Robot-Assisted Removal of a Posterior Pharyngeal Wall Mucoepidermoid Carcinoma

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Abstract This report presents a rare case of a mucoepidermoid carcinoma of the posterior pharyngeal wall of the hypopharynx. Excision of the lesion was performed by transoral robotic surgery (TORS). The rarity of hypopharyngeal mucoepidermoid carcinoma and the technical advantages of TORS are presented and discussed in this study.

Keywords Robot assisted · Da vinci surgical system · Pharyngeal · Mucoepidermoid carcinoma

Introduction

Mucoepidermoid carcinoma (MEC) was first presented as a different pathology of the salivary glands by Stewart et al. [1]. MEC commonly occurs in the parotid gland; the second most common origin is the minor salivary gland, particularly in the location of the palate [1, 2]. In the field of otolaryngology, the larynx and hypopharynx are rare localizations [3, 4].

Transoral robotic surgery (TORS) is a new method to perform endolaryngeal/pharyngeal surgery. Previous reports have encouraged its use in the field of otolaryn-

gology [5]. This report presents the transoral resection of a posterior pharyngeal wall MEC.

Case Presentation

A 76-year-old female presented with dysphagia persisting for 7 months and dyspnea for 3 months. Her history was not significant for tobacco use. Her other past medical history as well as her familial history were unremarkable.

On physical examination, a purple colored posterior pharyngeal mass extending from the level of the uvula to the upper esophageal inlet was observed. The mass was fluctuant with palpation. The bilateral neck was free of adenopathy. Other otorhinolaryngological, general physical and pulmonary examinations were normal.

A magnetic resonance imaging (MRI) scan centered on the nasopharynx, showed a 3.5×3.5 cm mass at the level of the C3 vertebrae corpus (Fig. 1). The lesion was hypo-intense on T1 weighted scans and hyper-intense on T2 weighted scans and displayed minimal rim enhancement. The lesion was restricting the airway at the level of the epiglottis. A punch biopsy was performed under local anesthesia. The initial pathologic examination revealed a mucopidermoid carcinoma. The patient underwent transoral robotic resection of the pharyngeal mucopidermoid carcinoma.

In the procedure, a trans-nasal endotracheal tube was inserted. The robotic system has two main parts which one is the surgeon console and the other is the manipulator unit so called patient cart. During the procedure the chief surgeon was located in surgeon console which was set up approximately 300 cm away from the patient within the operating room. An assistant surgeon is located near the manipulator unit in order to insert and check the instruments (Fig. 2).

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Fig. 1 T1 weighted sagittal view of the mass

Fig. 2 The set up of the robotic system. The chief surgeon was located on the surgeon console. The manipulator unit was located on the *right side* of the patient with a 30° angle from the bed. The assistant surgeon was located near the manipulator unit

Exposure of the supraglottis was achieved with a Feyh-Kastenbauer (FK) retractor (Gyrus Medical Inc., Maple Grove, MN, USA). After adequate exposure the da Vinci Surgical System's manipulator unit was set up on the right side of the patient with a 30° angle from the bed. The 0° 12.5 mm 3D endoscopic arm was inserted trans-orally into the midline and the operation field was visualized. The two lateral arms were placed into position in the laryngopharynx at approximately 30° angles from the axis created by the midline position of the endoscope. The 5 mm robotic

Fig. 3 The mass was dissected with the monopolar cautery instrument and Schertel grasper instruments

Fig. 4 Postoperative view. The mass was removed from the prevertebral surface

instrument was inserted trans-orally. The procedure was performed under the visualization of a 0° 3D endoscope (12.5 mm).

The mass was dissected from the pre-vertebral space posteriorly and tonsillar pillars laterally (Fig. 3). The mass was totally removed and no intraoperative complication occurred (Fig. 4). The patient recovered without tracheotomy and the patient started oral food consumption on the second postoperative day. The patient was discharged on the seventh postoperative day.

