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Original Research Article

Endoscopic coblation adenoidectomy and conventional adenoidectomy: a comparative study

Shilpa V.*, Suresh Kumar M., Gopakumar Parameswaran

Department of Otorhinolaryngology, KIMS Health, Trivandrum, Kerala, India

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***Correspondence:**
Dr. Shilpa V.,
E-mail: shilpa31993@gmail.com

ABSTRACT

Background: Adenoidectomy is most common paediatric surgical procedures. Commonly used methods for adenoidectomy are conventional curettage adenoidectomy and endoscopic coblator assisted adenoidectomy. The technique of coblation adenoidectomy has considerable influence on the duration of surgery, the blood lost intra operatively, pain on the first postoperative period.
Methods: Sample selected for study were children of age group 3 to 11 years attending ENT OPD with clinical signs of adenoid hypertrophy, who underwent adenoidectomy during the time period from October 2019 to June 2021. We compared the efficacy of ECA with CCA based on the intra-operative (operative time and bleeding) and post-operative parameters (pain on the first post operative day).
Results: Our study revealed that intra operative bleeding was more in CCA compared to ECA ($p<0.001$). ECA took more operative time than CCA group ($p<0.001$). Pain on the first post-operative day was more in CCA than ECA.
Conclusions: Primary objective was comparison of intra operative bleeding among both groups and the outcome was blood loss in ECA was less than CCA. Secondary objective was comparison of operative duration and pain on the first post-operative day and the outcome was, operative duration was less in CCA and pain in the first post-operative day was more in CCA. Our conclusion is that ECA was efficient on the basis of intra operative blood loss and post- operative pain in the first day. CCA was effective in operative duration.

Keywords: Conventional adenoidectomy, Endoscopic coblation adenoidectomy, Intraoperative bleeding, Post-operative pain, Operative time, VAS

INTRODUCTION

The nasopharyngeal tonsil or adenoid is a part of waldeyer's ring and is situated at the junction of the roof and posterior wall of the nasopharynx. Adenoid is subjected to physiological enlargement in childhood. Recurrent attacks of rhinitis, sinusitis, chronic tonsillitis or allergy of the upper respiratory tract may cause chronic adenoid infection and hyperplasia.[1] Adenoid hypertrophy is one of the most common diseases in otorhinolaryngological practice. It causes snoring, mouth breathing, nasal obstruction, voice change, recurrent sinusitis. It also causes eustachian tube obstruction, recurrent attacks of acute otitis media and later leads to chronic (C/C) otitis media. C/C adenoiditis can act as a septic focus for repeated respiratory infections. These all may affect a child's quality of life.[1] Studies have revealed that adenoid hypertrophy causing chronic airway obstruction can even lead to cor pulmonale.[2] Adenoidectomy is one of the most common paediatric surgical procedures. Commonly used methods for adenoidectomy are conventional curettage for removing

adenoids and endoscopic coblator assisted adenoidectomy. Conventional curettage for removal of adenoid is to take a curette and scrape the adenoid tissue in the nasopharynx. The coblator works on the principle of controlled ablation which causes disintegration of cells molecule by molecule causing volumetric reduction of tissue. This technique of coblation adenoidectomy has considerable influence on the duration of surgery, the blood lost intra operatively, pain in the postoperative period, the time taken for recovery in the postoperative period and the complete removal of adenoid tissue.[3] In this study we compared the efficacy of endoscopic coblation adenoidectomy (ECA) with conventional curettage adenoidectomy (CCA).

Objectives

Our primary objective was difference of intra operative blood loss in conventional and endoscopic coblation adenoidectomy. Secondary objectives were difference between conventional and endoscopic coblation adenoidectomy in, operative duration and post-operative pain in the first post-operative day

METHODS

Study design, location, duration and population

A prospective, observational study was conducted at KIMS health, Thiruvananthapuram, Kerala on Children in the age group of 3 to 11 years attending ENT OPD with clinical signs of adenoid hypertrophy from October 2019 to June 2021,

Inclusion and exclusion criteria

Inclusion criteria were; age group of 3-11 years with symptoms of adenoid hypertrophy such as snoring, mouth breathing, earache and adenoid hypertrophy confirmed by radiological investigation or diagnostic nasal endoscopy. Exclusion criteria were; Previous history of surgery for adenoidectomy, Bleeding disorders, Non consenting parents and Cases with cleft palate or previous history of cleft palate repair

