the upper part at a size of approximately 3.0 × 4.0 cm. The tissue was then transferred down the line and sutured with the wound edge to repair the hypopharyngeal wound. Third, the pharyngeal mucosa was sutured to close the pharyngeal cavity.

The wound healed in 1 stage after the operation without complications. Ten days after the operation, the gastric tube was pulled out, and eating was smooth. The postoperative pathology included the following: a mid-differentiated hypopharyngeal squamous cell carcinoma with metastasis in 12/50 of the lymph nodes of the left neck and 1/20 of the lymph nodes of the right neck, metastasis of 2/2 of the right tracheoesophageal groove lymph nodes, which had fused. Synchronization radiotherapy and chemotherapy were provided 1 month after surgery, and the tracheal cannula was removed after 4 months. Follow-up was 2 years after surgery, CT (Fig. 3) has since revealed no tumor recurrence or metastasis, and the functions of deglutition, respiration, and phonation are all good.

3. Discussion

The effects of radiotherapy of posterior pharyngeal wall carcinomas are non-ideal, and the commonly used treatments are surgery, postoperative radiotherapy and postoperative



Figure 3. Postoperative neck CT has since revealed no tumor recurrence or metastasis at 2 years after surgery. CT=computed tomography.

chemotherapy.^[5] After tumor resection, defects always remain on the hypopharynx or even on large areas of the esophageal tissue, and the structure of larynx is often damaged. The reconstruction of the pharyngeal defect in one stage and the preservation of the functions of deglutition, respiration, and phonation in combination with the complete removal of the tumor are difficult and key points of the surgical treatment of posterior pharyngeal wall carcinomas.

Different surgical approaches^[6] and repair methods are used according to the differences in the carcinoma's primary site and invasion range.^[7] The following repair methods are used: First, putting aside, which is suited for wound defects that are large and tumors that are limited to the posterior pharyngeal wall. Second, a local flap of tissue, such as a submental flap, platysma myocutaneous flap, or deltopectoral skin flap, can be used to repair the defects of the posterior pharyngeal wall and lateral wall separately, but the local tissue's hypertrophy and over-stiffness influence the functions of deglutition and respiration. Third, a laryngotracheal flap is suitable for old and frail patients and those with poor lung function, but laryngeal function will not be preserved. Fourth, the use of gastrointestinal flaps rather than hypopharyngoesophagus flaps or flaps from the free jejunum for repair is suitable for a wide range of tumors that involve the larynx and cervical esophagus.

The reconstruction of posterior pharyngeal wall carcinomas with posterior pharyngeal flaps has not been reported in clinical reports, and the authors believe that the indications for this procedure are T₁ and T₂ tumors located at the level of cricoid cartilage of the posterior pharyngeal wall, have diameters less than 3 cm, and do not involve the esophagus entrance, larynx or vertebra. Because the cricoid cartilage is in front of the tumor in this situation, part of the tissue repaired by the flap is overstuffed, which affects deglutition function. Wounds that are managed with the putting-aside method and the cricoid cartilage rub against each other; the prevertebral fascia is easily damaged and subsequently infected, and self-epithelization is not easy. Therefore, reconstructing the defect with a posterior pharyngeal flap is a good choice.

The posterior pharyngeal flap is actually a compound flap of the hypopharyngeal mucosa and muscle. The posterior pharyngeal mucosal muscle is relaxed and elastic, the blood supply is rich, and such flaps survive easily. The design of the posterior

pharyngeal mucosa muscle flap involve a pharyngeal flap with a length-to-width ratio of 2 to 3:1, where the maximum width does not exceed that of the lateral pharyngeal wall; a pedicle that, at the top, could be separated to the level of soft palate; an incision that was made according to the design line; and a cut from the posterior pharyngeal mucosa, the fascia pharyngis and the constrictor naris to the shallow end of the prevertebral fascia. The posterior pharyngeal flap was carefully separated from the prevertebral fascia and then used to form the posterior pharyngeal mucosal muscle flap; compression hemostasis was then applied with gauze. The flap was then slid down to repair the hypopharyngeal wound, and when the wound repaired by flap was relatively small, separate tissue surrounding the wound was used to decrease the tension, and sutures were then applied.^[8] The advantages of this approach include that the thickness and hypopharyngeal wall defect sizes are matched and that not only are the tissue survival and tissue compatibility good, but physiologically, the principle of the nearest draw is also followed.

The disadvantages of this approach are that it is not suitable for cases of tumors that invade the lateral pharyngeal wall and esophageal entrance. Attention should be given to the use of caution when the submucosal aspect of the tumor invasion is wide or the involvement of the cervical bone is extensive. Second, it is recommended that the collected posterior pharyngeal wall flap be as wide as possible; nearly all of the tissue of the posterior pharyngeal wall flap can be used to a length of 4 to 5 cm. Third, when making posterior pharyngeal flap, attention should be given to the hemostasis of both sides of the longitudinal incision so as not to form a hematoma of the retropharyngeal space after the surgery. Fourth, for patients who have velo-cardiofacial syndrome, because internal carotid artery may be mutated, if the location of the ingression is under the pharyngeal mucosa, these vessels may be damaged, which could lead to massive hemorrhaging during the surgical operation; thus, it is necessary to perform a vascular imaging examination before the operation.^[9] The posterior pharyngeal flap surgery is the most common and effective treatment for all types of causes of velopharyngeal dysraphism at home and abroad, for the types caused by cleft palate. Elsheike et al^[10] applied posterior pharyngeal flaps to mend velopharyngeal dysraphism; postoperatively, the patients exhibited good phonation and velopharyngeal closure without significant complications. Yu A et al^[11] applied posterior pharyngeal flaps to mend tumors of the pyriform sinus and preserved laryngeal function without pharyngeal fistulas or hypopharynx stenoses after the operation. In this paper, The patient who suffered from posterior pharyngeal wall carcinomas at the level of the cricoid cartilage underwent repair with posterior pharyngeal flaps, recovered well, preserved their laryngeal function preserved and were free of hypopharyngeal stenoses, pharyngeal fistulas, and other complications. Patient has provided informed consent for publication of the case.

In general, treatment of laryngeal and hypopharyngeal cancer by means of transoral robotic surgery (TORS) seems to be feasible and safe with satisfying functional and short-term oncologic results.

4. Conclusion

In short, there are several methods for reconstruction according to different parts and the area in which the posterior pharyngeal wall carcinoma is located, but the use of posterior pharyngeal flaps to repair posterior pharyngeal wall carcinomas at the level

of the cricoid cartilage, which is a new and feasible method, should be put into wider use.

Author contributions

All authors reviewed the final version of the manuscript and approve it for publication.

Data curation: Liangyu Zou

Resources: Liangyu Zou.

Supervision: Lianhe Li, Jugao Fang.

Writing – original draft: Lianhe Li.

Writing – review & editing: Jugao Fang.

Conceptualization: jugao fang.

Project administration: lianhe li.

Writing – original draft: lianhe li, Liangyu Zou.

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