Treatment of the cicatrical tracheal stenosis

Abstract: From 1984 to the present time in the 2nd clinic of the Tashkent Medical Academy (TMA) there were treated 186 patients with the cicatrical tracheal stenosis (CTS). Indications to the surgical treatment of cicatrical stenosis of the trachea were established at 76 (40.9%) patients. At 110 (59.1%) patients we used endoscopic techniques to expand and maintain the lumen of the trachea. The surgical intervention was circular resection with anastomosis. From hospital discharged 180 patients, 6 people died. Hospital mortality was 3.2%. Intraoperative complications and adverse postoperative period were observed after 12 (6.5%) interventions. Proper surgical treatment algorithm for patients with cicatrical stenosis allowed to achieve good and satisfactory long-term outcome at 93.5% of patients. Unsatisfactory results are directly related to postoperative complications, prevention of which will helps to improve the final outcome.

Keywords: trachea, cicatrical stenosis of trachea, circular resection of trachea, trachea-laryngeal anastomosis.

Among the diseases the cicatrical tracheal stenosis is the main indication to surgical treatment. There are various types of operations: circular resection of the narrowed segment with anastomosis, stage reconstructive- plastic surgery with the formation of the new airway at different tubes, endoscopic dilatation, laser recanalization of the lumen, using of endotracheal stents. These diseases treat surgeons, ENT, endoscopists. Each specialist elect him the most familiar method of treatment, which he is fluent. [14] The choice of treatment is not always rational. Most research in this area reflects the possibility of a single type of treatment. Only a multidisciplinary approach allows to choose the best treatment for a particular patient [2; 3; 6; 8].

From 1984 to the present time in the clinic of the Tashkent Medical Academy (TMA) there were treated 186 patients with the cicatrical tracheal stenosis (STS) aged 15 to 68 years. Among them 112 were males and 74 — females. Most patients, 172 patients (92.4%) were young and mature age. The most common tracheal stenosis occurred after respiratory resuscitation in trauma patients, the frequency of which in young and middle age, especially in males is higher. In identifying of the causes of cicatricalring trachea, cicatrical stenosis of trachea, circular resection of trachea, trachea-laryngeal anastomosis.

Analysis of the results of USD with CDC and ED of various vascular lumens allow earlier study of the morphology of atherosclerotic plaques, definition of early symptoms of destabilization, and performance of prophylactics of possible complications with corresponding therapy.

References:
cheal stenosis found out that in the history of these patients was to conduct the artificial ventilation (AV), tracheostomy, injury or transferred inflammatory diseases of the trachea.

Most often, in 125 (67.2%) patients the cicatricial stenosis localized at the cervical trachea, in 32 of these patients, it was combined with narrowing of subpalcal area of the larynx. The defeat of the cervical-thoracic trachea was observed in 45 (24.2%) and thoracic — in 16 (8.6%) patients. In 4 cases, the STS was complicated with the esophageal-tracheal fistula at the level of the cervical trachea, and 2 of them with the involving of the lower part of the larynx. The patients were mostly with II—III degree of airway narrowing. In 44 (23.6%) patients at admission was marked stridor. Cicatricial-granulation of the tracheal stenosis was diagnosed in only at 10 (5.4%) patients. This type of restriction is considered as the early stage of cicatricial stenosis, when granulation tissue is tender and has not been transformed into a rough coupling.

Indications to surgical treatment of cicatricial stenosis of the trachea installed in 76 (40.9%) patients. In 110 (59.1%) patients were used the endoscopic techniques to expand and maintain the lumen of the trachea. Surgical treatment consisted of resection surgery (circular resection of the trachea or larynx). In 10 patients diagnosed at admission posttracheostomotic cicatricial stenosis of the cervical trachea I and II degree, which did not cause breathing difficulties and did not require surgical correction.

In total 186 patients underwent 292 surgical and endoscopic intervention. In TMA has been developed and applied the original technique of tracheolaryngeal anastomosis in 12 patients.

From hospital discharged 180 patients, 6 people died. Hospital mortality was 3.2%. Intraoperative complications and adverse postoperative period were observed in 12 (6.5%) interventions. Most often it was observed in the patients operated in the time of formation of tracheal surgery (1984—1994 gg.). In the future, mortality and the incidence of postoperative complications were reduced. Complications often were with the chronic inflammatory nature and usually occurred after surgery or combined treatment (surgical and endoscopic). Death because of arrosive bleeding was in 3 patients, respiratory failure — at 2, posthypoxic swelling of the brain — at 2, PE — at 2, rupture of the trachea when probing — at 1, damage to blood vessels during surgery — in 1, total bronchospasm after endoscopic bougienage of the trachea — at 1.

Despite the widespread introduction of modern endoscopic surgery into clinical practice, helping patients with critical narrowing of the airway often causes great difficulties even in large hospitals, has highly-governmental experts. The greatest risk occurs in stenosis of III degree, especially when the diameter of the lumen of the trachea less than 5 mm., and the localization of constriction in tracheolaryngeal segment. In such situations, the treatment of choice is endoscopic expanseion of the tracheal narrowing followed by reajdustment of the trachea and bronchi. This tactic was used in 32 patients with severe stridor at rest. The most convenient and safe method is a probing of area of stenosis with the tubes of rigid bronchoscope, which allows you to restore quickly the adequate gas exchange. Bougienage have minimal damaging effect on surrounding tissue. When tracheal narrowing to 6—7 mm. the cicatricial tissue were destroyed by electrocoagulation [1; 9].

Endoscopic expansion of the tracheal lumen always given a temporary effect, even after prolonged dilatation on the endotracheal tube for 24 hours [15]. The duration of the free breathing ranged from several hours to several months. Most often it was 7—14 days. Then, regardless of the method of exposure to cicatricial tissue the lumen of the trachea again narrowed. For long-term saving of airway were entered the special stents [7].

Retraheostomy at different times after decannulation transferred 25 (13.4%) patients treated by us. Retraheostomy increases the extent of the zone of cicatricial stenosis and thereby complicate the subsequent treatment. It is justified only by the threat of the vital indications of asphyxia and without the possibility of expanding the lumen of the airways in another way. If the tracheostomy is performed, it should be performed through the affected part of the cervical trachea. Tracheostomy through the intact wall of the trachea leads to an increasing the length of the stenosis, which complicates further the implementation of radical resection with anastomosis and dooms the patient on a long multistage treatment.

Circular resection of trachea. We produced 76 circular resection of the trachea. The indication for surgery was limited cicatricaly stenosis of the trachea when it was possible to restore the integrity of the respiratory tract via anastomosis. The length of the resection ranged from 3 to 13 half-rings of cartilage. On average, 3—4 cm can be safely resected, which is 5—8 cartilaginous half-rings. At 56 patients we used the isolated cervical access (cervicotomy by Kocher), at 21 — cervicotomy with the partial longitudinal-transverse sternotomy. The integrity of the respiratory tract was restored by imposing of tracheal anastomosis in 54 (71.1%) patients. Tracheolaryngeal anastomosis was performed in 22 (28.9%) patients. The indication to tracheolaryngeal resection was cicatricial stenosis of the cervical trachea and larynx to the upper limit of cicatrix at least 1.5—2 cm from the vocal folds while maintaining the function of the latter. Tracheolaryngeal resection is the most complex surgery of the trachea. Since J. Gerwat [4; 5] and F. Pearson [10; 11] demonstrated the ability to secure tracheolaryngeal resection with anastomosis between the trachea and larynx, surgical tactics in this localization of stenosis has become more aggressive [12]. It should be noted that the diameter of subpalcal area of larynx exceeds the diameter of cervical trachea, which is important in relation of the edges of tracheo-laryngeal anastomosis for prevention of restenosis. To avoid such complications in the caudal part of the anastomosis, by the midline of tracheal semi-circle cartilage, was produced a longitudinal section of a length of 1—1.5 cm, crossing the semicircle cartilage of the breathing tube. When comparing the stitched edges of the anastomosis, crossed tracheal semicircle, pushing increases the inner circumference of the distal end of the anastomosis. As a result, the discrepancy of diameter of tracheolaryngeal anastomosis disappears.

