

TRACHEAL GRANULOMA IN A CHILD*

*Güler Kanra MD**, M. Kâzım Çağlar MD***, Uğur Dilmen MD****,
Fatma Uzun MD*****, Gülten Seçmeer MD*****,
Melda Çağlar MD*****, Meral Topçu MD*****, Olcay Oran MD***

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Treatment of acuta respiratory failure frequently requires intubation of the trachea with either an endotracheal or a tracheotomy tube, but both translaryngeal endotracheal intubation and tracheotomy may cause frequent and severe complications.

For the patient requiring airway protection, as in long-term mechanical ventilation, or the removal of pulmonary secretions and reduction of dead space, the benefits of tracheostomy are numerous¹⁻³. This is, indeed, the traditional means of dealing with the problem but long-term oro- or nasotracheal intubation has also been used extensively⁴⁻¹⁰. A great number of articles concerning the complications of long-term intubation have, however, been published^{4-6,11-17}.

This paper presents the rather rare case of a child with tracheal granuloma following long-term intubation and tracheostomy¹⁸.

Case Report

A 22-month-old boy was first admitted to Hacettepe Children's Hospital with the complaints of acute onset of respiratory difficulty, cyanosis and coughing, following the removal, two months previously, of an aspirated watermelon seed from the right main bronchus. During the first bronchoscopy, resuscitation had been required as there was cardiopulmonary arrest. The patient then required prolonged mechanical ventilation; for the first week oro-tracheal intubation was used, then a standard tracheotomy procedure was performed with incision of the

* From the Hacettepe University Institute of Child Health, Ankara.

** Professor of Pediatrics, Hacettepe University Institute of Child Health.

*** Pediatrician, Van Military Hospital, Van.

**** Pediatrician, Gülhane Military Academy of Medicine, Ankara.

***** Resident in Pediatrics, Hacettepe University Institute of Child Health.

***** Associate Professor of Pediatrics, Hacettepe University Institute of Child Health.

***** Professor of Pediatrics, Pathologist, Hacettepe University Institute of Child Health.

***** Pediatrician, Hacettepe University Institute of Child Health.

second tracheal ring and no removal of cartilage. The operation was performed under controlled conditions in the operating room. A softcuff tracheostomy tube was used, and mechanical ventilation was employed for a duration of ten days. During this period, lung infection developed and was treated with appropriate antibiotics, and the patient was discharged in good health 55 days after admission. One week later, he was again admitted to the same hospital with complaints of dyspnea, cyanosis and a cough of acute onset. While he was being examined in the emergency room, there was cardio-pulmonary arrest. After resuscitation the physical examination revealed that there was bronchopneumonia; this was confirmed by chest roentgenograms. Narrowness of the trachea was shown up on the direct chest roentgenograms. Dyspnea and cyanosis gradually disappeared after nebulization and antibiotic therapy. He died just as he seemed to be recovering from the illness. One hour before his death, the vital signs had been normal and the last feeding had been given 5 hours previously.

At postmortem examination, the main pathologic changes were in the respiratory system. When the trachea was opened, there was a papillary structure (papilla nodule) in the lumen attached to the right side of the trachea and 5 cm below the epiglottis (Figure 1). It was ovoid in shape with a smooth surface, a purplish-red

