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An Unusual Aspiration: Tracheo-esophageal Voice prosthesis

Sıradışı Bir Aspirasyon: Trakeo-özefajiyal Konuşma Protezi

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Abstract

Tracheo-esophageal voice prosthesis is currently the most successful and the principal method of voice and speech in patients undergoing total laryngectomy. Spontaneous dislodgement leading to tracheal aspiration is a rare complication. A 60 years old male living alone who underwent total laryngectomy with no radiotherapy for laryngeal carcinoma 3 years ago, admitted to our emergency department with a sudden shortness of breath. Chest radiography revealed atelectasis on the left lower lobe. Diagnostic flexible fiberoptic bronchoscopy showed Provox voice prosthesis at the level of bifurcation to left secondary bronchus. The device is successfully removed with biopsy forceps. As far as we know this case is the first Provox voice prosthesis aspiration case report which has been observed a more distal location from the main carina. In conclusion, chest and ENT physicians should know such long-term complications in laryngectomized patients.

Key words: *provox, tracheoesophageal voice prosthesis, aspiration.*

Özet

Trakeo-özofagial konuşma protezleri total larenjektomi uygulanan hastalarda ses ve konuşma rehabilitasyonu için halen kullanılan en başarılı yöntemdir. Trakeo-özofagial Provox Konuşma Protezi (PKP) trakea arka duvarı ile özofagus ön duvarı arasına cerrahi ponksiyon ile yerleştirilen bir cihazdır. Kendiliğinden yerinden çıkarak trakea içine aspirasyonu nadir bir komplikasyondur. Üç yıl önce larenks kanseri nedeni ile radyoterapi almaksızın total larenjektomi geçiren, yanlız yaşayan 60 yaşında erkek hasta, acil servisimize ani başlayan nefes darlığı ile başvurdu. Akciğer grafisinde sol alt lobda atelektazi tespit edildi. Tanısal amaçlı yapılan fleksibl fiberoptik bronkoskopide solda sekonder karina düzeyinde PKP görüldü. Aygıt biopsi forsepsi kullanılarak başarı ile çıkarıldı. Hasta protezi aspire edip etmediğinin farkında değildi. Olgunun ana karina seviyesinden daha distalde ilk PKP aspirasyonu olgusu olduğunu düşünüyoruz. Sonuç olarak Göğüs hastalıkları ve KBB uzmanlarının larenjektomili hastalarda bu gibi uzun dönem komplikasyonları bilmesi gerektiği kanaatine vardık.

Anahtar Sözcükler: *Provox, Trakeo-özefajiyal konuşma protezi, aspirasyon.*

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Tracheo-esophageal voice prosthesis (TEVP) is currently the most successful and the principal method of voice and speech in patients undergoing total laryngectomy (1). But in our country its use is limited to a small number of centers. Provox voice prosthesis (PVP), which is a kind of TEVP with a low-resistance indwelling prosthesis for vocal rehabilitation, is a device inserted through a surgically placed puncture connecting the back wall of the trachea to the front wall of the esophagus. PVP puncture may be performed as a primary procedure during laryngectomy or a secondary procedure at a later date (2). With this device, air may be diverted through the one-way valve of the prosthesis, into the esophagus, and subsequently into the remainder of the pharynx and oral cavity. The diverted air causes the mucosa to vibrate, allowing for normal articulation, thereby creating a laryngeal speech (3,4). Although it is reported that the use of PVP is associated with high success rates for voice acquisition, a low complication rate, an acceptable device lifetime with rather easy replacement and maintenance procedures, a number of PVP related complications have been reported since the beginning of its use (5,6,7). We have presented a case with an aspirated PVP and its subsequent management.

