SWALLOWING FUNCTION IN PATIENTS WITH VERTICAL HEMIPHARYNGOLARYNGECTOMY FOR HYPOPHARYNGEAL SQUAMOUS CELL CARCINOMA

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Objectives: We classified comprised three types of vertical hemipharyngolaryngectomy (VHPL) according to the extent of resection: limited VHPL (type I), total VHPL (type II), and extended VHPL (type III). This study was designed to evaluate the swallowing function in patients with VHPL for hypopharyngeal squamous cell carcinoma.

Methods: We performed a retrospective review of 30 patients followed for more than 2 years with VHPL between 1998 and 2011.

Results: Five patients (17%) experienced gastrostomy tube placement, 4 patients (13%) stricture, and 13 (45%) pneumonia. There was a significant difference in the fraction of gastrostomy tube placement among type II VHPL (36%), type I VHPL (0%), and type III VHPL (0%) (p=0.014). Flap size (larger than 70 cm²) was significantly associated with gastrostomy tube placement (p=0.043). No clinical variables were significantly associated with stricture and pneumonia. On videofluoroscopic swallowing studies in six patients with gastrostomy tube placement, swallowing decompensations included reduced laryngeal elevation (83%), epiglottic vallecula stasis (50%), pyriform sinus stasis (100%), decreased pharyngeal contraction (67%), laryngeal penetration/aspiration (100%).

Conclusion: More than 80% of patients with hypopharyngeal cancers treated with VHPL may be able to avoid gastrostomy tube placement. Type II VHPL and large flap reconstruction correlated with gastrostomy tube dependence. With the knowledge of this study, better counseling and vigilance as to swallowing difficulties may be possible.
Endoscopic laryngo-pharyngeal surgery (ELPS) using transnasal ultra-thin endoscope for superficial head and neck squamous cell carcinoma.

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Background) The standard treatment for early stage cancers of pharynx is surgical resection or radiation therapy, but these treatments are very invasive and sometimes impair quality of life. Endoscopic resection, which was developed as a treatment for gastrointestinal mucosal neoplasia, is widespread nowadays in Japan, and its indication has been expanded to the treatment of pharyngeal lesions. Endoscopic laryngo-pharyngeal surgery (ELPS) has been reported as a new endoscopic treatment. ELPS is a video assisted surgery under general anesthesia by 2 doctors (an operator and an endoscopist).

Methods) Between July 2009 and April 2013, ELPS using transnasal ultra-thin endoscope was performed for 84 patients (131 lesions) of superficial carcinoma of the oro-hypopharynx. Indication of ELPS was lesions with no apparent invasion to surroundings, and without any lymph-node and distant metastasis diagnosed by CT. ELPS using transnasal ultra-thin endoscope is a new technique developed to achieve one-piece resection for early oropharyngeal cancer. The procedures were as follows. Under general anesthesia, transoral intubation, and supine position, it starts with identification and demarcation of the lesion margins by iodine dying, which are then marked by endoscopist. Next, glycerol is injected into the subepithelial layer to separate the mucosa from the muscle layer proper. Then a Head and neck surgeon performs a circumferential mucosal incision with the electric needle knife (prototype, Olympus, Tokyo) transorally. Next, he grasp the edge of the resected mucosa by forceps transorally, the piece of mucosal tissue is then lifted to obtain effective countertraction. Finally, the subepithelial and vessels are cut from the oral side using the electric needle knife. EG-530NW (Fuji film, Tokyo) is a transnasal ultra-thin endoscope to provide high quality endoscopic images of a wide view of 140°, and 5.9mm in diameter, so it is easy for the operator to approach transorally.

Results) Among 131 lesions, 128 lesions (97.7%) were successfully resected en bloc. All lesions were histologically proven as squamous cell carcinoma. Tumor invasion beneath the epithelium was found in 67 lesions, and 61 lesions were confined to epithelium. The median maximum diameter of the lesions was 15 mm (ranged 2-60 mm). Median treatment time was 45 minutes (ranged 15-177 minutes). All patients were discharged without fatal complications. The median hospital stay was 7 days (range, 2-25 days).