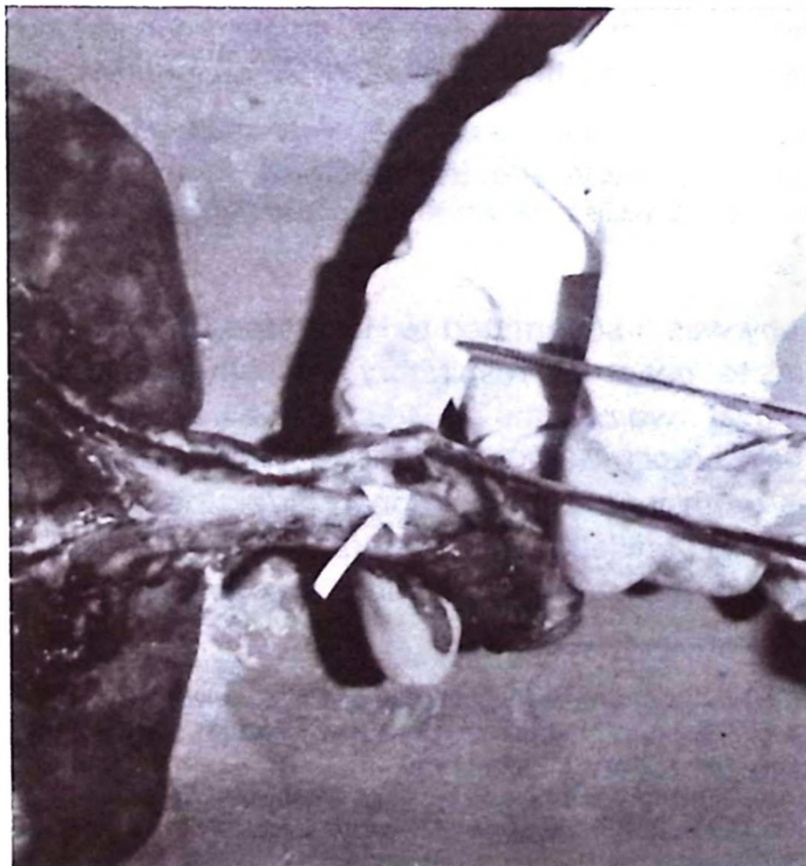


Figure 1

Tracheal granuloma in the lumen showed attachment to right side of trachea.

color, and a diameter of 0.5 cm. Tracheal stenosis was observed 1.5 cm below the papillary structure and 1.0 cm above the carina. In this location, the diameter of the tracheal lumen was 1.5 cm, but it was 2.5 cm in other regions. Other prominent findings were in the central nervous system. The brain was cyanotic and edematous. It weighed 1105 gr (normal 971 gr) and bilateral cerebellar conization was noted.

Microscopic examination of the papillary structure revealed that the fibrovascular connective tissue had been infiltrated by lymphocytes, polymorphonuclear leukocytes, macrophages and histiocytes, that is to say there was a pyogenic granuloma (Figure 2). It was not epithelized or pedunculated.



Figure 2

Fibrovascular connective tissue in granuloma was infiltrated by lymphocytes, polymorphonuclear leukocytes, macrophages and histiocytes (HE X 50).

Discussion

Although tracheotomy and tracheostomy are in many instances lifesaving procedures, the complication rate may exceed 65%^{4,19,20} and the mortality rate may be as high as 44%²⁰⁻²³. The complications include infection of the stoma, mucosal ulcers, tracheal stenosis at the cuff level, improper placement of the tracheos-

tomy tube, cardiorespiratory arrest, pneumomediastinum, septicemia, self-decannulation, stomal hemorrhage, subcutaneous emphysema, pneumothorax, fatal hemorrhage from the innominate artery, superficial erosions over the cartilaginous rings and tracheitis^{2,4,6,19-27}.

In a recent study⁴, it was shown that both endotracheal intubation and tracheotomy produce frequent and severe complications and problems despite use of soft-cuff flexible tubes and meticulous respiratory care, and it was concluded that the complications of tracheotomy are more severe than those of endotracheal intubation. The complication most commonly observed after endotracheal intubation is the appearance of posterior glottic ulcers extending from the arytenoid region to the subglottic space^{4,9,12,16,28-32}.

Pyogenic granuloma often occurs when there has been intratracheal anesthesia. This was first reported by Clausen³³ in 1932. It is an inflammatory tumor caused by friction trauma during intratracheal anesthesia or prolonged use of an endotracheal tube in the event of coma or laryngeal obstruction. It may also occur after laryngoscopic and bronchoscopic manipulations. To date it has been reported only in adults.

Since such manipulations may cause injury to the larynx or the trachea, the possibility of a papillary structure developing in the trachea or larynx should not be overlooked. Gastro-esophageal reflux has been reported as an etiologic factor for laryngeal granuloma which is similar to pyogenic granuloma³⁴. It usually occurs 2-3 weeks after there has been manipulation; in some cases it appears within 10 days.

The symptoms are principally hoarseness and a sensation of fullness, stridor or even obstructive laryngeal dyspnea which may, on occasion, necessitate tracheotomy. As the papillary structure becomes epithelized and pedunculated, it becomes smaller and more moveable. In some cases the papillary structure disappears spontaneously. If the pyogenic granuloma is removed before epithelization, it may recur.

In our case, pyogenic granuloma did not obstruct the lumen of the trachea; the main cause of the anoxia, which caused the brain edema and the cerebellar herniation which finally resulted in the death of the patient, was stenosis of the trachea. It has been reported that in adults, the localization of pyogenic granuloma is often in the larynx. In one prospective study it is concluded that pyogenic granuloma formation is an uncommon complication following use of an artificial airway⁴. In other studies it has been reported that most of the pyogenic granulomas are located on the vocal cords^{6,11}. Another report deals with tracheal localization¹¹. Since pyogenic granuloma is mostly described in adults and in the laryngeal localization, our case is quite interesting from the point of view both of age and of localization in the trachea.

Summary

The case of a 22-month-old with tracheal pyogenic granuloma is presented and the relevant literature reviewed. The complications of long-term endotracheal intubation and tracheostomy are discussed.

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