Complications of Total Laryngectomy

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Abstract

**Aim of study:** To find out various complications after total laryngectomy, with references to their presentation, diagnosis and management.

**Design:** It was a retrospective descriptive study.

**Setting:** Otolaryngology department, AdDiwanyah teaching hospital, from 1st of October 1999 till 31 of December 2007

**Patients and methods:** 43 patients undergoing total laryngectomy for proven carcinoma of the larynx were included in this study. Patients were reviewed after surgery and any complication that occurred was recorded. The presentation, diagnosis and management of these complication are discussed, along with voice rehabilitation after total laryngectomy.

**Result:** There were 33 male and 10 female. Age of patient range from 44-66 years. Complication included: pharyngocutaneous fistula (5 patients), cervical lymph node metastasis (4 patients), wound infection (3 patients), myocardial infarction (one patient).

**Conclusions:** Pharyngocutaneous fistula and cervical nodal metastasis are the most common complications after total laryngectomy. Preoperative radiotherapy, wide resection of the pharynx, early oral feeding are important risk factors for development of pharyngocutaneous fistula in total laryngectomy patients. Postoperative radiotherapy to the neck reduces the risk of nodal metastasis after total laryngectomy.
Introduction
Cancer of the larynx is an important malignancy in the head and neck region. It represents approximately 1% of all malignancies. It has a high rate of cure which reaches 85% and overall exceeds 50%. Tobacco and alcohol are the most possible etiological factors. It has greater predominance in men. Squamous cell carcinoma makes up the overwhelming proportion of malignancies in the larynx (1). There are many therapeutic options available for treatment of laryngeal cancer. These include LASER surgery (1), partial laryngectomies, total laryngectomy (2), and radiation therapy. Total laryngectomy is a radical procedure which involves removal of whole of the larynx. This procedure is useful in the treatment of advanced laryngeal cancer (3) and as a salvage procedure when previous partial laryngeal surgery or radiotherapy has failed (2). Pharyngocutaneous fistula is the most common complication after total laryngectomy, it considerably increases morbidity, hospitalization time and delay starting adjuvant radiation therapy. The reported incidence of pharyngocutaneous fistula is 3%-65%. Similarly late complications like stomal recurrence may render the tumour incurable thus adversely affecting the prognosis (24) (25). Other complications include hemorrhage, wound infection, pulmonary and cerebral embolism, cardiac infarction, pharyngeal stenosis (1). It is therefore important to diagnose these complications early so that timely management can be done. The risk factors involved in the development of these complications should also be recognized and avoidance of these risk factors will reduce the occurrence of complications.

Patients and Methods:
It is a retrospective descriptive study at the department of otolaryngology, Ad Diwanyah Teaching Hospital from the 1st of October 1999 till the 31 of December 2007. The patients were studied for complications of total laryngectomy which were done for patients who have histologically proven carcinoma of the larynx with N0 neck. All patients who underwent total laryngectomy along with additional surgical procedure like radical neck dissection or functional neck dissection were excluded from this study. The following aspects were considered; age, sex, smoking, tumour site, the pathological primary tumour, staging according to TNM classification, previous radiation therapy, hemoglobin level. All patients staged T3N0M0 and T4N0M0 and they received prophylactic intravenous chloramphenicol starting at the day of operation until the 10th postoperative day. In all patients closure of the pharynx were primary without flap rotation and the closure were performed by I-shaped closure by means of 3-0 vicryl suture. Inferior constrictor pharyngeus muscles are sutured as second layer and this layer is further augmented using suprahyoid muscles superiorly and thyroid lobe fascia inferiorly and chloramphenicol powder sprayed on the pharynx before insertion of the drains and before suturing the skin. In all patients oral feeding started at the 11th postoperative day. All patients received 1-2 pints of blood during the operation. All patients were observed for any postoperative complications during their stay at hospital and after discharge they were followed up for one year duration. A complete record of complications, their diagnosis and treatment was maintained during this period.

