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CASE REPORT

A report of four cases acute mediastinitis occurring following tracheoesophageal puncture in laryngectomees

Larenjektomi sonrası uygulanan trakeoözefageal delik işlemini takiben gelişen akut mediastinitis: Dört olgu sunumu

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Tracheoesophageal puncture is a simple procedure for speech rehabilitation of total laryngectomy patients. Despite its relative simplicity this is not an innocent technique without complications. The goals of this study were to determine the incidence of acute mediastinitis as an early postoperative complication related to this procedure, and to present non-surgical conservative management outcomes in this complication. Blom-Singer voice prosthesis was used for 51 secondary tracheoesophageal puncture procedures in 45 patients between 1994 and 2002 according to the technique described by Blom and Singer. In the postoperative period, four patients developed mediastinitis related to this procedure (7.8%). Of these, one patient had iatrogenic perforation of the posterior esophageal wall. A false dissection plane has occurred in the tracheo-esophageal party wall in three patients which subsequently resulted in mediastinitis. Mediastinitis was diagnosed by using clinical and radiological findings. All of these patients required prolonged hospitalization, intravenous antibiotics, and chest tube insertion. Only one patient underwent major surgical procedure to treat this complication. In conclusion; tracheoesophageal puncture for voice restoration is now regarded as a routine procedure usually done in outpatient conditions. However, our experience demonstrates that, this technique may be associated with significant complications such as mediastinitis. If mediastinitis is recognised earlier, it may be treated with conservative measures in most of the cases.

Key Words: Laryngectomy/rehabilitation; esophagus/surgery; trachea/surgery; punctures/adverse effects; mediastinitis/etiology; postoperative complications/etiology.

Trakeoözofageal delik, total larenjektomili hastaların konuşma rehabilitasyonu için uygulanan basit bir yöntemdir. Uygulamanın kolay olmasına rağmen komplikasyonlar olabilmektedir. Bu çalışmanın amacı bu uygulamada ameliyat sonrası erken dönemde gözlenen akut mediastinit sıklığını saptamak ve bu komplikasyonda cerrahisiz konservatif tedavi deneyimlerimizi sunmaktır. 1994-2002 yılları arasında 45 hastaya toplam 51 kez Blom ve Singer'in[1] tarif ettiği teknik uygulanarak sekonder Blom-Singer ses protezi kullanıldı. Bu uygulamada ameliyat sonrası dönemde dört olguda (%7.8) mediastinit gelişti. Olguların birinde özofagus arka duvarında perforasyon gelişti. Üç olguda trakea ve özofagus arasında hatalı diseksiyon planı oluşarak mediastinit ile sonuçlandı. Mediastinit tanısı, klinik muayene ve radyolojik bulgularla konuldu. Olguların tümü hastanede yatırılarak uzun süreli antibiyotik tedavisi ve göğüs tüpü ile tedavi edildi. Olgulardan sadece birinde bu komplikasyonu tedavi etmek amacıyla cerrahi tedavi uygulandı. Sonuç olarak; ses rehabilitasyonu için uygulanan trakeoözofageal delik, genellikle ayakta tedavi şartlarında rutin olarak uygulanan bir prosedür haline gelmiştir. Bununla birlikte bizim deneyimlerimiz, bu tekniğin mediastinit gibi önemli komplikasyonlarla birlikte olabileceğini göstermektedir. Mediastinit eğer erken dönemde saptanırsa, olguların çoğunda konservatif tedbirlerle tedavi edilebilir.

Anahtar Sözcükler: Larenjektomi/rehabilitasyon; özofagus/cerrahi; trakea/cerrahi; delikler/yan etkiler; mediastinit/etyoloji; cerrahi sonrası komplikasyon/etyoloji.