CASE

A 60 years old male living alone who underwent total laryngectomy with no radiotherapy for laryngeal carcinoma 3 years ago, admitted to our emergency department with a sudden shortness of breath. Initial examination revealed no acute pathology related to tracheostomy passage. Vital signs were normal other than respiratory rate (32/minute). Routine haematological and biochemical parameters were within normal limits. In chest examination breath sounds was decreased on the left side. Chest radiography revealed volume loss, left mediastineal shift and diaphragmatic elevation on the left side (Figure 1A). Arterial blood gas was compatible with respiratory alkalosis with moderate hypoxemia. Diagnostic flexible fiberoptic bronchoscopy revealed an undefined foreign body at the level of bifurcation to left secondary bronchus. It's successfully removed from its place with biopsy forceps. By consulting otolaryngologist we have learned that this was a PVP (Figure 1B). We are un-aware of a dislodged speaking valve in the trachea causing atelectasis. Patient was not aware of PVP whether he aspirated it or not. A retrospective past history revealed that he underwent tracheoesophageal puncture with secondary insertion of PVP 6 months after operation. After removal of PVP control chest film was normal (Figure 1C).

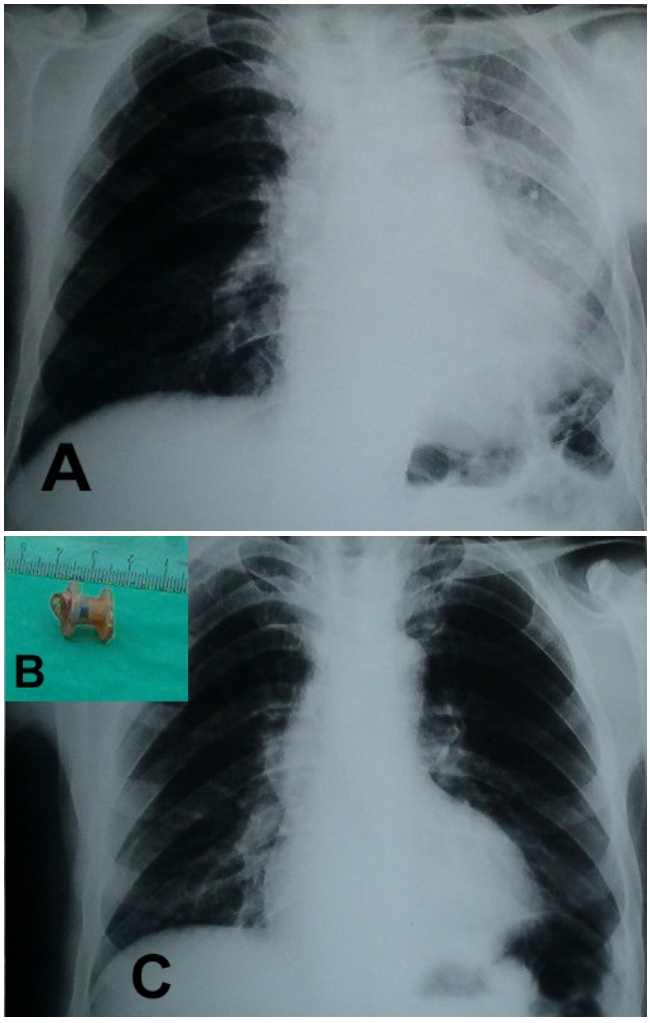

Figure 1: *Posterioanterior chest film on admission (A), the removal of Provox voice prosthesis with flexible bronchoscopy (B), control chest film after removal of PVP (C).*

DISCUSSION

Recognized complications of tracheo-esophageal puncture and valve insertion include pharyngoesophageal spasm, extrusion or aspiration of the PVP, leakage through or around the PVP causing tracheal reflux, peristomal inflammation and cervical subcutaneous emphysema, postoperative fistula,