Methods of measurement and outcome of interest

Children attending ENT outpatient department with complaints suggestive of adenoid hypertrophy and satisfying the inclusion criteria were enrolled in the study after obtaining verbal consent from the parents. At first I took the detailed history regarding the disease along with physical examination. Adenoid hypertrophy was confirmed by X-ray soft tissue lateral view or DNE. To do adenoidectomy conventional method and endoscopic coblator assisted method were used commonly in our hospital. Patients opting for respective surgery were grouped accordingly. In the conventional technique, adenoidectomy was done by using the adenoid curette. In the endoscopic coblation assisted technique, endoscope was used along with a coblator to shave off the adenoid tissue.

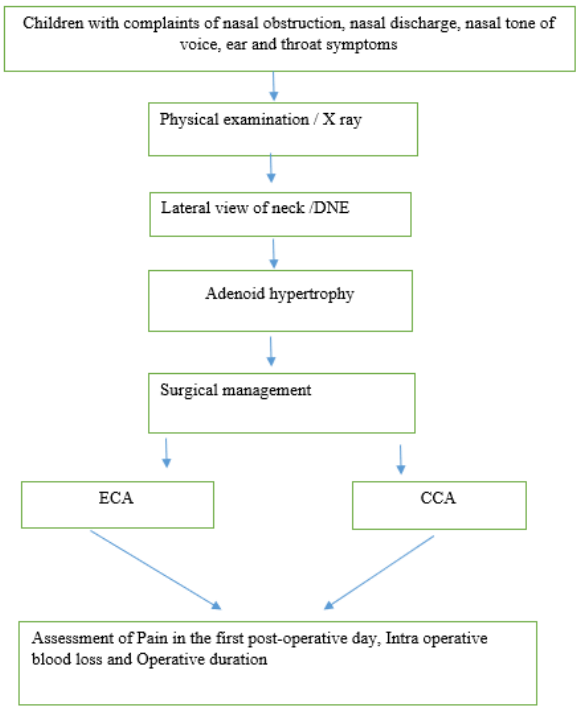

Figure 1: Procedure.

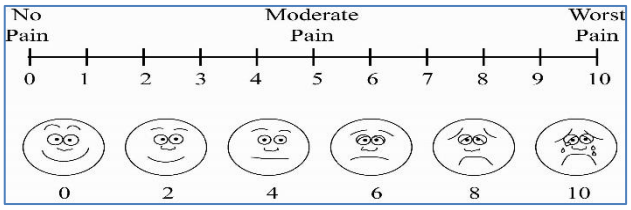

Figure 2: Visual analogue scale.

Surgery was performed by the consultant and I observed the intra-operative and post-operative parameters. Intra operative parameters include operative time and intraoperative bleeding. Post-operative parameter includes assessment of post-operative pain in the first post-operative day. I calculated the intra operative time from the time patient was handed over by the anaesthetist and include setting up of instruments, operative steps, packing and securing the bleeding. The measurement ended when the patient was handed back to the anaesthetist. Then I have compared the total time taken for both groups. In case of conventional adenoidectomy I measured the intra operative bleeding by counting the number of three square inch gauze which was soaked with blood and each gauze was assumed to a corresponding blood loss of 10ml and whatever blood come into the suction apparatus. In case of endoscopic coblator assisted adenoidectomy it was assessed by amount of fluid in the suction apparatus minus amount of irrigating solution. Assessment of post-operative pain in the first post-operative day by using visual analogue score (VAS) was done.[4] I visited the ward

and met the child and enquired the level of pain on the first post-operative day (24 hrs after surgery) and noted down by observation based on VAS score. All data were entered into MS Excel and analysed using the statistical software SPSS version 16.0. Descriptive statistics was summarized using means with standard deviations for continuous variables, frequency and percentages for categorical variables. The distributions were examined using histograms. An independent t test was used for comparing the intra operative blood loss, operative duration and post-operative pain on the first day, p value less than 0.05 were considered statistically significant. All patients were enrolled only after taking informed consent.

RESULTS

Among the study population, 27.5% were between 3-5 years of age, 35% between 6-8 years of age and 37.5% were between 9-11 years of age.

