Chemical Ablation in Adenoid Surgery

TEODORA IOANA GHINDEA[1], ALEXANDRU DUMITRAS MEIUS[3], DRAGOS CRISTIAN STEFANESCU[4], CATALINA PIETROSANU[2], IRINA IONITA[2]*, ANDRA IULIA SUCEVEANU[5], ANDREEA RUSESCU[2], VIOREL ZAINEA[2,3], RAZVAN HAINAROSIE[2,3]

[1]CMDTAMP, 8th-10th Washington Str., 011794, Bucharest, Romania

[2]Carol Davila University of Medicine and Pharmacy, 8th Eroii Sanitari Blvd., 050474, Bucharest, Romania

[3]Prof. Dr. D. Hociota Institute of Phonoaudiology and Functional ENT Surgery, 21st Mihail Cioranu Str., 050751,Bucharest, Romania

[4]Gen. Dr. Aviator Victor Anastasiu National Institute of Aeronautical and Space Medicine, 88th Mircea Vulcanescu Str., 010825, Bucharest, Romania

[5]Ovidius University, Faculty of Medicine, Universitatii Str., 900470, Constanta Romania

The pharyngeal tonsil is a lymphatic tissue mass located in the roof of the nasopharynx. The function of the pharyngeal tonsil is to prevent infections with the help of antibodies. Chronic inflammation and allergies lead to hyperplasia of the adenoids that is found almost exclusively in children. The treatment of choice is surgical treatment; conservative treatment is only indicated preoperatively or if surgery is contraindicated. In this paper, we will present a new surgical method for adenoidectomy performed trans-orally with coblation, under endoscopic control.

Keywords: nasopharynx, adenoids, coblation

The pharyngeal tonsil, or the adenoid, along with the tubal tonsils, the palatine tonsils and the lingual tonsil form Waldeyer's ring[1].

The pharyngeal tonsil is a lymphatic tissue mass located in the roof of the nasopharynx, above and behind the uvula. Histologically it consists of a layer of ciliated epithelial cells covered by mucus. The cilia move constantly and propel the mucus to the pharynx and from there the mucus is swallowed and sent in the stomach. The role of the mucus is to carry the infectious agents or dust particles inhaled through the nose in the pharynx where there is a more resistant epithelium. To replenish the mucus blanket, the nasopharyngeal tonsil also contains glands that secrete mucus [1,2].

The development of the adenoid starts in the embryonic life, after the 16th week. After birth the enlargement process begins until the age of 5 to 7 years. After the age of 7 the pharyngeal tonsil starts to decrease and by puberty they it is almost completely gone [3-5].

The function of the pharyngeal tonsil is to prevent infections with the help of antibodies [4].

Chronic inflammation and allergies lead to hyperplasia of the adenoids that is found almost exclusively in children. The main causative organisms are Streptococcus pneumoniae, Haemophilus influenzae, Streptococcus type A or viruses [6,7].

During childhood the size of the oro-nasopharyngeal space is not fully developed and enlarged adenoids can lead to problems that affect the quality of life [7].

The main symptoms of chronic adenoiditis are: nasal obstruction, mouth breathing, sleep disorders, snoring, obstructive sleep apnea, mucopurulent rhinorrhea, reduced smell ability, lack of appetite, delayed development [8].

Hyperplasia of the adenoids can also cause a series of complications like sinusitis, purulent rhino-pharyngitis, otitis media caused by blockage of the Eustachian tube, gothic palate with malocclusion and dryness of the oral and pharyngeal mucosa due to moth breathing [8].

The diagnostic procedures include inspection, physical examination of the ear, nose and throat and hearing tests. Children with adenoid faces usually have a pale skin, with open mouth and sunken eyes. The examination of the ear reveals a retracted tympanic membrane that can be accompanied by middle ear effusion. Mucopurulent secretions can be found in the nasal cavity. Examination of the oral cavity can show gothic palate, tonsillar hyperplasia, secretions on the posterior wall of the pharynx [8].

The examination of the nasopharynx can be performed through posterior rhinoscopy or nasal endoscopy. These procedures reveal the shape, dimensions and aspect of the adenoids [8].

The treatment of choice for chronic adenoiditis is surgical treatment, conservative treatment is only indicated preoperatively or if surgery is contraindicated. The conservative treatment uses antibiotics, decongestant nose drops and immunostimulants. The surgical treatment was usually the curettage of the adenoids using the adenoid curette. Nowadays with the improvement of medical devices new methods of adenoidectomy are available [9].

In this paper we will present a new surgical method for adenoidectomy performed trans-orally with coblation, under endoscopic control.

Experimental part

Although adenoidectomy is a common surgical procedure in ENT pediatric surgery, it is associated with many complications [10].

In the last years different techniques were developed to reduce risks and morbidity [10,11].

Coblation is a new technology that can be used in ENT pediatric surgery for adenoidectomy and tonsillectomy. It is minimally invasive and it reduces intraoperative and postoperative complications like blood loss, nasal regurgitation, permanent change of voice, leasions to nearby structures like torus tubaris, incomplete excision of the adenoid tissue [11].

Coblation is a non-heat, minimally invasive technology used for dissection, ablation of tissue and coagulation by using radiofrequency energy combined with saline solution [12].