Conclusion) ELPS using a transnasal ultra-thin endoscope is safe and less invasive for superficial cancers of oro-hypopharynx. Although we need additional cases and longer follow up period, ELPS has a potential to be a new treatment option for superficial cancers of oro-hypopharynx.
Objective: Management of squamous cell carcinoma (SCC) of the larynx and hypopharynx has evolved following the Veterans' Administration Larynx Preservation trial and Radiation Therapy Oncology Group (RTOG) 91-11 to favor organ preservation, with salvage total laryngectomy (TL) for those with persistent or recurrent disease. Reported rates of occult neck disease in the salvage laryngectomy patient are conflicting, ranging from 4%-20%. Due to the increased morbidity of neck dissections in the irradiated neck at the time of salvage total laryngectomy, the indication is questionable. In the current study, we sought to determine if elective neck dissection resulted in improved overall (OS) or disease-free survival (DFS).

Study Design: Retrospective chart review of 226 patients with laryngeal or hypopharyngeal squamous cell carcinoma.

Methods: We analyzed the charts of patients treated at our institution from 2005-2011, assessing for age, race, pack years, tumor staging and subsite, procedure, extracapsular spread (ECS), recurrences and second primaries. Chi-square or Fisher's exact test were used to calculate frequencies between patient with and without neck dissections (ND). Kaplan-Meier and Cox regression methods were used to calculate OS and DFS.

Results: Of the 226 patients reviewed, 36 underwent primary TL and 190 underwent organ preservation therapy. A total of 16.8% of these patients failed conservative management and underwent a salvage TL for persistent or recurrent disease. Of those, 72% (23/32) did not have a neck dissection while 9 patients had at least a unilateral selective ND at time of salvage therapy, mainly for palpable residual or recurrent disease. We found no clinical or statistically significant difference in OS or DFS when comparing those undergoing primary versus salvage TL (p=0.12). There was no survival difference when comparing those undergoing salvage TL with versus without a ND (OS p=0.88, DFS p=0.69) or based on subsite (p=0.28). There was no significant difference in rate of extracapsular spread seen in the neck dissection specimens from primary TL when compared to salvage TL (p=0.42). However, those who were node negative on salvage ND did have increased survival when compared to those who were node positive (p=0.005). Locoregional recurrence and distant metastatic disease were not significantly different between the groups. (p=0.5)

Conclusions: Salvage laryngectomy may be performed without neck in cases in which the neck is clinically or radiographically uninvolved, since the procedure does not enhance overall or disease-specific survival.

Key Words: Neck Dissection, Salvage Total Laryngectomy, Squamous Cell Carcinoma

Level of Evidence: 2c
LONG TERM FOLLOW UP OF MANAGEMENT OF ENLARGED TRACHEO-OESOPHAGEAL PUNCTURE WITH BLOM-SINGER LARGE ESOPHAGE AND TRACHEAL FLANGES VOICE PROSTHESES

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Introduction: Voice rehabilitation after total laryngectomy is a major socio-economic challenge. Voice rehabilitation can be achieved by voice prostheses, which provide rapid patient satisfaction. Enlarged tracheo-oesophageal puncture is a frequent complication and can be difficult to manage. We reported our several years experience with Blom-Singer large esophage and tracheal flanges voice prostheses as useful tool in enlarged tracheo-oesophageal puncture management.

Material and method: A prospective study was conducted from November 2010 to October 2013 on 93 Blom-Singer large oesophageal and tracheal flange voice prostheses placed in 30 patients with enlarged tracheo-oesophageal puncture causing leakage around the voice prosthesis.

Result: Leakage around the voice prosthesis resolved in all patients with a mean prosthesis lifespan of 138 days. The patients considered voice quality to be similar to that obtained with the initial voice prosthesis.