Table 1: Comparison of intra operative blood loss.

Intra operative blood loss	CCA		ECA	
	N	%	N	%
10-15	0	0	18	90
16-20	9	45	2	10
21-25	5	25	0	0
26-30	3	15	0	0
31-35	2	10	0	0
36-40	1	5	0	0
Total	20	100	20	100

Table 2: Statistical comparison of intra operative blood loss.

Groups	CCA	ECA	P value
Intraoperative blood loss	Mean±SD	Mean±SD	0.000
	25.25±6.172	13.25±3.354	

Total 42.5% were classified into Clemens and Mcmurray grade 2 and 57.5 % were grade 3. In CCA group, 45% of children had intra operative blood loss between 16-20 ml, 25% between 21-25 ml, 15% between 26-30 ml, 10% between 31-35 ml and 5% had 36-40 ml. mean±SD was 25.25±6.172.

Table 3: Comparison of operative duration.

Operative duration (hrs)	CCA		ECA	
	N	%	N	%
15-20	19	95	0	0
21-25	1	5	0	0
26-30	0	0	8	40
31-35	0	0	7	35
36-40	0	0	3	15
41-45	0	0	1	5
46-50	0	0	1	5
Total	20	100	20	100

Table 4: Statistical comparison of operative duration.

Groups	CCA	ECA	P value
Operative duration	Mean±SD	Mean±SD	0.000
	17.10±2.174	33.6±5.679	

Table 5: Comparison of post-operative pain.

Post-operative pain score	CCA		ECA	
	N	%	N	%
2-3	2	10	9	45
4-5	17	85	11	55
6-7	1	5	0	0
Total	20	100	20	100

Table 6: Statistical comparison of post operative pain.

Groups	CCA	ECA	P value
Post-operative pain	Mean±SD	Mean±SD	0.009
	4.2±0.768	3.6±0.598	

In ECA group, 90% had blood loss between 10-15 ml. Only 10% had blood loss between 16-20 ml. Mean±SD was 13.25±3.354. P value is <0.001. Hence the statistical analysis is significant. ECA is more efficacious than CCA in case of intra operative blood loss. CCA group, in 95% of the patient surgery ended between 15-20 min and in 5% between 21-25 min. mean ±SD was 17.10± 2.174 ECA group, in 40% of the patient surgery ended between 26-30 min, 35% between 31-35%, 15% between 36-40 min, 5% between 41-45 min and another 5% between 45-50min. Mean±SD was 33.6±5.679. P value is <0.001. Hence the statistical analysis is significant. CCA is more efficacious than ECA on the basis of operative duration. In CCA group 85% of the child had score between 4-5, 10% between 2-3 and 5% between 6-7. Mean±SD was 4.2±0.768. In ECA group 55% had pain score between 4-5 and 45% between 2-3. Mean±SD was 3.6±0.598, p value is <0.05. Hence the statistical analysis is significant. ECA is more efficacious than CCA on the basis of pain on the first post-operative day.

DISCUSSION

We conducted a study to compare the efficacy of ECA with CCA among 40 children between 3-11 years of age with adenoid hypertrophy. 27.5% of children were in an age group of 3-5 years, 35% between 6-8 years and 37.5% between 9-11 years. 62.5% of them were males and 37.5% were females. Adenoid hypertrophy was diagnosed by x ray and diagnostic nasal endoscopy and which was graded by using Clemens and Mcmurray grading system.57.5% were in grade 3 and rest of them was in grade 2. In our study primary objective was to compare the intra operative blood loss in ECA and CCA. In case of CCA we measured intra operative bleeding by counting the number of three square inch gauze which was soaked with blood and each gauze was assumed to a corresponding blood loss of 10ml

and whatever blood come into the suction. In case of ECA it was assessed by the amount of fluid in the suction minus amount of irrigating solution. In CCA group, 45% of children had intra operative blood loss between 16-20 ml, 25% between 21-25 ml, 15% between 26-30 ml, 10% between 31-35 ml and 5% had 36-40 ml. mean±SD was 25.25±6.172. In ECA group, 90% had blood loss between 10-15 ml. Only 10% had blood loss between 16-20 ml. Mean ±SD was 13.25±3.354, p value is <0.001 hence this is statically significant. From the observation, it showed that ECA technique is more efficacious than CCA based on intra operative blood loss.