Results:
The 43 patients included in this study comprised of 33 male (76%) and 10 female (24%). The age of the patients range from 44-68 years with an average of 56 years. 20 patients had glottic tumour (47%), 7 had supraglottic tumour (16%) and 14 had transglottic

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tumour (32%) and 2 had subglottic tumour (5%). The stage of the tumour was T3N0M0 in 25 patients (58%) whereas in 12 patients (28%) T4N0MO and 6 patients (14%) TxNOMO. 10 patients had received preoperative radiotherapy. All patients were smokers and 3 of them smokers and alcoholic. 42 patients had squamous cell carcinoma while verrucous carcinoma found in only one patient. Of those who had squamous cell carcinoma 26 patients (62%) had well differentiated carcinoma and 14 patient (33%) had moderately differentiated carcinoma while poorly differentiated carcinoma found in only 2 patients (5%). Complications: pharyngocutaneous fistula found in 5 patients and these diagnosed at the day 6-20 post operatively. In all patients nasogastric tube kept in place and feeding continue through it with pus taken for culture and sensitivity. Antibiotics were given accordingly and dressing changed twice daily along with high protein diet, hemoglobin level checked and maintained above 11 gm/dl in all patients. All of these fistulae healed conservatively without the need of any surgical intervention and all of these patients receive preoperative radiotherapy before the operation of total laryngectomy. Four patients developed cervical nodal metastasis 6-10 months postoperatively. Two of them refuse another surgery and only palliative treatment was offered. The other two managed with functional neck dissection. Three patients had wound infection near the stoma after an interval of 4-6 days following surgery. Pus sent for culture and sensitivity and antibiotics given accordingly with local wound dressing and the infection controlled without the need for any surgical intervention. One patient developed myocardial infarction in the first post operative day and another patient had cardiac arrhythmia and both of them managed successfully in the CCU in our hospital. No patient developed pharyngeal stenosis or any other serious complication.

Discussion:
Carcinoma of the larynx is an important malignancy in head and neck region. It accounts for 40% of all head and neck malignancies (6). Male to female ratio varies globally and lies between 2:1 to 9:1 (7). In our study male to female ratio is 3:1 and this may be attributed to the high ratio of female smokers in Iraq especially in rural areas. The peak age of incidence in United Kingdom is 62 years (1) and in Pakistan is 50 years (8). In our study the mean age of patients was around 56 years. The mode of treatment is based on clinical staging of tumour, its histologic type and general health of the patient. Other factors, which should be considered, are age of the patient, ancillary facilities available and experience of surgical team. Treatment of T3N0M0 laryngeal cancer is controversial, it is classified as stage III and the recommended therapy for these cancers is both surgical and radiotherapy. Some centres prefer radiotherapy alone and keep salvage surgery in reserve, whereas some centers prefer total laryngectomy alone or in combination with postoperative therapy (3). Regarding the T4N0M0 laryngeal cancer, total laryngectomy followed by postoperative radiotherapy is generally accepted mode of treatment (7). Pharyngocutaneous fistula is the most common complication after total laryngectomy (5) (9) (10). In our study pharyngocutaneous fistula is the most common complication, incidence in literature between 3%–65% (5). In our study 8%. A number of risk factors for the development of pharyngocutaneous fistula have been defined. Among them, preoperative radiotherapy, prophylactic antibiotic therapy, stage and width of the surgical procedure (11) and low hemoglobin level postoperatively.

There are authors in the literatures who concluded that preoperative radiotherapy increases the risk of pharyngocutaneous fistula formation (12, 13, 14, 15) while others do not accept it to be a statistically significant factor (11, 16, 17). Preoperative radiotherapy
impaires the tissue perfusion and may increases the tendency towards pharyngocutaneous fistula formation. In our study preoperative radiotherapy was important risk factor because five out of ten patients received preoperative radiotherapy had developed postoperative pharyngocutaneous fistula In patients with advanced carcinoma, wide resection of the tumour area increases the likelihood of pharyngocutaneous fistula formation. In our study three out of five patients who developed pharyngocutaneous fistula are T4N0M0 and they need wide resection of the pharynx so it is an important risk factor for the development of pharyngocutaneous fistula.