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Despite the progress in conservation laryngectomy techniques, total laryngectomy is still the preferred choice of treatment in most of the advanced laryngeal carcinoma cases. Loss of speech after total laryngectomy creates a considerable impact on quality of life. Since the first introduction of laryngectomy by Billroth in 1873, several techniques have been developed for speech rehabilitation of total laryngectomy patients. The esophageal speech technique and usage of different types of voice prosthesis are the most popular techniques for speach rehabilitation. Blom-Singer voice prosthesis was first described by Blom and Singer'in[1] While it is a relatively easy procedure to insert a Blom-Singer prosthesis complications may occur.[2] Several complications due to voice prosthesis insertion were reported in the literature such as granulation tissues, allergic reaction, esophageal perforation, stoma stenosis, cellulitis, aspiration of prosthesis, aspiration pneumonia and mediastinitis.[2-7] In this study, we reviewed our data related to Blom-Singer voice prosthesis application with special emphasize given on the causes and incidence of mediastinitis in this group.

CASE REPORT

Blom-Singer voice prosthesis was used in 45 total laryngectomy patients between 1994 and 2002 at our tertiary care center. Six patients had this fistula procedure twice. There were two female and 43 male patients. The age ranged in 38 to 72 years with a mean of 59 years. In all of the cases, the technique described by Singer and Blom[8] was used as a secondary tracheoesophageal fistula procedure. Acute mediastinitis associated as a complication with this procedure were noted.

Case 1– A fifty four year old man was referred to the Otorhinolaryngology clinic with a history of dyspnea and hoarseness for three years. There was not any history of radiotherapy or chemotherapy. After the indirect laryngological examination, direct laryngoscopy and biopsy was recommended. The pathological report of the specimen was squamous cell carcinoma. The stage of the tumour was $T_3N_0M_0$ and it was a supraglottic tumour. Total laryngectomy and bilateral functional neck dissection was performed. The pathological reports of the specimen showed pathologically T_4 tumour without invasion to surgical borders. Postoperative radiotherapy or chemotherapy was not required. Three months after the operation, the patient was hospitalized for voice prosthesis application. At early postoperative period, the patient complained about dyspnea. He was diagnosed by using clinical and radiological findings which were consistent with mediastinal emphysema, pleural fluid, and mediastinal fluid collection (Fig. 1). Clinical findings were high fever (over 39°C), increased white blood cell count, chest pain and subcutaneous emphysema. In this patient a false passage occurred in the tracheoesophagesl wall which resulted in mediastinitis subsequently. He did not need any surgical intervention. He required prolonged hospitalization, cessation of oral intake for seven days, intravenous antibiotics, and chest tube insertion. The patient was monitorized and followed by Otorhinolaryngology and Thoracic surgery departments together. Within 24 hours fever dropped and pain relief was achieved. Full recovery was observed within one week.

Case 2– A sixty three year old man visited the Otorhinolaryngology department with a history of dyspnea and hoarseness for two years. He did not receive any treatment including radiotherapy or chemotherapy. There was a transglottic mass determined during indirect laryngoscopic examination. The stage of the tumour was $T_3N_1M_0$. Histopathological result of punch biopsy material was reported as squamous cell carcinoma. Total laryngectomy and ipsilateral radical neck dissection, and contralateral functional neck dissection was performed. Surgical borders did not show any tumour invasion. Postoperative radiotherapy or chemotherapy was not required. Five months after the operation he was hospitalized for voice prosthesis implanta-

Fig. 1 - *Computed thorasic tomography of patient. Bilaterally localized pleural fluids and mediastinal emphysema are seen.*

tion. Three hours after tracheoesophageal puncture, chest pain, high fever and dyspnea were observed. He was diagnosed by using clinical and radiological findings which were consistent with mediastinal emphysema, pleural fluid, and mediastinal fluid collection. Other clinical findings were increased white blood cell count and subcutaneous emphysema. In this patient a false passage occurred in the tracheoesophageal wall which resulted in mediastinitis. He required prolonged hospitalization, cessation of oral intake for seven days, intravenous antibiotics, and chest tube insertion. He did not need any surgical intervention. The patient was monitorized and followed by Otorhinolaryngology and Thoracic surgery departments together. Within 48 hours fever dropped and pain relief was achieved. Full recovery took one week.

