Trakeal Patolojilerde Cerrahi
Surgery for Tracheal Pathologies

Dr. Aslı Gül Akgül / Hakkari Devlet Hastanesi Göğüs Cerrahisi Kliniği, Hakkari
Dr. Hasan F.Batırel / Marmara Üniversitesi Tıp Fakültesi Göğüs Cerrahisi Kliniği, İstanbul
Dr. Mustafa Yüksel / Marmara Üniversitesi Tıp Fakültesi Göğüs Cerrahisi Kliniği, İstanbul

ÖZET

Üst hava yolu stenozu sıklıkla üst trakeal ve subglottik seviyelerdeki patolojiler ile ilişkilidir. Enflamatuvar stenoz, trakeal rezeksiyon ve rekonstrüksiyonların en sık endikasyonudur. Primer trakea tümörlerinin de primer rekonstrüksiyona uygun ise en ideal tedavisi rezeksiyon olmaktadır. Benign ve malign sebeplerle trakea cerrahisi uyguladığımız yaşları 24–50 arasında değişen 9 olgudan, postentübasyon trakeal stenoz tanısı olan 5'ine servikal insizyon ile, trakeal tümör tanılı 4 hastaya ise torakotomi yolu ile trakeal rezeksiyon ve uç-uca anastomoz başarılı şekilde uygulandı.

Dikkatli preoperatif değerlendirmeyi takiben uygulanacak başarılı cerrahi teknik trakeal patolojilerin cerrahisinde tatmin edici sonuçları da beraberinde getirmektedir.

Anahtar Kelimeler: *Trakeal stenoz, cerrahi, anastomoz*

ABSTRACT

Upper airway stenosis is usually associated with a complex of pathological conditions at the high tracheal and the subglottic levels. Inflammatory stenosis of the trachea remains the most common indication for tracheal resection and reconstruction. Primary tumors of the trachea are best treated by resection when primary reconstruction may be safely accomplished. Nine cases with ages between 24–50 were treated with surgery for benign and malign tracheal stenosis. Tracheal resection and end-to-end anastomosis were successfully performed to 5 cases with a diagnosis of postintubation stenosis via cervical approach and 4 cases with tracheal tumors via thoracotomy.

Accurate preoperative assessment and preparation associated with a perfect surgical technique is mandatory to obtain good results for tracheal surgery.

Key words: *Tracheal stenosis, surgery, anastomosis*

INTRODUCTION

Upper airway stenosis is usually associated with a complex of pathological conditions at the high tracheal and the subglottic levels(1,2). Benign inflammatory tracheal stenoses and acquired laryngotracheal stenosis due to prolonged intubation for ventilation purposes remain the most common indications for tracheal resection and reconstruction(3,5). Primary tumors of the trachea are rare. Primary squamous cell carcinoma and adenoid cystic carcinoma of the trachea are best treated by resection(2,4). We report our experience with the surgical management of benign and malignant tracheal stenoses.

CASES

A total of 9 patients (8 male, 1 female) underwent primary tracheal resection and reconstruction for both neoplastic and non-neoplastic stenosis. Median age was 34 (24 – 50) years. The cause of airway stenosis was postintubation stenosis in 5 patients and neoplasia in 4. The patients were admitted to our clinic with dyspnea (n=9), stridor (n=1) and cough (n=1). One of the cases was urgent, other operations were performed in elective conditions. All patients underwent radiologic and bronchoscopic assesment to determine the extent of involvement of the trachea, the integrity of the vocal cords and the presence or absence of tracheomalacia. No neoadjuvant treatment was performed for malignant pathologies.

The operative approach was through a cervical collar incision in 5 patients and right thoracotomy in 4. Surgical procedures were circumferential tracheal resections in 7 patients, circumferential trachea with partial cricoid resection in 2 patients. The amount of trachea resected ranged from 1.5 to 5 cm (median; 3).