Low postoperative hemoglobin level is a significant risk factor in the development of pharyngocutaneous fistula(15). In our study we found no patient had hemoglobin level below 11gm/dl because all our patients had received 1-2 pints of blood during the operation according to the blood loss. So we couldn’t prove it as a risk factor for pharyngocutaneous fistula formation. All of the patients in our study were fed with nasogastric tube for 10 days postoperatively. Krouse et al noticed that 19% of their patients had sinus tracts in the in the pharynx and soft tissue of the neck when they applied barium swallow pharyngoesophagography postoperatively. They have reported a significant increase in pharyngocutaneous fistula formation in patients with sinus tracts longer than 2 cm (13). According to this, starting oral intake earlier may be a factor that increases the development of this sinus tract into a fistula. Therefore we recommend not to start early oral intake in order to decrease the fistula formation risk. Since all of our patients were fed with nasogastric tube for 10 days, we were not able to compare the results with early oral intake without nasogastric tube. We also were not able to compare patients who were given prophylactic antibiotics with those who were not, since all were given antibiotics.

In our series all fistulae closed spontaneously without any surgical intervention. Postoperative wound infection is a major source of infectious morbidity in total laryngectomy patients. The overall incidence of postoperative wound infection after major head and neck surgery is 23% and this becomes higher in those patients who have received preoperative radiotherapy. The most important aetiological factor is methicillin resistant staphylococcus aureus. Administration of prophylactic antibiotics reduces the risk of postoperative infection. In total laryngectomy patients, 1gm cefazolin with 500 mg metronidazole have been recommended as surgical prophylaxis. In our series all patients received chloramphenicol 1gm tid which is an broad spectrum antibiotic act against gram positive and negative bacteria and also act against anaerobes. Three patients (7%) developed postoperative wound infection. Culture and Sensitivity reveal 2 E. Coli and one patient Staph. Aureus infection and they were treated by antibiotics accordingly and no patient need further surgical management. The incidence of regional lymph node metastastasis has been reported as 44% for supraglottic cancer, 20% for subglottic cancer and 5% for glottic cancer. In our study 4 patients (8%) developed nodal metastasis, two of them managed with functional neck dissection and the other two refuse surgery and only palliative treatment offered. Speech rehabilitation after total laryngectomy is a major problem during follow up. Use of oesophageal speech, electrolarynx and tracheoesophageal fistula are popular methods of voice rehabilitation, howevere much of literatures supports tracheoesophageal puncture speech and prefers it over oesophageal speech and use of electrolarynx (21). Patients using tracheoesophageal puncture speech, rate their overall quality of life higher than those patients who are using either oesophageal speech.
Or electrolarynx(22). The overall success rate of tracheoesophageal puncture speech after total laryngectomy has been reported as high as 93%(23). In our study 5 patients(12%) have acquired useful oesophageal speech. One patient used elecrolarynx usefully. Tracheoesophageal fistula with Blom-Singer valve was not used in any patient because of its non availability in Iraq. Reason for this high rate of failure in developing oesophageal speech in our patients was lack of rehabilitation facilities and trained speech therapist.

Conclusions:
1. Smoking is the most possible etiological factor for carcinoma of the larynx and this should be prohibited.
2. Complications following total laryngectomy are infrequent but when they occur patient’s morbidity is considerably increased.
3. Pharyngocutaneous fistula and cervical lymph node metastasis are the most common complications after total laryngectomy.
4. Preoperative radiotherapy, wide resection of the pharynx, early oral feeding are important risk factors for the development of pharyngocutaneous fistula in total laryngectomy patients.
5. Postoperative radiotherapy to the neck reduces the risk of nodal metastasis after total laryngectomy.

References: