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PLASTY FOR EXTENSIVE COMBINED DEFECTS OF THE LARYNX AND TRACHEA

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Abstract: Etiologic features of chronic stenoses of the larynx and trachea are presented. The possibilities of using the cartilage of the nasal septum for extensive defects of the larynx and upper trachea are considered. The attention is paid to the essential advantages of septal cartilage use in comparison with other methods of plasty. Physiologically it is more optimal than other transplants because of greater stability at infection of the surgical wound, absence of immunogenicity and sharp phenomena of biological incompatibility. Cartilage is nourished by diffusion, which makes it more resistant to unfavorable conditions compared to any other tissue. The technique and advantages of the proposed modification of laryngotracheoplasty using nasal septal cartilage for extensive defects are described.

Key words: Larynx, trachea, scar stenosis, definitive defect, stage reconstruction, cartilage-transplantation.

Bibliography: 9 sources.

A special place in surgical rehabilitation of patients with stenoses of the respiratory tract is occupied by the issues of reconstruction of the anterior wall framework of the larynx and trachea. It is connected with the search for the implantation material suitable for organ-replacing reconstruction of the anterior wall of the larynx and trachea in conditions of its high physiologic mobility and wound infection. The elimination of larynx and trachea defects by conventional musculoskeletal plasty without the use of skeletal tissues is not always sufficient. The choice of implantable material is critical when planning such operations. The need for supporting tissues arises in case of extensive stomas, when conditions are created for trapping and pathologic flotation of the newly formed anterior wall and narrowing of the respiratory tract during breathing [2-4, 7, 8]. To close limited laryngotracheal defects, various variants of local skin and muscle plasty are used. In the absence or deficiency of its lateral walls, plasty using auto- and allo- genic cartilage or bone tissue is usually applied. Implantation of various artificial materials, as well as tracheal prostheses, does not always lead to epithelialization of the surface and often ends with the development of hypergranulations, infection and rejection [1, 5, 8, 9].

The aim of the study. Development and evaluation of the plasticization method for extensive combined defects of the larynx and trachea.

Patients and research methods. In the State Institution "RSNPMCH named after Acad. V. Vakhidov" we conducted a study in 22 patients (age 15-47 years) on chronic stenosis of larynx and trachea of different etiology. There were 13 (59.1%) men and 9 (40.9%) women. High morbidity rate was

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observed in the most able-bodied age group - from 26 to 35 years (39.2%). The causes of respiratory tract patency disorders at the level of larynx and trachea are as follows. The leading place among the causes of laryngotracheal stenosis is occupied by medical traumas - 59.2%, including: after intubation treatment - 69.2%, after tracheostomy and strumectomy - 15.3% each, non-medical traumas (household, road traffic) - 50% each, laryngeal tumor diseases - 13.1% (these patients were treated in our non-oncological clinic for various reasons), idiopathic paresis of vocal folds - 19.2%. The clinical diagnosis was established on the basis of the patient's anamnesis, taking into account information from the patient and relatives, data from discharge summaries, and referrals from the sending medical institution. The onset of the disease, cause, duration, therapeutic measures taken, dynamics, etc. are noted. During clinical examination, attention is paid to the character of breathing through natural routes and tracheostomy tubes. If the patients had previously undergone tracheostomy or tracheofissure, the nature of morphologic changes outside and inside the stoma, its extent and depth were studied when the tube was removed. Indirect laryngoscopy allows to investigate the larynopharynx, laryngeal cavity and the initial section of the trachea. Transnasal fibrolaryngobronchoscopy was performed in all patients. This method gives valuable information about the state of the mucous membrane of the respiratory tract, the function of vocal folds, allows to determine the nature of destruction of morphologic disorders, sometimes its extent, which is necessary when planning therapeutic tactics. If the patient has a stoma opening (fibroscopy), nasopharyngeal mirror examination was also performed through the stoma. MRI examination made it possible to determine the level and extent of narrowing in vascular projections of the topography of nearby vessels, as well as the condition of the lungs.

Functional studies of internal organs and laboratory data, as well as consultations with a neurologist, therapist, cardiologist and other specialists made it possible to identify concomitant and associated pathologies. Tactics and methods of treatment of patients with scar stenosis of the larynx and trachea (RSST) were chosen depending on the degree, level and extent of the stenosed area of the larynx and trachea. Endoscopic methods of treatment were applied in 6 (27.3%) patients, the indication for which was the presence of polyps, granulations, papillomatosis, membranous changes and synechiae in the area of the anterior or posterior commissure of the larynx. If membranous form of stenosis was detected, we performed trial bouching of the stenosis with an intubation tube under the control of an endoscope from the smaller diameter to the larger one, in case of ineffectiveness we performed excision. In preparation for plasty, 4 (18.2%) patients with paralytic laryngeal stenosis underwent tracheostomy; 12 (54.5%) patients underwent stage reconstructive-restorative operations on the larynx and trachea, which included restoration of airway patency followed by dilatation of the formed lumen with T-shaped laryngeal-tracheal silicone prosthesis. One patient from this group had a detached gunshot bullet wound of the anterior part of the larynx and trachea, and 1 patient had strangulation trauma. The indications for staged reconstruction of the larynx and trachea were the presence of rough scar tissue in the lumen of the larynx and trachea with the phenomena of stenosis of III degree according to the classification of S. M. Mueg and R. T. T. Sottop (stenosis length - more than 2.5 cm), as well as ineffectiveness of conservative and endoscopic treatment, presence of a functioning tracheostomy and impossibility of decannulation.