In 1 patient after excision of the rings pathologic part of the trachea was totally resected and right and left main

bronchial parts were anastomosed to distal trachea forming a new carina. Anastomosis for the membranous portion was performed with continuous suture of 3-0 polydioxanone (PDS, Ethicon, Inc., Somerville, NJ) in all patients. In cartilaginous portion, interrupted sutures of 4-0 polyglactin (Vicryl) was used in 2, continuous suture of 3-0 polydioxanone (PDS, Ethicon, Inc., Somerville, NJ) in 7 patients. Approximation of the tracheal ends after tracheal resection was achieved by cervical flexion. A heavy suture was placed through the chin and the sternal side at the end of the operation. The patient was extubated in the operating room and was kept in intensive care unit (ICU) for 24 – 48 hours.

We had no hospital mortality. The pathology revealed adenoid cystic carcinoma in 3 patients and carcinoid tumor in 1. Postoperative radiotherapy was applied to all patients with the diagnosis of adenoid cystic carcinoma. Anastomosis was controlled by broncoscopy 1 week after the operation.

Hospital stay was between 6 - 30 days (median; 11) and ICU stay was 1 - 2 days (median; 2). The median follow-up was 1.5 years.

One major complication of bilaterally vocal cord paralysis was occured. Minor morbidity occured in 3 patients (33 %); temporary vocal cord dysfunction (1 patient), which necessitated no spesific treatment; superficial wound infection (1 patient), managed with drainage and conservative therapy; anastomotic granulation tissue in one month follow-up (1 patient), treated with bronchoscopic dilatation. One patient with adenoid cystic carcinoma recurred in the pleural cavity 6 years after the operation.

DISCUSSION

Experimental and clinical tracheal and bronchial repair or anastomosis began fitfully in the late 19th century. In the 1950s and 1960s, experimental investigation of the potential extent of tracheal resection with primary anastomosis by anatomical mobilization and without prosthesis greatly widened these possibilities. Approximately half of the adult trachea could be removed surgically and reanastomosis performed(6,8). Most tracheal lesions can now be resected and primary reconstruction safely effected. The strategy for treatment of airway stenoses is now well established and leads to a high level of success with minimal or no sequele(4). The amount of trachea that can be resected and permit safe approximation varies with age and build of the patient, the pathologic condition and prior surgical procedures. In our patient group we performed a tracheal resection between 1.5 - 5 cm.

Postintubation lesions continue to provide the principal indication for tracheal resection and reconstruction, although the etiology and methods for their prevention were defined over 25 years ago. The common factor in the origin of these lesions is pressure necrosis by the endotracheal tube, the tracheostomy tube, or their attached cuffs at varying points in the upper airway. The point at which the damage occurs and the subsequent attempt at healing by cicatrization, results in a spectrum of lesions(4,9).

Primary tumors of the trachea are rare. Three treatment modalities have been applied to these tumors: tracheal resection, endoscopic resection and radiotherapy. Of these, tracheal resection alone provides pathological confirmation of complete tumor removal and offers long-term survival.

Complete resection of tracheal tumors is the preferred treatment because airway obstruction is relieved, cure is achieved in benign and low-grade malignant tumors, and resection is associated with the best long-term survival in tracheal carcinomas(2). In the preoperative assessment the precise topography of the injury with exact location and length of the stenosis, the length of the tracheal involvement, the presence of inflammation and edema at the border of stenosis must be defined. Rijid broncoscopy represents the best preoperative diagnostic procedure for inflammatory tracheal stenosis; helical CT with a 1-1.5 thin section has allowed multiplanar reconstruction of high quality, permitting detailed evaluation of tracheal stenosis(10). For preoperative management all our patients underwent radiologic and bronchoscopic evaluation to determine the extent of the tracheal involvement and presence of tracheomalacia or any other related pathologies.

A host of conservative treatments, including repeated dilatation, local and systemic steroids, cryo-surgery, fulguration, and prolonged or permanent stenting with T tubes or stents have largely proved successful and without excessive complications only for highly selected lesions(11,12). Recent years have seen a prolific increase in use of the laser for management of cicatrizial lesions of the airway. However, experts in laser therapy agree that only thin webline strictures can be removed definitively by laser treatment. Laser resection undoubtedly increases the extent of injury in some cases and may result in damage to the cricoid posterior plate. Similarly, the use of an endotracheal prosthesis could increase the length of stenosis and must be avoided in all patients who are candidates to receive surgical operations. Laser and endotracheal prosthesis should be used as a therapeutic option only in patients with absolute contraindications to surgery(13).