Table 1: Complications related Tracheo-esophageal voice prosthesis

Study	Design	Patients (n)	Type of device	Complications
Garth et al. 1991 (4)	Retrospective	119	Blom-Singer	Fungal colonization (15%) Granulation tissue (6%) **Aspiration (1,7%)*** Enlarged fistula (2%)
Von Weissenbruch and Albers 1993 (2)	Prospective	37	Provox	Fungal colonization (68%) Obstruction of valve part (16%) Leakage through prosthesis (35%) Leakage around prosthesis (11%) Dysphagia (14%) **Displacement of prosthesis (11%)**** Granulation tissue (8%) Hypopharyngeal stenosis (5%) Tracheostoma stenosis (5%) Gastric reflux complaints (5%)
Hilgers and Balm 1993 (3)	Retrospective	132	Provox	Widening of the fistula (20,5%) **Spontaneous extrusion (4,5%)****
Izdebski et al. 1994 (5)	Retrospective	95	Blom-Singer and Groningen	Leakage through prosthesis (10%) Leakage around prosthesis (5%) **Dislodgement (10%)**** **Tracheal aspiration (5%)*** Fungal colonization (5%) Obstruction valve part (10%) Gastric distention (10%) Irradiation-related problems (10%) Fistula repuncture (5%)
Leder and Erskine 1997 (6)	Retrospective	81	Blom-Singer	Leakage around prosthesis (4%) Fungal colonization (78%) Gastric distention (10%) Granulation tissue (7%) Transient dysphagia (5%) Fistula (5%)
Laccourreye et al. 1997 (7)	Prospective	37	Provox	Leakage through prosthesis (33%) Leakage around prosthesis (27%) Deterioration of the prosthesis (%24) Tracheostoma stenosis (8%) Granulation tissue (16%) Dysphagia (2.7%)
Yoskovitch 2001 (8)	Case report	1	Tracheo-esophageal puncture prosthesis	**Aspirated prosthesis in left main bronchus**
Basha and Durham 2002 (9)	Case report	1	Groningen	Retained speaking valve in the lower part of esophagus
Hiltmann et al. 2002 (10)	Case report	1	Provox	Mechanical ileus

** Early postoperative period and shallow aspiration (incorrect insertion)*

*** No tracheal aspiration*

hypopharyngeal and tracheostoma stenosis, obstruction of valve part, fungal colonization, granulation tissue, dysphagia, gastric distention and mechanical ileus (2-10). Spontaneous dislodgement leading to tracheal aspiration is a rare complication (Table 1).

Aspiration of TEVP including PVP has been reported more frequently in the early postoperative period due to incorrect insertion and shallow aspiration. Aspiration distal to trachea has not been reported in the late postoperative period. Extrusion is usually caused by coughing coupled with improper fitting (5).

The diagnosis of foreign bodies is difficult to establish in patients with a noncharacteristic medical history and discrete symptoms. Accordingly authors were able to make a presumptive diagnosis of foreign body before bronchoscopy in only 55% of patients (11). We were not aware of PVP due to communication problem of this alone patient. Indication for bronchoscopy in this particular case was thought to be obstructive atelectasis. Our presumptive diagnosis actually was endobronchial tumor instead of foreign body aspiration as an indication of diagnostic bronchoscopy. Unlike in children, clinical presentation of foreign bodies in adults commonly occurs without asphyxia and is therefore suggestive of chronic lung disease, bronchial tumors or pneumonia (12). The clinical presentation of patients is also dependent on the size of foreign body aspirated and the degree of obstruction. Pneumonic and atelectatic radiographic changes are found in 70-75% of the patients, regardless of the time that had elapsed after the foreign body aspiration (11-13). The chest radiograph was diagnostic with a definitely radioopaque shadow in only 15-20% of the patients (11,14). In all types of TEVP there are some radioopaque parts. When we re-evaluated patient's chest X-Ray retrospectively we have noticed that there was a circle-shaped opacity in lateral chest X-Ray.

Unlike in our case, dislodgement leading to tracheal aspiration (mostly shallow) occurred in less than 5% of all patients with PVPs in early postoperative period (2-7). It's the only Provox aspiration at the level of bifurcation to left secondary bronchus as far as we know.

It's concluded that both otolaryngologists and pulmonologists must be aware of such a complication of TEVP even in the late postoperative period of laryngectomized patients.

CONFLICTS OF INTEREST

None declared.

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