

Postoperative Complications Following Endoscopic-Assisted Coblation Adenoidectomy in Maldivian Children: A Retrospective Review

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Abstract



Background

Endoscopic-assisted coblation adenoidectomy is a surgical procedure that uses a Coblation wand under endoscopic guidance to remove adenoid tissue. It utilizes radiofrequency energy to create a plasma field that gently dissolves and remove adenoid tissue. An endoscope provides better visualization during the procedure. It is an alternative to traditional curettage adenoidectomy offering potential benefits like reduced intra-operative bleeding, less post operative pain. While generally safe, potential risks include bleeding, infection, damage to surrounding structures. The objective of this study is to identify the prevalence of complications after endoscopic-assisted coblation adenoidectomy and to assess safety of the procedure in the paediatrics patients.

Methods

This is a retrospective chart review conducted in ENT department, ADK Hospital, Maldives, who underwent endoscopic-assisted coblation adenoidectomy from March 2024 to May 2025. A total of 232 pediatric patients were included in the study.

Results

We noticed major complications in 6% of cases including one case of primary haemorrhage(0.4%), three cases of secondary haemorrhage(1.2%), five cases of acute sinusitis(2%), two cases of dental subluxation(0.8%), two cases of acute otitis media(0.8%) and one case of temporary velopharyngeal insufficiency(0.4%).

Conclusions

Life-threatening complications after endoscopic-assisted Coblation adenoidectomy are rare and is considered to be a relatively safe and minor procedure.

Keywords: Coblation adenoidectomy; Primary haemorrhage; Adenoid hypertrophy.

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Introduction

Adenoid surgery, also known as adenoidectomy is the surgical removal of lymphoid tissue present in the nasopharynx. The adenoids are midline structures situated on the roof and posterior wall of the nasopharynx [1]. Adenoid hypertrophy is often seen in the children between age 1 to 6 years and can be a problem even in older children and adults. Adenoid hypertrophy can lead to upper airway obstruction and recurrent upper airway infection. Untreated adenoid hypertrophy can lead to serious conditions such as maxillofacial anomalies, pulmonary hypertension and cor-pulmonale [2]. Adenoidectomy either alone or with tonsillectomy and tympanostomy tube insertion is considered most frequently performed procedure in pediatric otorhinolaryngology in the world. There are many techniques of adenoid surgery currently utilized. Curettage, suction diathermy, laser, microdebrider and coblation technique are the preferred techniques. Curettage technique was widely used before, remained quite popular. However, it has various complications, such as incomplete removal, trauma to underlying tissues and hemorrhage [3]. Endoscope began to be utilized in adenoidectomy operations to ensure full removal of the adenoid bulk, achieve better hemostatic control with enhanced visualization and prevent possible damage [4]. Endoscopic-assisted coblation adenoidectomy is a surgical procedure that uses a coblation wand under endoscopic guidance to remove adenoid tissue. It utilizes radio-frequency energy to create a plasma field that gently dissolves and remove adenoid tissue. An endoscope provides better visualization during the procedure. It is an alternative to traditional curettage adenoidectomy offering potential benefits like reduced intra-operative bleeding, less post operative pain, faster recovery and improved eustachian tube function. While generally safe potential risks include bleeding, infection, damage to surrounding structures. Primary and secondary haemorrhages are major complications for all patient undergoing adenoidectomy. Primary haemorrhage is any bleeding during the procedure and within 24 hour of

surgery. This is considered rare during endoscopic assisted Coblation adenoidectomy and occurs in 0.4 percent of cases according to the literature. Significant delayed bleeding is not observed with endoscopic assisted coblation adenoidectomy. Dehydration and emesis can be alarming in paediatric patients because of their reduced haemodynamic reserves [5].

