Comparison of Perioperative Collateral Injury, Presence of Residual Adenoid Tissue and Recovery Time in Conventional Versus Microdebrider Assisted Endoscopic Adenoidectomy in Children Less than or Equal to 12 Years

Drishya Pradeesh[1], Archana Pillai R[2], Rajamma KB[3]

ABSTRACT

Introduction: Adenoids together with palatine tonsils tubal tonsils and lingual tonsil form the inner Waldeyer's ring and its enlargement depends on external factors such as allergy, immunosuppression, passive tobacco smoke but mainly chronic bacterial and viral infection. The study compares the effectiveness of certain factors in conventional curettage versus endoscopic adenoidectomy in a tertiary care centre in Trivandrum, Kerala, India. Study was done with the objectives to study the perioperative collateral injury, presence of residual adenoid tissue and recovery time in conventional versus microdebrider assisted endoscopic adenoidectomy in children less than or equal to 12 years.

Material and methods: An observational study was done in a group of 60 patients of age less than or equal to 12 years who satisfied the inclusion criteria who underwent treatment in department of ENT in Sree Gokulam medical college during a period of 2017 – 2018. Patients were grouped into 2 groups of 30 each. Group A underwent conventional curettage and group B underwent microdebrider assisted endoscopic adenoidectomy. Patients were followed up 1 week and 2 months following the procedure by post operative nasal endoscopy to assess collateral damage and residual adenoid tissue.

Results: The residual tissue in conventional adenoidectomy was 20% and 20 – 50% in 2 cases and more than 50% in 4 cases. This was the main cause of persistence of symptoms in conventional adenoidectomy. The mean recovery time was 4.1 days in conventional and 3.2 days in endoscopic adenoidectomy. In conventional adenoidectomy 3 cases (10%) had collateral damage in which 2 cases had injury to eustacian tube orifice and 1 case had injury to torus tubaris. In the endoscopic microdebrider assisted surgery no collateral damage was recorded.

Conclusion: The study showed that the completeness of dissection, collateral injury and recovery time was better in the endoscopic adenoidectomy compared to conventional curettage.

Keywords: Microdebrider, Endocopic Adenoidectomy, Conventional Adenoidectomy

INTRODUCTION

Adenoid is a part of inner waldeyers ring seen in the nasopharynx which attains maximum size physiologically by the age of 3 – 7 years and then regresses.[1] It becomes hypertrophied in chronic upper respiratory tract infections allergy etc and causes symptoms of snoring, mouth breathing, hyponasal speech, sleep disturbances, Eustachian tube obstruction and failure to thrive in children.[2] Adenoid hypertrophy causes chronic otitis media by causing mechanical obstruction to the Eustachian tube and also by acting as a significant reservoir of infection.[3] The bacteria and viral strains present in nasopharynx like streptococcus pneumoniae, hemophilis influenzae and Moraxella catarrhalis are very similar to those found in the middle ear cavity.[4,5] Chronic mouth breathing in adenoid hypertrophy causes the posterior displacement of tongue and mandible backwards and downwards causing 'adenoid facies' which is thin nose with hypoplastic maxilla narrow alveolus high arched palate crowded upper teeth short upper lip and open lip posture.[6,7,8] A study by Arnold et al 19 cases out of 1124 patients were found to have granulomas of adenoid of which 3 cases had nasopharyngeal carcinoma.[9] Nasopharyngeal tuberculosis has also been reported following radiotherapy for nasopharyngeal carcinoma, in HIV patients and also primary nasopharyngeal tuberculosis reported in 1 case.[10,11]

The clinical manifestation of adenoiditis maybe reversed readily with removal of adenoid tissue.[12] The most common method of adenoidectomy being trans oral removal of adenoid tissue blindly with St Clair Thompson's adenoid curette or adenotome.[13] This technique includes digital palpation of adenoid tissue and removal using a curette which is a rather blind technique. Hemostasis is achieved using post nasal packing. In such cases complete removal is difficult to determine[14] and also leads to inury of nasopharyngeal mucosa[15], eustatian tube scarring or remnant tissue becoming hyperplastic which inturn acts as a bacterial reservoir causing recurrence and persistance of symptoms.[12,16] Manoukian and Pearl in 1994 identified adenoid remnants in 4% post adenoidectomy cases following 'blind' techniques especially

[1]Junior Resident, Department of ENT, [2]Assistant Professor, Department of ENT, [3]Professor and HOD, Department of ENT, Sree Gokulam Medical College And Research Foundation, India

