Tetraplegia After a Tracheal Resection Procedure*

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We describe a 27-year-old patient who was admitted to our hospital for a tracheal stenosis caused by an adenocystic carcinoma. A tracheal resection procedure was performed and the head was fixed to the anterior chest wall by two sutures. Postoperatively he became tetraplegic, from which he completely recovered after the sutures were removed. We think that the decreased blood flow in the anterial spinal artery with flexion of the neck in combination with hypotension was the direct cause of this major complication.

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racheal resection is performed in cases of inflammatory and neoplastic diseases.\(^1,2\) Several complications of this resection therapy (fistulization with mediastinal leakage, late stenosis, hemorrhage, etc) are well known and described in literature.\(^3\) To reduce the tension on the suture line, several methods are available; ie, flexion of the neck, laryngeal release, mobilization of the lung hilus, and division of the left main bronchus.\(^4\) When the neck has to be kept in flexion, but not extreme, we usually suture the chin to the anterior chest wall. In this case report, we describe an unusual complication of anterior flexion of the neck following tracheal resection and laryngeal release.

Case Report

In February 1991, a 27-year-old man was admitted to our hospital for a tracheal stenosis caused by an adenocystic carcinoma. The patient complained of progressive dyspnea and inspiratory stridor for a few months. There were no symptoms of cough, sputum production, pain, fever, or hemoptysis. He was a smoker (10 pack-years) and used no medication.

Physical examination revealed no abnormalities. Results of laboratory results (hematologic and biochemical) were normal. Radiographs of the thorax and computed tomographic details of the trachea revealed a process distal in the trachea (Figs 1 and 2).

A bronchoscopy showed a tumor in the distal part of the trachea from the dorsal membrane with obstruction for more than 75 percent of the lumen. Several cartilaginous rings were involved in this tumor process, which ended 3 cm above the main carina. Because of the intra-tracheal extent of the process, the patient was first treated with laser therapy. Afterwards, the patient was operated on by a median sternotomy and 5 cm of the trachea were resected. After laryngeal release and anterior flexion of the neck, an end-to-end anastomosis was performed and the head was fixed to the anterior chest wall by two sutures. Intraoperatively there were no complications.

On the first postoperative day, the patient became hypotensive for several hours with systolic mean arterial pressure around 70 mm Hg. By restoring the circulating volume, the patient became normotensive.

On the second postoperative day, the patient was extubated. Several hours later, he developed a tetraplegia that was confirmed by the neurologist. The neurologic investigation revealed a paralysis of the legs and minor weakness of the C-7 and C-8 innervated musculature of the hands; there were no sensory disturbances. The fixation sutures between the head and chest wall were removed immediately. In a few days, the neurologic signs resolved gradually. A first MR image showed no evidence for acute cervical disk protrusion or other neurologic disease. A second MRI scan was made with maximal flexion of the neck and in transversal projection. There was some evidence for a stenosis of the medullary channel, secondary to spondylosis, but there were no signs of spinal cord compression.

After a few weeks, the patient completely recovered and was discharged from our hospital.

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Pathologic anatomic examination revealed incomplete resection of the tumor, so we decided to add postoperative radiotherapy. After 2 years, in March 1993, the patient was still alive and doing well without evidence of recurrence.

**DISCUSSION**

Regressive tetraplegia after tracheal resection is rare, and as far as we know, it has been mentioned only once in the literature. In neurosurgical and cardiosurgical procedures, it is a well-known complication. Especially in aortic reconstruction with prolonged cross clamping of the aorta or division of one or more intercostal arteries at the level of the lower thoracic vertebra, the blood supply of the medulla is jeopardized.

Our patient showed a complete loss of motor activity below level C7, except for the activity of the pelvic muscles. A possible explanation for this phenomenon may be the development of a relative stenosis of the cervical medullary channel as a result of the maximal anterior flexion of the neck. This could have caused a partial compression of the anterior spinal artery, which became symptomatic during the period of hypotension. On an MRI scan, a relative stenosis of the vertebral channel by spondylosis was seen on level C7. There was no compression of the medulla.

Obstruction of the anterior spinal artery occurs in several diseases, *ie*, embolization during or following aortic surgery, arteritides, aortic dissectios, cervical spondylosis, cervical intervertebral disk hernia, syphilis, and compression by tumor.

In general, occlusion of the anterior artery leads to a loss of pain and temperature sensation below the level of the lesion in combination with a paralysis of motor function and a relative or absolute sparing of the proprioceptive sensation. The prognosis depends on the duration of occlusion and the existence of anastomoses.

In our patient, there was a decreased blood flow in the anterior spinal artery, probably caused by flexion of the neck in combination with hypotension, resulting in an isolated paralysis of the muscles below the involved segment. Theoretically this isolated symptom can be explained by the localization of the pyramidal tract, which is vascularized by the end branches of the anterior spinal artery, and in this way the most vulnerable structure in cases of decreased blood flow in the anterior spinal artery. Recovery is variable, but as shown in our patient, it can be complete.

**REFERENCES**