Major other complications mentioned in the literature after adenoid surgery include velopharyngeal insufficiency, nasopharyngeal stenosis, atlantoaxial subluxation, mandibular condyle fracture, regrowth of adenoid and chronic eustachian tube dysfunction [6] Eustachian tube dysfunction might be due to surgical trauma, edema in the surrounding tissues and clots in the early post operative period following curettage adenoidectomy. *Di Rienzo Businco et al.* [8] reported that coblation adenoidectomy, compared with cold curettage, has the advantages of decreased intra- and postoperative bleeding, better safety, precise tool for adenoid removal and less injury to the adjacent tissues. *Ozkırıs et al.* [9] reported that the coblation technique provides a less-bleeding at surgical bed but a longer operation time when compared to the curettage technique.

Minor complications of adenoidectomy according to the literature may be nausea and vomiting, bad breath, throat pain, ear-ache, torticollis, bruise and swelling of uvula, minor injuries to soft palate, tongue and lips, temporary difficulty in swallowing, temporary change in voice, mild fever, dehydration, nose bleeding, crusting and nasal congestion. Our aim of this work is to identify the prevalence of complications after endoscopic-assisted coblation adenoidectomy and to assess safety of the procedure in the paediatrics patients.

Methods

This is a retrospective chart review conducted in ENT department, ADK Hospital, Male, Maldives. Permission was taken from the authority before analysis of patient chart as there was no formal institutional review board. We evaluated chart of patients who underwent endoscopic-assisted

coblation adenoidectomy from March 2024 to May 2025. Total of 232 pediatric patients with severe adenoid hypertrophy with or without obstructive sleep apnoea were taken into the study. All procedures were performed by senior consultant ENT surgeon at ADK hospital, Male, after obtaining informed consent from the patient party. ADK hospital is one of the tertiary referral hospitals at capital city of Maldives. Patients from all the other islands are being referred to this hospital. Older technique like curettage method is not being utilized here because of high rate of remnant adenoid tissue and bleeding which could be troublesome especially in pediatric patients. Age of the patients was from 18 months to 14 years. Significant symptomatic chronic adenoid hypertrophy (endoscopic grade-3, grade-4) with one or more of the following symptoms- sleep apnoea or sleep disordered breathing, adenoid facies, delayed and defective speech, halitosis, mouth breathing, recurrent history of URTI, recurrent otitis media with effusion, were included in the study. Exclusion criteria was pediatric patients under 18 months, having history of recurrent tonsillitis or tonsillar hypertrophy requiring adenotonsillectomy or tonsillectomy, having significant nasal obstruction due to other causes such as septal deviation, hypertrophied inferior turbinates or nasal polyps, patients with congenital nasal or maxillofacial anomalies such as cleft lip and palate, choanal atresia, retrognathia or macrognathia, or patients with bleeding or coagulation defects.

Detailed history taking, clinical examination of oral cavity, anterior nose and otoscopy of the patient was analyzed to exclude or include the in the study. Diagnosis was confirmed by X-ray nasopharynx-lateral view or fiberoptic nasopharyngoscopy or CT scan. Adenoid size was graded pre-operatively using 2.7 mm flexible (Karl Storz, Germany) endoscope. Endoscopic grading of adenoid size is as following: if only upper part of nasopharynx occupied by adenoid mass was classified as grade 1 ($\leq 25\%$) (free choanae). If adenoid tissue occupied equal or less than 50% of nasopharynx with sufficient choanal opening and sufficient tubal visualization was

classified as grade-2. If adenoid tissue occupies about 75% of the nasopharynx with partial involvement of the tube ostium and considerable obstruction of choanal openings was classified as grade-3. If adenoid tissue reaches the lower choanal border without allowing visualization of the tube ostium ($>75\%$) was classified as grade 4. Tympanometry was done in to exclude otitis media with effusion.