Case 3– A thirty eight year old man was admitted to the Otorhinolaryngology department with dyspnea and hoarseness for one year. During laryngological examination, a supraglottic $T_3N_0M_0$ tumour was observed. The result of the punch biopsy was reported as squamous cell carcinoma. No evidence of treatment history such as surgical therapy, radiotherapy or chemotherapy was determined. Total laryngectomy and bilateral functional neck dissection were performed. The histopathological study showed tumour negative surgical borders. Radiotherapy or chemotherapy was not recommended. Three months later, the patient was re-hospitalized for voice prosthesis implantation. In a few hours after surgical intervention, the patient felt worse. He had high fever (over 39°C), increased white blood cell count, chest pain and subcutaneous emphysema. Radiological findings were consisted with mediastinal emphysema, pleural fluid, and mediastinal fluid collection. In this patient a false passage occurred in the tracheoesophageal wall which resulted in mediastinitis. He required prolonged hospitalization, cessation of oral intake for seven days, intravenous antibiotics, and chest tube insertion as done in the first two cases. He did not need any surgical intervention. The patient was monitorized and followed by Otorhinolaryngology and Thoracic surgery departments together. Within 24 hours fever dropped and pain relief was achieved. Full recovery was completed within one week.

Case 4– A fifty-five years old man was admitted to the Otorhinolaryngology department with two years history of hoarseness and dyspnea, without any kind of treatment. $T_3N_0M_0$ transglottic tumour was observed during laryngological examination and punch biopsy was performed. The histopathological result was squamous cell carcinoma. Total laryngectomy and bilateral functional neck dissection was performed. There was not any invasion of surgical borders. Postoperative radiotherapy or chemotherapy was not required. The patients was re-hospitalized for implantation of voice prosthesis three months later. Clinical observation of the patient became worse by and by after the procedure. He had high fever (over 39.5°C), increased white blood cell count, chest pain and subcutaneous emphysema. Radiological findings were consisted with mediastinal emphysema, pleural fluid, and mediastinal fluid collection. He had iatrogenic perforation of the posterior esophageal wall which resulted in mediastinitis and underwent immediate cervical exploration with primary repair of esophagus. He required prolonged hospitalization, cessation of oral intake for 15 days, intravenous antibiotics, and chest tube insertion. The patient was monitorized and followed by Otorhinolaryngology and Thorasic surgery departments together. The patient was hospitalized 45 days after fistula. Full recovery took two months.

DISCUSSION

Voice prosthesis application needs creation of a tracheoesophageal fistula in laryngectomized patients. This technique may be accompanied by minor or major complications. Most of these complications can be managed by conservative treatment or just observation, although some of these complications need surgical intervention.

Tracheoesophageal fistula may be performed as a primary or a secondary procedure. Primary tracheoesophageal fistula is created at the time of laryngectomy. According to Andrews et al.[7] this procedure was prone to more severe complications, especially infections than secondary fistula procedure. They concluded that if the patients require postoperative radiation therapy, the care of their stoma with a fistula may be more problematic. Since our series mostly consists of advanced laryngeal cancer cases we used postoperative radiotherapy in a large proportion of these patients. Hence, tracheoesophageal fistula was created secondary in all our patients three to six months after laryngeal surgery.

It is possible to observe both minor and major complications during secondary tracheoesophageal fistula formation. Major complications such as esophageal perforation causing mediastinitis, cervical osteomyelitis, neck abscesses may develop because of rigid esophagoscopy.[7] In this study, osteomyelitis or neck abscesses were not observed. Mediastinitis developed in four cases. We did not encounter any other early postoperative complication, except slight hemorrhage in this study. Andrews et al.[7] reported one esophageal perforation and Silver et al.[5] reported three mediastinitis and noted that none of these patients needed surgical drainage. In our series, three of four cases who developed mediastinitis required any surgical drainage or major surgical intervention. The success of treatment of acute mediastinitis by means of conservative interventions may be due to early diagnosis of mediastinitis. We managed these patients with hospitalization, stopping oral intake, intravenous antibiotics, and chest tube insertion. The clinical picture did not progress to generalized mediastinal infection and conservative management was sufficient in our series. Only one patient underwent major surgical intervention for repair of the tear in posterior esophageal wall to treat this complication.

According to our experience, once mediastinitis was diagnosed, the patient must be hospitalized with immediately insertion of a nasogastric catheter and IV fluid replacement if needed. A careful evaluation by means of physical examination plus radiological findings should be performed. Intravenous antibiotherapy is started. Major surgical intervention is not usually needed in those cases if mediastinitis is recognized in a few hours of procedure.

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