Conclusion: The Blom-Singer large oesophageal and tracheal flange voice prosthesis is a useful solution for the management of periprosthetic leakage ensuring similar voice quality and a slightly superior lifespan to that of other voice prostheses.
Background- An increasing number of cancers of the larynx and hypopharynx are treated by nonsurgical organ preservation protocols. This has resulted in an increase in the number of salvage laryngectomy over the last decade. Prior radiation / chemoradiation has been known to be associated with significant postoperative morbidity namely pharyngocutaneous fistula. Literature is divided as to whether a prophylactic flap to augment the suture line would help decrease the fistula rates. However there is a paucity of adequate data in this regard. We present our analysis on utility of pectoralis major myofascial flap (PMMF) in salvage laryngectomy settings which is one of the largest series pertaining to the subject.

Materials & methods- Setting- Tertiary care cancer center. Retrospective analysis of a prospectively collected database on patients who underwent salvage laryngectomy between January 1999 to November 2013. Patients who required pharyngeal reconstruction to augment pharyngeal mucosa were excluded. Only those who had primary closure of the neopharynx were included in the study. 152 patients were evaluable for analysis. Patients who underwent primary pharyngeal closure were analysed. Postoperative pharyngeo-cutaneous fistula rate was noted and fistulas were divided into minor and major depending upon the need for exploration. Statistical analysis was done using SPSS version 18.0 Chicago, IL USA. Univariate analysis was done by chi square test. Multivariate analysis was done using logistic regression method. Comparison between two groups done by unpaired student t test.

Results - Of 152 patients 66.4% received prior radiotherapy while 33.6% patients were treated with chemoradiation. Laryngeal tumors constituted 81.6% while 18.4% were hypopharyngeal cancers. All were primary closure but in 38.8% patients suture line was reinforced using onlay PMMF. Decision to augment suture line was taken by treating clinician. Overall fistula rate for entire group was 44.1%. Majority of them (90%) were minor fistulas which healed on conservative management. 7(10%) patients required re-exploration. We analyzed various factors affecting leak including T stage, N stage, site, type of prior treatment (RT/CTRT), dose of radiation, interval between RT and surgery, preoperative and post operative haemoglobin, preoperative albumin, type of closure (vertical/transverse), technique of closure, suture material, extent of neck dissection, PMMF, cut margin status, soft tissue infiltration, thyroid gland involvement and perinodal extension. Of these site (larynx/hypopharynx), thyroid gland involvement, PNE and positive cut margins were significant on univariate analysis. However on multivariate analysis only cut margin positivity was significant. Of total patients who had leak, 60% had undergone primary closure while 40% had PMMF. However this difference was not significant statistically (p value- 0.7). Mean hospital duration was 13.5 days in primary closure group and 13.2 days in patients with PMMF (statistically not significant p value - 0.87). Rates of re-hospitalisation did not differ significantly within the two groups (p value- 0.9).

Conclusion - Positive cut margins are only significant factor affecting the leak rate. Onlay PMMF did not improve outcome of salvage laryngectomy following radiation/chemoradiation with respect to pharyngocutaneous fistula.
OBJECTIVE: Present a new technique of secondary vocal prosthesis placement on an outpatient basis without general anesthesia by means of digestive endoscopy.

STUDY DESIGN: Prospective case series of 85 laryngectomized patients underwent tracheoesophageal prosthesis placement.

METHODS: Laryngectomized patients were sedated with midazolam and underwent digestive endoscopy and tracheoesophageal punch with vocal prosthesis insertion and evaluated for success rate, duration of the procedure and complications.

RESULTS: A success rate of 97.6% was achieved with this surgical technique. The mean procedure time was estimated at 14 minutes, and no serious complications due to the prosthesis insertion were observed.