Results of the study and discussion. Stage reconstruction of the larynx and trachea was performed in 54.5% of patients. At computed tomography and endoscopic examination in these patients scar stenosis of the larynx and trachea (RSHT) of II stage was revealed in 3 (25%), III stage - in 6 (50%), IV stage with obliteration of the lumen above the cannula - in 3 (25%). In patients with extended RSHT the process was localized in the subclavian section of the larynx and cervical trachea in 7

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patients, in the cervical-upper thoracic section - in 4 patients, in the middle thoracic section - in 1 patient. At the first stage of treatment of patients under endotracheal anesthesia we performed laryngotracheophyssure or tracheophyssure, mobilization and dissection of the anterior tracheal wall, sparing excision of scar tissue and removal of granulations, redressing of fibrotic cartilages, formation of a wide stoma by skin-laryngotracheal sutures, modeling and placement of a silicone T-stent. In massive scar stenoses of the larynx and the initial trachea, when the airway lumen is not clearly visible, the greatest difficulty is the choice of the correct direction for recanalization. For this purpose, an intubation guide is used, which is inserted into the larynx through the mouth by the anesthesiologist. After viewing the guide, a dissection from the tracheostomy was performed. This approach excludes the possibility of formation of a false passage, traumatization of surrounding organs. However, in case of complete occlusion of the airways with coarse scars, it can only be felt by finger examination. The terms of stenting of the examined patients were not standard: 4 (66.7%) patients did not require stenting after endoscopic treatment, for 2 patients (33.3%) two-month stenting was sufficient. In the group of patients who underwent stage reconstruction of the larynx with more extended stenoses, with extensive wound surfaces as a result of surgery, 10 (83.3%) patients needed 6 months to form a stable airway lumen, in 2 (16.7%) cases longer terms - 1-1.5 years were required, because after stent removal during the follow-up period the phenomenon of restenosis appeared, so the patients underwent restenting.

It seems to us that restenosis is influenced by a non-smooth cut of the long ends of the endotracheal prosthesis during its preparation, the rough ends of which irritate the mucosa and are one of the causes of hypergranulation. Of no small importance is the decrease in immunologic resistance of the body, as well as under-treated inflammatory lung diseases, poor-quality local postoperative care. Plasty of the trachea and larynx defect was performed if free breathing was preserved for at least one month (in the first week of inpatient and then outpatient follow-up) after stent removal without signs of restenosis. The surgeon should be sure that its lumen is stable and that there will be no recurrence of stenosis after stoma plasty. At the final stage of rehabilitation we performed plastic closure of the persistent gaping defect and restoration of the anterior wall of the larynx and trachea. It should be noted that in 2 (16.7%) patients the tracheal defect after stent removal healed independently. Local plasty was performed in 4 (33.3%) patients with persistent lumen restoration in a small stoma defect up to 2.5 cm without signs of demalacia. In 6 (50%) patients with an extensive defect within the anterior wall of the larynx and one or two rings of the trachea (the defect was considered extensive if its size exceeded 2.5 cm), implantation with septal cartilage was used to restore the framework of the larynx and trachea. It should be noted that autochartilage has been used for correction of various defects of organs and tissues since ancient times: from fragments of the nasal septum, rib arch, auricular and thyroid cartilages, etc. is considered the gold standard in plastic surgery of the head and neck [2-6]. In our opinion, the most optimal and practical is a transplant from a fragment of the nasal septum. In physiological respect the nasal septum is more optimal than other grafts because of the greater stability at infection of the surgical wound, absence of immunogenicity and sharp phenomena of biological incompatibility. The cartilage is nourished by diffusion, which makes it more resistant to unfavorable conditions compared to any other tissue [6, 7]. The best results for tracheal skeletal defect repair were obtained by V. I. Koshel et al. [1], who used septal cartilage. If the tracheostoma was larger than 1-1.5 cm, a three-layer anterior wall was formed: the inner layer was formed at the expense of mobilized and sewn medial parts of the sterno-iliac muscles on both sides with chromium catgut, the middle layer was formed at the expense of two or three fragments of septal cartilage, and the outer layer was skin. As practice shows, it is risky to place the graft on the deformed trachea when the height of the lateral tracheal walls is low due to chondrolysis because of the increased

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probability of postoperative narrowing of the lumen or prolapse of the flap into the lumen of the airways.

Conclusions. Tactics and methods of treatment of patients with chronic stenoses of the larynx and trachea depend on the degree, level and extent of the stenosed area: endoscopic methods were required in 27,3% of cases, stage reconstruction of the larynx and trachea - in 54,5%. The terms of stenting are not standard: in case of extended scar stenosis - from 6 months in 83,3% to 1-1,5 years in 16,7% of patients. When endoscopic treatment is indicated, it is not required in 66.7% of patients. Autogenous septal cartilage is the most suitable material for making a graft at laryngotracheoplasty.

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