Surgical Technique and Post Operative Care

Patients were subjected to general anesthesia via an orotracheal tube, placed in supine position, Boyle Davis mouth gag was inserted as in tonsillectomy, Draffin's bipod placed to hold the Boyle Davis mouth gag, head end kept slightly lower than the neck. An infant feeding tube or small sized red rubber catheter was passed from both side of nostril and taken out from oral cavity to retract back the soft palate. Bilateral nasal cavity was decongested using cotton pledgets soaked in 1:1 diluted, 1:1000 adrenaline or 0.05 percent oxymetazoline. A 0° 2.7 mm, 18 cm pediatric Hopkins rod endoscope was passed from either side of nasal cavity to visualize nasopharynx. The size of the adenoid was assessed and the border to be reached is identified. The coblator wand (procise max) slightly bent and passed through oral cavity into the nasopharynx. Coblator II setting was kept as 4/9 for coblation and coagulation respectively. Foot pedal ablation is activated when the wand is close to the the adenoids, avoiding direct contact. The adenoidectomy was started high in the nasopharynx from upper limit of adenoid tissue, which often can not be reached by conventional curette. Resection was continued from one side to another side on an even level until the inferior edge of adenoid pad would be reached. The ablation, coagulation and aspirating action of the wand and simultaneous irrigation removes both adenoid tissue fumes and the blood, thus providing a clear view. Hemostasis achieved with coagulation mode and rarely by using cottonoid soaked in 1:1000 (1:1 diluted) adrenaline. Check endoscopy was done to see if any adenoid tissue left and to assure complete hemostasis. Operative time, amount of blood loss

and intra-operative complications recorded. For the post operative care, child was kept in the recovery room for 2 hours and then shifted to general ward for 22 hours. Injectable amoxycillin/clavulanic acid, paracetamol, antiemetic, oxymetazoline nasal drop were routinely given to all patients till 24 hours. Child was discharged for home after 24 hours as protocol. Patient were called for review after 1 week and then after 6 weeks. Post operative complications were monitored throughout the hospital stay and up to 6 weeks post operation.

Data was collected from all 232 patients and analyzed using SPSS software package for the social sciences, version 20. Frequencies and percentages were generated for categorical variables

Results

A total of 232 pediatric patients were included in our study. 56.5% were males and 43.5% were females. (Table- 1A) The mean age was 9.03 years, 12.5 % were under 3 years old, 19% were between 3-5 years and 68.5% were between 5-14 years old. Pre-operatively 30% had grade III, 70% had grade IV size of adenoid, 82% of patient had otitis media with effusion(type B tympanogram),69% suffered from sleep apnoea, 98% had allergic rhinitis. 80% had bad breath, 6.5% had adenoid facies, 19% had hypo- nasal speech, 52 % had recurrent history of URTI.All the children were used to breathe from mouth (Table 1).

Table 1. Clinico demographic characteristics of the patients

Variable	n (%)
Age	
18 months-3 years	27 (12.5%)
3 years-5 years	66 (19%)
5 years-14 years	139 (68.5%)
Gender	
Male	131 (56.5%)
Female	101(43.5%)
Obstructive Sleep Apnoea	
Yes	161 (69%)
No	71 (31%)
Halitosis	

Yes	187 (80%)
No	45 (20%)
Cough	
Yes	203 (87%)
No	31 (13%)
Adenoid facies	
Yes	15 (6.5%)
No	330 (93.5%)
Adenoid size	
Grade 3	70 (30%)
Grade 4	162(70%).
Allergic rhinitis	
Yes	228(98%)
No	4(2%)
Otitis media with effusion	
Present	189 ((82%)
Absent	43(18%)
Recurrent URTI	
Yes	120 (52%)
No	112(48%)
Hypo nasal speech	
Yes	44(19%)
No	188(81%)
Mouth breathing	
Yes	232(100%)
No	0.00%

We noticed major complications in 6% of cases and none of them were life-threatening. We observed one case of primary intra-operative haemorrhage (0.4%), three cases of secondary haemorrhage (1.2%), five cases of acute sinusitis (2%), two cases of dental subluxation (0.8%), two cases of acute otitis media (0.8%) and one case of temporary velopharyngeal insufficiency (0.4%).The prevalence of primary haemorrhage was 0.4% (1/232). Few drops of bleeding from the nose happened in 7th-9th post operative day which was regarded as secondary hemorrhage (Table 2).