CONCLUSION: The advantages of this new technique over the classic technique are lack of use of general anesthesia, performance of procedure on an outpatient basis, lower complication risks (including hemorrhage, mediastinitis, vertebral fracture, esophageal perforation; and minor oropharyngeal, and esophageal mucosal trauma), and direct visualization of the prosthesis in the esophageal lumen.
**BIOFILM ON THE TRACHEOESOPHAGEAL VOICE PROSTHESIS: CONSIDERATIONS FOR ORAL DECONTAMINATION**

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**Introduction**

The tracheoesophageal puncture (TEP) procedure restores verbal communication after total laryngectomy using a voice prosthesis (VP). Microbial colonization can significantly shorten the prosthetic device life, and antifungal methods are widely prescribed in attempts to improve the longevity of VPs. To date, few have correlated the microbiota of the oral cavity and VP, or reported effects of decontamination regimens beyond use of antifungals. Our aims were to: 1) investigate patterns of prosthetic and oral colonization, 2) describe oral decontamination regimens prescribed on the basis of microbial assessment (“targeted decontamination”), and 3) record changes in VP device life after targeted decontamination.

**Methods**

We conducted a retrospective review of all patients seen in the TEP clinic at the University of Texas MD Anderson Cancer Center between 01/01/2003 and 07/01/2013. Patients with microbial analysis of the VP were included. Two subgroups were analyzed: 1) patients with microbial analysis of the VP and the mouth were analyzed to identify patterns of common contamination, and 2) patients who were prescribed targeted oral decontamination on the basis of the microbial analysis of the VP were analyzed to evaluate effects on device life.

**Results**

Fifty-eight of 605 TEP patients who had microbiological analysis of the VP were included. Of 58, 30 (52%) had fungal colonization including 11 (19%) with C. albicans infection, 6 (10%) C. glabrata, 18 (31%) C. tropicalis, and 11 (19%) with multiple yeast infections. Forty-one of 58 had bacterial colonization on the VP, 46% with Staphylococci (mostly S. aureus), 17% with Streptococci, 19% K. pneumoniae and 8% P. aeruginosa. Two patients (3%) had only fungal colonization, 28 (48%) bacterial only, and 28 (48%) had fungal and bacterial. Fifteen of 58 patients had specimens for both TEP and oral microflora. In this subgroup, 20% had common fungal infections in the mouth and on the VP and 13% percent had staphylococcus in both samples. Among the 25 who received targeted decontamination regimens, oral measures included: broad spectrum rinse (20%), antibiotic rinse (4%), antifungal agents (68%), and general oral hygiene measures (8%). In addition, 28% were prescribed levofloxacin, 20% amoxicillin/clavulanic acid, 12% moxifloxacin, 8% amoxicillin, 16% ciprofloxacin, 4% clindamycin, 4% nitrofurantoin and combinations thereof for bacterial infections. After targeted decontamination, the average of life of prostheses improved from 7.89 weeks before to 10.82, but this was not statistically significant (p=0.260).

**Conclusions**

In this preliminary study, the majority of patients with a short VP device life had bacterial or mixed bacterial and fungal colonization; VPs rarely had fungal contamination alone (3%). For this reason, we have recently explored the use of targeted decontamination regimens that were associated in this study
with 35% improvement in VP duration.
S317  A SHEEP MODEL FOR REVASCULARISED LARYNGEAL ALLOTRANSPLANTATION: A NOVEL PRECLINICAL LARGE ANIMAL MODEL FOR HUMAN LARYNGEAL ALLOTRANSPLANTATION
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Rationale

Advanced laryngeal cancer is a debilitating disease, which accounts for approximately 25% of the 53,000 head and neck cancer cases diagnosed annually in the US. For patients with advanced laryngeal and hypopharyngeal cancer, and recurrent disease, total laryngectomy is regarded the most appropriate treatment option. Laryngectomy patients have an impaired ability to breath and communicate. Laryngeal allograft transplantation has long been considered an unmet therapeutic option for these patients and recently two laryngeal allotransplants have been reported. Large animal preclinical models will serve to develop improved clinical surgical protocols for this procedure.

The aim of this study was to develop a novel large animal model of revascularised laryngeal allotransplantation as surgical proof of concept prior to human allotransplantation.