**email: irinaroshu@yahoo.com; Phone: 0040721241122*

All authors have contributed equally to this paper

Saline solution represents the conductive medium. When the radiofrequency energy passes through it, the saline solution breaks into ions [13]. The ions form a plasma field that dissociate the soft tissue's molecular bonds causing its dissolution. The plasma has only a chemical effect, not a thermal one [12].

Tissue temperatures while using coblation are approximately 40º- 70º C, the heat being dissipated in the process [14].

The reduced thermal effect leads to no damage on the surrounding tissues, less pain and faster recovery [14].

The components of the coblation system are the radiofrequency generator, the foot pedal, the irrigation system and the wand. For adenoidectomy we use a wand especially designed for oropharyngeal surgery with suction, ablation and coagulation features [15].

In our clinic we perform chemical ablation of adenoids under endoscopic control. We use the 70º rigid endoscopic tube trans-orally or the 0º one trans-nasal.

Further, we will present our approach regarding coblation adenoidectomy.

The surgical procedure is performed under general anesthesia with the patient in a head up position. A special mouth gag designed for pediatric usage is placed to keep the oral cavity open. The soft palate needs to be retracted by inserting two Nelaton tubes through the nasal cavity and getting them out through the oral cavity, to allow better visualisation of the nasopharynx. We used the 70° endoscopic rigid tube trans-orally for a better view of the adenoid tissue (fig. 1).

Afterwards, coblation of the adenoids was performed until the prevertebral fascia became visible. In other patients instead of the 70° endoscopic rigid tube, we used the 0° nasal rigid endoscope, and the coblation was also performed trans-orally (fig. 2, fig. 3).

After the surgery there was minimum bleeding, less pain for the patient and no complications were noticed.

By using the endoscopic control, the entire adenoid tissue was removed even behind the tubal orifices with no injuries of the nearby anatomical structures. Because coblation is a smoke-free procedure, the surgical field was better visualised by the surgeon which led to an increased intra-operatory comfort and performance.

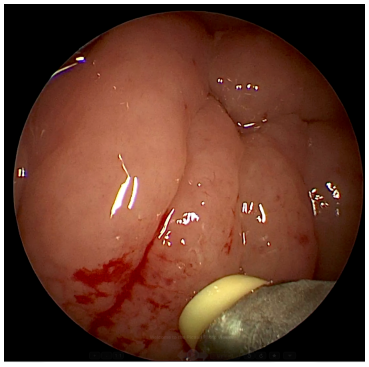

Fig. 1. 70° endoscopic tube view of adenoid tissue

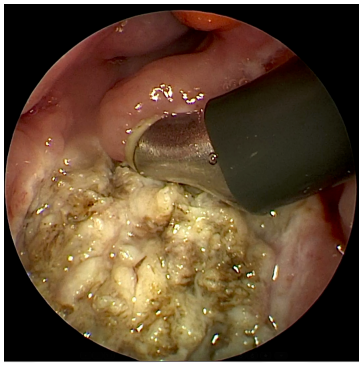

Fig. 2. Intraoperative picture, during turbinate coblation, with no hemorrhage and surrounding tissue damage

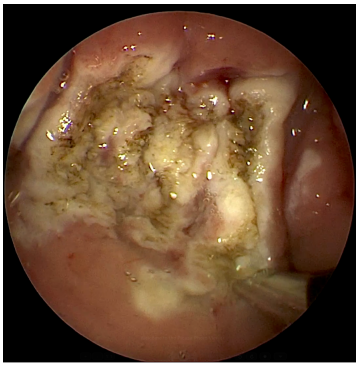

Fig. 3. Intraoperative view, after coblation of the adenoid tissue

Results and discussions

The treatment of choice for children with hypertrophic adenoids is surgery. In time, a series of techniques were developed to aid the surgeon, to increase the comfort and performance of the surgical treatment.

The use of coblation increased because of its multiple advantages and functions. The functions include ablation, coagulation, suction and irrigation.

Due to these functions, complications and morbidity were reduced.

Intraoperative bleeding was reduced which led to a better view of the surgical field [16].

Being a non-heat technology, no damage to the surrounding tissue was done, and there were no tissue burns.

Performing coblation under endoscopic control increases visibility allowing the surgeon to remove all adenoid tissue even near the tubal orifices without injuries to the near anatomical structures.

The healing process is faster with less pain, no postoperative complications and less hospital stay[17].

Although coblation has many advantages, there are also some disadvantages like the costs of the wands and the need for a specific learning curve in coblation and pediatric endoscopic surgery.

Conclusions

We consider adenoid coblation to be a safe and advantageous surgical method with superior results compared to the classical approach.

The technology is easy to use, it provides minimal damage to surrounding tissues which leads to a faster recovery of the patient with less pain and scarring.

Other advantages of this minimally invasive surgery are less hemorrhage both intraoperative and postoperative, the absence of toxic smoke and decrease of surgical time.

By combinig coblation with endoscopy, we increased the visibility of the surgical field allowing the surgeon to visualise better the adenoid tissue as well as the anatomical landmarks ensuring the complete removal of tissue that leads to the absence of recurrences.

These are the reasons why we consider coblation a top choice for the ablation of the hypertrophic adenoids.

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