Unconnected with the surgery, the patient died 3 weeks later from a cardiac stroke. The final pathology specimen revealed a low-grade MEC (Fig. 5). All surgical margins were negative. Histochemical stains were positive for PAS and D-PAS and immunochemical stains were positive for p63.

Fig. 5 The histopathologic view of the final pathology specimen which revealed low grade mucoepidermoid carcinoma

Discussion

MEC's of the larynx and hypopharynx are rare [4]. The origin of the tumor is the subepithelial salivary glands or intraepithelial mucous glands [3]. Tumors arising from the minor salivary gland predominantly occur as an asymptomatic submucosal swelling. The mass has a blue-red color and is fluctuant on physical examination [2]. Its biological behavior is difficult to predict, but the location, histological stage and grade are the most important factors affecting the therapeutic decision [6].

Because of their rarity and differing histological types, diagnostic and therapeutic decisions are often made empirically from case to case [3]. Low-grade MECs are unlikely to metastasize and have a high 5 years survival rate. Local resection with an adequate margin from the surrounding normal tissue is usually sufficient [7, 8].

MEC is regarded as radio-resistant; however, postoperative radiation has been previously reported [9]. Treatment of the neck is variable and postoperative radiotherapy to the primary site and neck also presents an option for low-grade MEC [10].

The surgery is typically performed with external or endolaryngeal/pharyngeal approaches. External surgery for such tumors will prolong the operative time, intraoperative blood loss, the postoperative healing process, hospital stay and perioperative morbidity. Traditional open surgical procedures, which require large cervicofacial incisions and dissections with mandibulotomy or pharyngotomy, also result in considerable cosmetic deformity, malocclusion, and dysphagia [11]. Endolaryngeal/pharyngeal surgery is preferable, because no skin incision, tracheotomy, or mandibulotomy is required. The limited area of the tongue base and pharynx, a restricted view of the area through the laryngoscope and the

limitations of surgical instruments make the manipulations more difficult in this area [12]. A learning curve with regard to the laser also exists that is significantly longer than with TORS. When performed with standard instruments en-bloc resection is sometimes not possible and will be resulted with piecemeal resection of the tumor.

The robotic da Vinci Surgical system is an evolution in minimal invasive surgery. Previous reports have encouraged its use in the field of otolaryngology [5, 13].

The basic advantages of the system include an excellent 3-D magnified visualization, the motion capacity of the robotic instrument, and simultaneous resection and coagulation capabilities. These advantages result in a good excision of lesions, minimal intraoperative blood loss, and minimal postoperative morbidity. The need for extensive surgeries, median or lateral thyrotomy, or medial or lateral pharyngotomy is avoided with the technique. Cosmetic and functional problems will also be avoided. The postoperative period is improved in terms of postoperative pain and the healing process. The return of the patient to their normal diet is shorter than with other methods. A shorter recovery period and shorter hospital stay are other significant advantages.

The successful use of TORS has been reported in early T1 and T2 carcinomas of the hypopharynx [14]. However, the resection of a posterior pharyngeal wall salivary gland neoplasm has not been previously reported.

TORS is not without its disadvantages. The system does not provide the surgeon with feedback from the tissue or tissue contact feeling. Additionally, the instruments are still limited in shape and size, the procedure is not always effective, and its use is not widespread, meaning learning and training programs have not yet been established. Further studies to confirm its efficacy in the field of otolaryngology are required.

Despite its cost, the system has many uses and the benefits in surgeon time and postoperative morbidity should be taken into account when considering cost effectiveness. Taking into consideration the reduced rate of complications associated with its use, we believe that the robotic surgery system will be accepted as cost-effective.

Conclusions

The TORS system is gaining popularity and new applications of the surgery will allow us to learn and discuss the utility and the limits of the system. In the present case, the tumor was successfully removed in one stage. This report presents the initial use of the system in posterior pharyngeal wall MEC and demonstrates the robotic system's feasibility in oral/pharyngeal salivary gland neoplasms.

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