Methods

Neck dissections were performed in five sheep to elucidate vascular anatomy. Anaesthetised sheep were placed in a supine position with their neck extended. A U-shaped incision was made 5 cm below the cricoid cartilage and a skin-flap was elevated to expose the sternomastoid muscle and visualize the common carotid artery and the external jugular vein. The vascular branches to the larynx and the thyroid gland were identified and an angiogram exhibited the arterial supply and venous drainage of the larynx.

Laryngeal allotransplants were performed in four sheep. Dissection was conducted in two sheep at each session and the retrieved laryngeal allografts were cross-transplanted. In both sheep the larynx was completely mobilized and attached to its vascular supply to minimise warm ischaemia time prior to transplant. The blood supply on the left side was ligated and the laryngeal vessels on the right side were followed to their major vessels. A segment of common carotid artery was resected with the thyroid artery. The thyroid vein was resected with a cuff of EJV. The retrieved grafts consisting of the larynx, trachea and the thyroid gland were removed from each donor sheep and perfused with heparinised University of Wisconsin solution. The allografts were implanted orthotopically into each recipient sheep and revascularised. Both the donor common carotid and EJV were anastomosed to their host's respective vessels in an end-to-side fashion. A post-transplant angiogram was performed to show graft perfusion. Transplanted animals were euthanized following surgical closure.

Results

The sheep larynx receives its arterial supply from the caudal laryngeal artery, a branch of the cranial thyroid artery, which comes off the common carotid artery. The thyroid vein, a tributary of the EJV, drains the larynx, thyroid and trachea.
The retrieved grafts showed good re-perfusion upon vascular anastomosis and clamp release. Post-transplant angiography confirmed compete perfusion of the larynx. The transplantation procedure confirmed surgical proof-of concept in this sheep model.

Conclusions

Sheep laryngeal structure and function is very similar to humans. This large animal model is clinically translatable because it allows for closely simulated human surgery. Moreover, this model is amenable to monitoring with flexible laryngoscopy, angiography and MRI scans. This study sets the stage for future experiments involving allografts and exploring immunological response post-transplant, before moving to clinical trials.
THE SYRIAN CIVIL WAR CASUALTIES TREATED IN THE WESTERN GALILEE MEDICAL CENTER, ISRAEL

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Introduction: The civil war in Syria began in 2011. Mortality from war wounds has steadily decreased since systems were put into place to rapidly move the wounded to field hospitals near the Israel-Syria border, and then to hospitals in northern Israel. With the logistical help of the UN, Israel has been treating wounded Syrians for the past year.

Material & Methods: Data was retrospectively collected on all patients that had maxillofacial and/or neck injuries.

Results: Since 03/2013 our hospital treated 137 Syrian patients. The age range was 10m-40y. Transfer time from the battlefield to the Western Galilee Medical Center was 6 to 24 hours. Most patients had direct injuries from high velocity weapons. Most of the injuries were classified as severe head and neck injuries. Most patients had multiple trauma. Some patients were admitted with a tracheotomy or coniotomy that was done in or adjacent to the battlefield. All patients were treated by a multidisciplinary team composed of a traumatologist, otolaryngologist, maxillofacial surgeon, neurosurgeon, ophthalmologist and a rehabilitation team. Patients had imaging studies as needed. Nine patients died in our hospital. No patient had military-type protection on arrival (helmet or bullet proof vest). Hospitalization was between 3 days and 12 weeks.

Conclusion:

- Compared to other military casualties these patients had no anti-weapon protection such as helmets or anti-bullet vests, hence the high number of injuries to the head and chest.

- Since these patients are not representative of all the casualties in Syria, generalizations of the severity distribution of injuries cannot be extrapolated from these cases.

- The transfer time is longer than reported in other modern battlefield casualties, a factor that can also explain the severity of the injuries.

- A multidisciplinary team approach to treat these complex injuries is essential and can only be performed in a tertiary trauma center.