



УДК: 616.23-003.9-089

## POSSIBILITIES OF ENDOSCOPIC TREATMENT OF CICATRICAL TRACHEAL STENOSIS

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Cicatricial tracheal stenosis (CTS) is based on damage to its normal structures and their replacement with coarse connective tissue [1,3,5,7,9, 11]. One of the mechanisms of the development of CTS is the fact that respiratory resuscitation is often performed against the background of shock of various genesis, which is manifested by a violation of microcirculation, including in the tracheal wall, which contributes to the development of infection and impaired regeneration. Due to the increase in the number of victims with severe combined injuries that require prolonged ventilation and tracheostomy, the frequency of occurrence of various scar stenoses of the larynx and trachea, according to various data, reaches 25% [2, 4, 6,8,10]. Symptoms of CTS, the main of which is difficulty breathing, usually occur within 1 to 7 weeks after extubation or tracheostomy, i.e. after the formation of scar tissue in the tracheal wall with subsequent narrowing of the airway lumen. The main radical operation that allows to remove the damaged area and restore the integrity of the airways remains circular resection of the trachea with an end-to-end anastomosis" [12,14, 16, 18, 20]. The results of the operation can be considered satisfactory. However, such formidable complications as failure of anastomosis sutures, erosive bleeding, recurrence of stenosis, laryngeal nerve paralysis, mediastinitis are possible. According to various authors, the frequency of postoperative complications in patients who underwent tracheal resection is 8.6–9.4%, and the mortality rate reaches 5% [13,15, 17, 19].

**The purpose of the study.** Improving the diagnosis and surgical treatment of patients with cicatricial tracheal stenosis.

**Material and methods:** We observed 72 patients, 55 of them men and 17 women, aged 12 to 68 years with cicatricial stenosis of the trachea, developed as a result of prolonged intubation of the trachea or after tracheostomy. In 46 of them, the consequences of severe combined injuries required a ventilator, in 4 – severe injuries, 22 – comatose state of various genesis. In 23 patients, cicatricial stenosis of the trachea developed due to prolonged ventilation through an intubation tube, in 49 – after the imposition of a tracheostomy. 27 patients were admitted with tracheostomy. The main clinical symptom in patients with CTS was difficulty breathing, the severity of which depended on the degree and duration of stenosis, varying from shortness of breath during exercise to stridorous breathing in rest. I degree – "scar deformation", does not require treatment, without clinical manifestations, II degree – difficulty breathing





during exercise (10 b-x), III degree – shortness of breath at rest (subcompensation of breathing) (32 b-x), IV degree – stridor, hypoxia, threat of asphyxia (30 b-x). All patients, along with general clinical and radiological examination methods, underwent spirometry, endoscopy, and multislice computed tomography (MSCT). Instrumental research methods allowed us to determine the localization, extent, nature, degree of narrowing and inflammation in the lungs as a result of obstruction, depending on the duration of the disease.

**Results and discussion.** The defeat of the cervical trachea occurred in 58 patients, the upper–thoracic – in 10, the middle–thoracic - in 2, the lower-thoracic - in 2. The narrowing was from 1/3 of the diameter or more, but in most patients there was a narrowing of 2/3 of the diameter of the airway. The length of the narrowing ranged from 2.0 to 6.5 cm, mainly a circular form of the lesion was observed. In 5 examined patients, the length of the narrowing was up to 2 cm, in 62 – more than 2-2.5 cm, in 5 patients there was a two-level lesion.

In all patients, the indicators of external respiration function were changed more by restrictive or mixed type of varying severity. After short-term preoperative preparation, 67 patients underwent radical surgical interventions consisting in circular resection of the trachea with an end-to-end anastomosis, 16 patients underwent laryngotracheal anastomosis, 46 - tracheotracheal anastomosis. Out of 5 patients with two-level resection, 3 had a laryngotracheal, 2 - tracheotracheal anastomosis. In 5 patients with isolated unexpressed stenosis of the cervical trachea with a length of up to 2 cm, it was possible to improve the patency of the trachea after 2-3 sessions of endoscopic coagulation destruction of the stenosed area. With cervical and upper thoracic stenoses (59 b-x), interventions were performed through cervical access. When stenosis was localized in the upper thoracic and lower upper thoracic trachea (8 b-x), a cervical approach with partial upper sternotomy (up to the middle third of the sternum body) was used. The installation of an intubation tube was of great importance. During resection of the cervical and upper thoracic trachea, the intubation tube was installed below the anastomosis with minimal pressure in the cuff and was fixed outside to avoid dislocation and injury of the anastomosis. After surgery and preliminary endoscopic rehabilitation, the patient was extubated as early as possible, which allowed avoid many complications. After the anastomosis was completed, endoscopic sanitation of the tracheobronchial tree was performed without fail, special attention was paid to the comparison of the mucous membrane, interposition of soft tissues, cartilage between the stitched ends of the trachea. At the end of the operation and sanation endoscopy, the patient's head was fixed in the position of the chin brought to the front surface of the chest, which reduced the tension of the ends of the anastomosis and facilitated the coughing up of sputum. In the postoperative period after tracheal resection, special attention was paid to the prevention of complications from tracheal anastomosis and purulent-inflammatory complications from the lungs and wounds. Antibiotics were prescribed taking into





