A Patient with Juvenile Recurrent Respiratory Papillomatosis Complicated by Laryngeal Stenosis after Laryngeal Microsurgery: A Clinical Case

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Introduction

Laryngeal papillomatosis is one of the global problems in the field of laryngology, since the exact etiopathogenesis of the disease is still not known. It is believed that about 10–60% of the world’s population is infected with the human papillomavirus (HPV) latently, but not all get laryngeal papillomatosis, the causative agent of which is type 11 and 16 of this virus [1]. Juvenile respiratory laryngeal papillomatosis suggests that infection occurs secondarily, through the natural birth canal of the mother. The virus penetrates through the damaged area of the mucous membrane and affects the basal cells of the multilayered squamous epithelium [2]. Respiratory laryngeal papillomatosis is a benign neoplasm with a very low risk of dysplasia [3].

About 3.5% of neoplasms of ENT organs are laryngeal papillomatosis, which has more than 50 types of treatment [4]. The larynx and trachea are often affected by the HPV, and the oropharynx, nasopharynx, nose, and oral cavity are involved less often. HPV affects the distal airways in 48% of children. Only 3.3% of cases had lung damage. At the same time, the incidence of lung cancer among these patients was 16% [1]. It is also very rare to detect isolated papillomatosis of the trachea.
and lungs without involving the larynx [5]. Low-frequency radiation laser ablation in the treatment of laryngeal papillomatosis has shown its effectiveness in practice [6]. Removal of papillomatosis with a blue laser is basically a new method and has shown its effectiveness, since it removes tissues with minimal carbonization and minimal visible impact on surrounding tissues [7].

Along with surgical methods of treatment, conservative treatment of laryngeal papillomatosis is also used, in which there is a slow growth of the tumor. For example, treatment with cidofovir significantly lengthens the remission time of recurrent respiratory laryngeal papillomatosis [8] [9]. The study showed that HPV vaccination reduces the development of recurrent laryngeal papillomatosis [10].

**Study design**
Clinical case.

**Objective**
Surgical repair of laryngeal stenosis and achieving remission of laryngeal papillomatosis.

**Materials and Methods**

Patient, 5 years old, came to us in February 2016 with the complaints of persistent hoarseness, asthma attacks, and dyspnea for 4–5 months. The child was hypostenic, covered with cold sweat. Breathing was rapid, with a characteristic stenotic noise when breathing. During inhalation, there was a retraction of intercostal spaces, jugular, and supraclavicular pits. Cyanosis of the lips, mucous membranes, and skin were observed. Examination with fiber-optic laryngoscope showed a widespread growth of laryngeal papillomas complicated by stenosis of Grades 3–4 (Figure 1).

The patient was hospitalized, emergency tracheostomy and endolaryngeal papilloma removal surgery were performed.

The patient contacted us again after 10 months. It turned out from the anamnesis that during this period of time, the child was subjected to endolaryngeal microsurgical repairs 6 times: With cold instruments and a CO₂ laser at intervals of 1.5–2 months due to recurrent papillomatosis (Figure 2) and decannulated after two surgical treatments. Diagnosis: Laryngeal papillomatosis, common form, recurrent course with 3–4 grade stenosis.

Taking into account the widespread growth of papillomas in the larynx, frequent relapse, the patient was recommended to consult an immunologist-allergist (December 2016). An immunologist was examined and the results of the tests showed the following:

| Analysis from December 29, 2016 |
|---------------------------------|
| Total IgE | 44.45 MU/ml |
| CLIA HPV IgM | 0.27 |
| CMV IgG | 26.53 |
| HBsAg | 2.0 MU/ml |
| ELISA-HPV IgM | Not detected |

Skin allergic testing from December 29, 2016

| Test          | Reaction |
|---------------|----------|
| Pillow feather | +++      |
| House dust mite | ++      |
| Sheep wool | ++      |
| Whole chicken egg | ++      |
| Aspergillus | ++++     |
| Test control | +        |

Based on the anamnesis and the results of the tests, the immunologist-allergist diagnosed: Primary immunodeficiency, unspecified (deficiency in the production of specific antibodies); allergic rhinitis, persistent form, moderate course, and stage of incomplete remission. Basic medical treatment was prescribed: (1) Lycopene 1 mg for 10 days under the tongue in between meals. Repeat the course in a month. (2) Inhalation of B2 fast-acting agonists (Berodual solution) through a nebulizer 12 drops. (3) Montelukast sodium 5 mg 1 tablet at night for 1 month, then a repeat course after 15 days. (4) Xyzal/Zyrtec 1 capsule × 2 times a day from the 1st days of ARVI for 7–10 days.

**Figure 1:** Endolaryngoscopic picture of the larynx before surgery

**Figure 2:** Endolaryngoscopic picture after surgery
The patient underwent two courses of treatment with an allergist-immunologist in 2017. The treatment made it possible to achieve remission within 3 months. Previously, relapses occurred monthly and surgical repair was required. Subsequently, the patient underwent endolaryngeal surgery once for laryngeal papillomatosis with minimal overgrowth. Also patient was undergoing endolaryngeal surgery on vocal cord twice due to a postoperative complication—cicatricial stenosis of the larynx (membranous vocal folds) from 2017 to 2018, where a remission of laryngeal papillomatosis was established. Further follow-up of the patient with a phoniatrist and an immunologist-allergist is recommended.

The control fibrolaryngoscopy of the patient was performed in September 2021 (Figure 3). As shown in Figure 3, there is a post-operative scar and a slight deformation of the left vocal cord. At present, no recurrence of respiratory laryngeal papillomatosis has been detected. The patient's voice was sonorous and without hoarseness.

In 2017, a second examination was carried out by an allergist-immunologist and repeated tests were prescribed to assess the immune status. According to the analysis results: Total IgE – 30.45 MU/ml; HPV IgG – 9.93; and CMV IgG – 20.53; there is a decrease in indicators, which indicates the effectiveness of the treatment. According to clinical indicators, there is a significant improvement, which is indicated by the absence of relapses. Further observation by an otolaryngologist, an allergist-immunologist, and repeated courses of treatment, if necessary, is recommended.

### Conclusion

The study in 2021 showed that the patient is in remission. Children with prolonged hoarseness must undergo laryngoscopy. Furthermore, this clinical case shows the importance of studying the immune status of patients with laryngeal papillomatosis, which allows us to identify changes in cellular and humoral connections of the immune status – a decrease in all populations of T-lymphocytes and quantitative deficiency of B cells, a decrease in the main classes of immunoglobulins. These results make it reasonable to use immunomodulatory therapy in these patients. Treatment of laryngeal papillomatosis should be comprehensive and in addition to surgical treatment should include differential immune correction.

### Ethics Statement

This clinical case was part of the clinical observation by the staff of our department.

### Authors’ Contributions

All authors declare that there are no conflicts of interest regarding the present study.

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