We noticed bruising and swelling of the uvula in 81% patients, minor burn in lips in 0.8%, minor burn of soft palate by coblator in 4%, nausea and vomiting in 10%, mild fever (<100 degree F) in 0.8%, ear pain in 5%, minor nose bleeding in 2%, halitosis in 8%, sore throat in 27% and in 39%, we

Table 2. Major complications of patients

Major complications	n (%)
Primary haemorrhage (Intra-operative and <20 ml)	1(0.4%)
Secondary haemorrhage (few drops only)	3(1.2%)
Regrowth of adenoid	Could not be assessed
Velopharyngeal insufficiency(temporary)	1(0.4%)
Atlantoaxial subluxation	0(0.0%)
Emotional trauma	0(0.0%)
Chronic Eustachian tube dysfunction	0(0.0%)
Nasopharyngeal stenosis	Could not be assessed
Dental subluxation	2(0.8%)
Acute Sinusitis	5(2%)
Acute Otitis media	2(0.8%)
noticed crusting of nose and nasal congestion (Table 3).	

Table 3. Minor complications of patients

Minor complications	n (%)
Minor burn in lips	2(0.8%)
Swelling of uvula and bruising	190(81%)
Minor burn in soft palate and uvula	10(4%)
Mild fever	2(0.8%)
Foreign body in throat	0(0.0%)
Early nose bleeding (few drops)	4(2%)
Crusting of nose and nasal congestion	91(39%)
Ear pain	12(5%)
Nausea and vomiting	24(10%)
Dehydration	17(7%)
Bad breath	18(8%)
Sore throat	62(27%)
Temporary dysphagia	5(2%)
Temporary change in voice	7(3%)
Neck pain and torticollis	6(2.5%)
Running nose	13(5.6%)

Discussion

There are many methods for adenoidectomy but for the purpose of our study, we took patients who underwent endoscopic-assisted coblation adenoidectomy. The aim of our study was to determine the prevalence of post adenoidectomy complications. In our study, prevalence of primary haemorrhage was observed in 1 case out of 232

patients (0.4%) and that too was noticed during the procedure. Secondary haemorrhage occurred in 3 cases (1.2%).The intra-operative haemorrhage was stopped with coagulation, secondary haemorrhage subsided with decongestant nasal drop and antibiotics. None of the patients required readmission and second operation. Ear and sinus infection were treated with antibiotics. Dental

evaluation and treatment was done for dental injury. Those results are similar to the study by *Richmond et al.* [6] and *valtonen et al* [7]. We did not noticed other complications like adenoid remnant, injury to muscles of posterior pharyngeal wall, injury to Eustachian tube orifice that were noticed in many other studies. Regrowth of adenoid tissue is also a potential concern following adenoidectomy. In a large study of over 10,000 adenoidectomies, it was found that the rate of revision adenoidectomy was 1.5% and children under 5 years of age were 2.5 times more likely to have a revision(second) adenoidectomy [10].

In our study, we could not assess regrowth of adenoid tissue and stenosis of nasopharynx due to limited follow up period which was 6 weeks post op only. Post operatively, children were playful and were normally eating soft diet 4 hours after the procedure, had minimum pain and wished to be discharged on the same day of operation. In general, parents were satisfied with the immediate outcome of the operation. Notably, we noticed few incidence of minor post operative complications that were of little significant in terms of hospital stay, management, morbidity and mortality of the patient. Although many articles and studies have mentioned the prevalence of major and life threatening complications such as major bleeding requiring readmission and second surgery for hemostasis, we did not noticed any life threatening complications after endoscopic assisted coblation adenoidectomy.

Limitations

Large sample size and multiple studies are to be conducted to reach into conclusion at statically significant level.

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Conclusions

Life-threatening complications after endoscopic-assisted coblation adenoidectomy are rare and it is considered to be a relatively safe and minor procedure.

Recommendation

On the basis of findings, generalize the study to different settings.

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Authors' Contributions

Conceptualization: DG, MLA, KKG, PS

Data curation: DG, MLA, KKG, PS

Formal analysis: DG, MLA, KKG, PS

Investigation: DG, MLA, KKG, PS

Methodology: DG, MLA, KKG, PS

Writing-Original Draft: DG, MLA, KKG, PS

Writing-Review & Editing: DG, MLA, KKG, PS

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