The basic principles of tracheal reconstruction introduced by authors with large experience(4,14). These principles include avoidance of excessive anastomotic tension, maintenance of tracheal blood supply and meticulous dissection and anastomosis.

Patients with airway stenosis present with dyspnea on effort, wheezing that progresses to stridor and, later, episodes of obstruction with even minimal amounts of mucus. Too often, such patients are diagnosed as victims of asthma, particularly as the lung fields are clear radiologically(9).

Segmental tracheal resection remains the preferred definitive treatment for postentubation tracheal stenosis. Tracheal tumor is another reason for stenosis. A majority of patients can safely undergo tracheal, laryngotracheal, or carinal resection with low perioperative risk. In some cases, the proximity of intrathoracic organs creates anatomical limits to en-bloc resection and necessitates adjuvant radiotherapy in malignant tumors. Meticulous preoperative assessment and preparation associated with a perfect surgical technique are mandatory to obtain good results.

REFERENCES

1) Wolf M, Shapira Y, Talmi YP, Novikov I, Kronenberg J, Yellin A.: Laryngotracheal anastomosis: primary and revised procedures. Laryngoscope 2001;111: 622-627.

2) Gaissert HA. Primary Tracheal Tumors. Chest Surg Clin N Am 2003;13:247-256.

3) Loutsidis A, Zisis C, Lariou K, Bellenis I.: Surgical management of idiopathic subglottic tracheal stenosis. Eur J Cardiothorac Surg 2000;17:488-491.

4) Grillo HC, Donahue DM, Mathisen DJ, Wain JC, Wright CD.: Postintubation tracheal stenosis. Treatment and results. J Thorac Cardiovasc Surg 1995;109:486-493.

5) Harries PG, Mason PS, Ramsay AD, Carruth JAS.: Idiopathic tracheal stenosis. J Laryngol Otol 1996; 110: 973-975.

6) Grillo HC.: Tracheal Replacement: A Critical Review. Ann Thorac Surg 2002;73:1995-2004.

7) Cantrell JR, Folse JR.: The repair of circumferential defects of the trachea by direct anastomosis: experimental evaluation. J Thorac Cardiovasc Surg 1961;42:589-598.

8) Grillo HC, Dignan EF, Miura T.: Extensive resection and reconstruction of mediastinal trachea without prosthesis or graft: an anatomical study in man. J Thorac Cardiovasc Surg 1964;48:741-749.

9) Grillo HC, Donahue DM.: Postintubation tracheal stenosis. Chest Surg Clin N Am 1996;6:725-731.

10) Quint LE, Whyte RI, Kazerooni EA, Martinez FJ, Cascade PN.: Stenosis of the central airways: evaluation by using helical CT with multiplanar recontructions. Radiology 1995;194:871-877.

11) Shapsay SM, Beamis Jr. JF, Hybels RL, Bohigian RK.: Endoscopic treatment of subglottic and tracheal stenosis by radial laser incision and dilatation. Ann Otol Rhinol Laryngol 1987;96:661-664.

12) Gaissert HA, Grillo HC, Mathisen DJ, Wain JC.: Temporary and permanent restoration of airway continuity with the tracheal T-tube. J Thorac Cardiovasc Surg 1994;107:600-606.

13) Sharpe DAC, Dixon K, Moghissi K.: Endoscopic laser treatment for tracheal obstruction. Eur J Cardiothorac Surg 1996;10:722-726.

14) Couraud L, Jougon JB, Velly JF.: Surgical treatment of nontumoral stenosis of the upper airway. Ann Thoracic Surg 1995;60:250-260.

15) Rea F, Callegaro D, Loy M, Zuin A, Narne S, Gobbi T, et al.: Benign tracheal and laryngotracheal stenosis: surgical treatment and results. Eur J Cardiothorac Surg 2002;22:352-556.