In a study conducted by Rohan bidaye et al[(5)]in two groups with 30 patients each found that in a CCA, the average blood loss was 44.33 mL, but in an ECA, the average blood loss was 32.47 mL. They concluded that ECA is more effective than CCA in terms of operative blood loss. Mahmut Ozkiris et al conducted a study to compare efficacy of adenoidectomy techniques and they concluded that intraoperative blood loss in coblation group offered lesser bleeding when compared to curettage techniques.[6] Another randomized study conducted by Vijayakrishnan et al for children with OSA compared conventional and coblation adenotonsillectomy.[7] 50 children with OSA were randomly selected and were subjected to either of the technique. They compared the surgical procedures on the basis of intra operative blood loss, and found that intraoperative blood loss was more in the conventional group. In a study El Tahan et al found that compared to CCA intraoperative blood loss is less in ECA.[8] All these studies were correlating with our study finding that the ECA had less intraoperative blood loss than CCA. Our secondary objectives were to compare operative duration and post-operative pain on the first post-operative day. Operative duration was calculated by noting the time patient handed over by the anaesthetist and include setting up of instruments, operative steps, packing and securing the bleeding. The measurement ended when the patient was handed back to the anaesthetist. Then I compared the total time taken for both groups. CCA group, in 95% of the patient surgery ended between 15-20 min and in 5% between 21-25 min. mean±SD was 17.10±2.174. In ECA group, in 40% of the patient surgery ended between 26-30 min, 35% between 31-35%, 15% between 36-40 min, 5% between 41-45 min and another 5% between 45-50min. mean±SD was 33.6±5.679 p value is <0.001 hence the study is statistically significant. Hence CCA is more effective than ECA on the basis of operative duration. Secaattin gulsen et al conducted a study they checked operative time between ECA and conventional adenoidectomy.[9] They found that the ECA group had a considerably longer mean operative time than the CCA group (p=0.001). In a study by Ferreira et al compared conventional adenoidectomy with micro debrider assisted and ECA.[10] They were assessed operative duration and found that in terms of process duration, the conventional approach had the shortest surgical time (p=0.05) when compared to the others. Datta et al conducted a comparative study of conventional versus endoscopic powered adenoidectomy.[11] The two groups were studied with regards to intra operative duration. The intra operative time in CCA varied from 22-29 min whereas in ECA from 27-55 minutes. All these studies were correlating with our study finding that the CCA had less operative duration than ECA. Assessment of post-operative pain in the first post-operative day done by using VAS.[4] In CCA group 85% of the child had score between 4-5, 10% between 2-3 and 5% between 6-7. Mean±SD was 4.2±0.768. In ECA group 55% had pain score between 4-5 and 45% between 2-3. Mean±SD was 3.6±0.598, p value is <0.05 so the study is statistically significant. Hence ECA is more efficient than CCA based on post-operative pain on the first post-operative day. Chauhan et al conducted a prospective randomized control study on 70 children.[12] They found that in compared to the conventional method, coblation adenoidectomy was found to have significant decrease pain and a faster return to normal nasal breathing. These data suggest that ECA is a safer, more effective alternative to the CCA. Businco et al conducted a study in adenoid hypertrophy patients.[13] The outcomes evaluated after surgery was pain score on the first day. They found that pain score is more in CCA. All these studies were correlating with our study finding that the ECA had less pain score than CCA. From this study we found that ECA was more efficacious than CCA in terms of intra operative bleeding and post-operative pain on the first post-operative day. CCA was more effective in terms of operative duration.

Limitations

This study not compared the recovery period, completeness of removal and recurrence of disease in both conventional and coblator adenoidectomy group. The study was conducted in different age groups and different grades of adenoid hypertrophy, hence this can cause difference in values.

CONCLUSION

Primary objective of our study was comparison of intra operative bleeding among both groups. In ECA blood loss was less than CCA. Secondary objective of this study were operative duration and pain on the first post-operative day. Operative duration was less in CCA. Pain on first post-operative day was more in CCA group. Hence ECA was more efficient than CCA based on intra operative blood loss and post-operative pain on the first day. CCA was more effective than ECA on the basis of operative duration.

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