The presence of a tracheostomy is a poor predictor of the risk of postoperative infectious complications and anastomotic insufficiency. When functioning tracheostomy operated on 8 patients who had to simultaneously resect tracheostomy and restore the integrity of the breathing tube.

Complications after circular resection of the trachea were observed at 6 patients, 3 of whom died. The most severe complication is insufficiency of tracheal anastomosis with subsequent development of septic complications — arrosive bleeding, respiratory failure, restenosis of the trachea. 2 patients died because of complications. Prevention of anastomotic insufficiency should be begun before the operation, choosing the best option of surgical treatment.

Good results were achieved at 70 (92.1%) patients who underwent the circular resection of the trachea. Quality of life does not differ from the life of healthy people. The possibility of their labor rehabilitation is not associated with changes in the tracheal wall, but with the severity of comorbidities, during the treatment of which the cicatricial stenosis of the trachea occurred. Inadequate long-term results (saving tracheostomy in the trachea) are due to complications in the immediate postoperative period.
The basis of endoscopic treatment of cicatricial stenosis is the expansion and preservation of the lumen of the trachea by endoscopic methods. This type of treatment is widely used in the past 2 decades.

From 1984 to nowadays, a variety of endoscopic procedures performed at 107 patients. Total performed 216 endoscopic intervention. Endoscopic treatment as an independent method was used in 75 patients with cicatricial stenosis of the trachea and in combination with surgery — at 59 patients.

Postoperative complications occurred at 6 (3.2%) patients. Most complications developed after bougienage and endoprosthesi- s of stenotic segment of the trachea. 3 patients died. The mortality rate was 1.6%. The immediate cause of death were acute respiratory failure with bilateral tension pneumothorax (2 patients), asphyxia with blood and total bronchospasm. The most common (1.6% of cases) [13] in the postoperative period there was a displacement of the endoprosthesi. Dislocation of a self-locking prosthesis was observed in 2 cases after using a smooth prosthesis, fixed ligature to the soft tissues of the neck — in 1 case.

A good long-term outcome after endoscopic treatment observed at 50% of patients in the initial stages of cicatricial narrowing of the trachea, the so-called cicatricial-granulation stenosis. Rough cicatricial have not been formed yet and timely endoscopic treatment for the removal of granulation tissue and dissection of delicate cicatrices was effective. In another form of stenosis — formed resistant cicatricial stenosis — good long-term result was achieved only in 32% of cases. 6% of patients after treatment were maintained shortness of breath on exertion, and the result is regarded as satisfactory. The unsatisfactory outcome of treatment at 41% of patients was associated with restenosis after removal of the tracheal stent. This result forced us in recent years to review the possibility of endoscopic treatment of patients with cicatricial stenosis of the trachea. Despite the good immediate result, in long-term periods often occurs restenosis. Currently, we use endoscopic techniques expansion and preservation of the lumen of the respiratory tract or with a temporary purpose — to prepare the patient for surgery to stabilize the general condition, or as a palliative treatment option alternatively to permanent tracheostomy.

Conclusion. Cicatricial tracheal stenosis in 88.7% of cases had iatrogenic origin, and occurs after the respiratory resuscitation. The operation of choice at cicatricial stenosis is a circular resection of the trachea. It can cure the patient in a single step. Emergency circular resection on a background of respiratory disorders is accompanied by high mortality rates, its should be limited. Endoscopic treatment as an independent method is indicated in the cases of forming cicatricial-granulation stenosis, or as a palliative treatment option. The main causes of death are anastomotic insufficiency, erosive bleeding into the airways and tracheal rupture during probing. Prevention of inflammatory complications and anastomotic insufficiency can reduce the mortality rate. Proper surgical treatment algorithm for patients with cicatricial stenosis allows to get a good and satisfactory long-term outcome at 93.5% of patients.

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