account the sensitivity of the microflora to them, which was determined before the operation by examining sputum, flushing secretions from the trachea and clarified during the operation when seeding from the mucous membrane of the trachea. With a strong cough, vomiting and an increase in intra-abdominal pressure, a high aerodynamic pressure occurs in the tracheobronchial tree. To prevent this, after surgery, the patient was prescribed mucolytics, bronchodilators. If necessary (with concomitant purulent bronchitis), a course of sanitization bronchoscopy or inhalation therapy was performed. Thorough sanitation and inhalation therapy prevent the development of postoperative inflammatory process in the lungs. Of no small importance in the postoperative period is the flow of air and blood through the drainage or the graduate from the mediastinum and the wound of the cervical region. Drains and graduates were removed after cessation of discharge within 1-2 days. 2-4 weeks after surgery, 3 (4.2%) patients had a picture of anastomosis restenosis, which was eliminated by electrocoagulation destruction in combination with dilation of the anastomosis site. 1 (1.3%) patient died on the 6th day after the operation of resection of the cervical-thoracic trachea with end-to-end anastomosis with extended stenosis up to 6.5 cm due to insufficiency and erosive bleeding from the anastomosis. 68 (94.5%) patients were discharged with a good result, no complications were observed in the long term.

As an example, we give a description of a patient with two-level cicatricial stenosis of the trachea. Patient T., 21 years old, with cicatricial stenosis of the cervical and thoracic trachea, developed as a result of prolonged intubation of the trachea and the imposition of a tracheostomy. According to endoscopy, the stenosis site is located 3.5–4 cm below the vocal cords, ends in the form atresia above the tracheostomy site. The second lesion is a narrowing at the level of the upper thoracic trachea of a circular nature, the diameter of the narrowed area is 4-5 mm, the device is impassable. MSCT revealed: the first level of atresia of the cervical trachea at the VC-7 level of the vertebral body for up to 2.5 cm with a tracheostomy, below for 2.5 cm is a section with a healthy tracheal lumen: at the VTh-2 level, the second affected area with a narrowing of the lumen in the upper thoracic trachea with a diameter of up to 4 mm and a length of up to 2.3 cm. The tracheal wall at this level is circularly thickened to 9 mm.

The place of narrowing of the cervical and upper-thoracic trachea, Anesthesia in the patient was carried out as follows: after preliminary bugging, an intubation tube No. 5 was first carried out through the tracheostomy for the narrowing zone, then cervical access was performed with partial upper sternotomy with the allocation of the affected upper trachea to the larynx. The site is circularly resected to the lower edge of the tracheostomy, circular nodular sutures are applied to the respiratory shunt, then an orotracheal intubation tube is carried out for stenosis of the thoracic trachea, for stitches are pulled on the first anastomosis. The thoracic section of tracheal stenosis was isolated, which was circularly resected for up to 3 cm with the remaining above the normal segment of the trachea and a second, tracheotracheal anastomosis was





applied. In total, 5-6 scar-altered tracheal rings were removed. With the help of circular nodular sutures with atraumatic thread polypropylene 2.0, two end-to-end anastomoses were applied. The patient was discharged in a satisfactory condition on the 7th day after the operation with a good result. No complications were observed in the early and long-term periods after the operation.

### **Conclusion**

1. CTS is a fairly frequent and formidable complication of respiratory resuscitation, which has a negative effect on the patency of the respiratory tract and worsens pulmonary ventilation.

2. The only radical method of treating patients with CTS is surgical intervention in the form of circular resection of the trachea with an end-to-end anastomosis. As our little experience shows, surgical treatment of these patients should be carried out as early as possible.

3. A detailed examination of patients allows timely clarification of the localization, extent, nature of the lesion and the degree of obstruction of the trachea and, according to indications, early radical surgical intervention.

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