Corresponding author: Dr Archana Pillai, TC 27/1742, Pattoor Vanchiyoor Road, Vanchiyoor PO Trivandrum 695035, India

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near pharyngeal roof and near the torus tubaris, hence questioning the reliability of the digital palpation method.[17] So it was concluded that digital palpation is not a reliable method. Visualisation of nasopharynx during adenoidectomy is important for complete removal.[18,19]

In other methods like suction diathermy and Co2 laser it showed risk of burns and cicatrisation of surrounding tissue.[20,21,22] KTP 532 laser and electronic molecular resonance tools have shown to cause nasopharyngeal stenosis.[23,24] When using microdebrider few surgeons used post nasal mirror for visualising adenoids.[25,26] Joseph C Beck introduced a method to improve intraoperative visualisation by retracting the soft palate with a small catheter through nose.[27] With the development of fiberoptic and endoscopic instruments it allows for a complete removal of tissue under direct vision.

In cases of velopharyngeal insufficiency where lower part of adenoid needs to be preserved demands surgery with greater precision which is impossible with the conventional curettage and in such cases the microdebrider offers better control.[25,26] Stainslaw et al[26] found that use of microdebrider results in a more appropriate depth of dissection compared to too deep or too shallow dissection using the curette. Canon et al[16] popularised this endoscopic assisted adenoidectomy by calling it a natural progression of endoscopic technology for a more complete surgery. The rigid endoscope allows for good visualisation ensureing complete removal and no collateral damage also there is no need to extend the neck so can be used in patients where neck extension is contraindicated.[22]

Study was done with the objectives to study the perioperative collateral injury, presence of residual adenoid tissue and recovery time in conventional versus microdebrider assisted endoscopic adenoidectomy in children less than or equal to 12 years.

MATERIAL AND METHODS

The study design is observational and the study group is children less than or equal to 12 years in both sexes undergoing adenoidectomy with or without tonsillectomy in Sree Gokulam medical college and research foundation during the period of 2017 – 2018.

Inclusion criteria

1. Children less than equal to 12 years of age diagnosed with adenoid hypertrophy.
2. Children undergoing adenoidectomy with or without tonsillectomy
3. Children previously treated medically for adenoid hypertrophy

Exclusion criteria

1. Children who previously underwent adenoid3ecgtomy
2. Children who could not complete post operative follow up
3. Children not willing to be part of the study
4. Children with craniofacial abnormalities
5. Children with neuromuscular disorders

Study variables were operative time, collateral damage and presence of residual adenoid tissue. A profoma based patient evaluation was done pre operatively. Detailed history and thorough cinical examination was done along with a family history of bleeding or coagulation disorders. The diagnosis of adenoids is based mainly on clinical examination, imaging technique and endoscopy.

Hematological assessment was done with serology and chest Xray and Xray nasopharynx soft tissue lateral view. Acute infections were taken for surgery only after treating medically and waiting for atleast 2 weeks post remission.

In children less than 6 years radiographs of nasopharynx soft tissue view in lateral position with neck slightly extended. Assessment was by Fujiokas method[28] in children less than 6 years by adenoid to nasopharynx size ratio and graded as

Grade 1 0.3 to 0.5 small

Grade 2 0.5 to 0.7 medium

Grade 3 0.7 to 1.0 large

In children elder than 6 years in addition to Xray nasopharynx soft tissue lateral view, a nasal endoscopy was performed in children elder than 6 years with flexible fiberoptic nasopharyngoscope or 0 degree 4mm rigid endoscope this was graded as per Clemens and McMurrays classification[29]

Grade 1 adenoid tissue filling one third of vertical portion of choana

Grade 2 adenoid tissue filling one third to two thirds of choana

Grade 3 adenoid tissue filling two thirds to nearly complete obstruction

Grade 4 complete choanal obstruction

The parents of the children chose the mode of treatment whether endoscopic or conventional and children were grouped accordingly. A detailed consent was also taken.

Postoperative antibiotics given for 5 days discharged once fit and taking orally. Post operative assessment of residual adenoid tissue signs of postoperative infection and collateral injury was done using fiberoptic nasal endoscope 1 week and 2 months postoperatively.

Postoperative symptom relief was assessed using a detailed questionare with relief of mouth breathing, snoring, improvement of sleep pattern appetite school performance and hyperactivity. A cold spatula test was also done as a preliminary assessment.

RESULTS

30 cases from both group A and B were observed. In the conventional group 51.7% underwent adenotonsillectomy and 48.3%underwent adenoidectomy alone. In the endoscopic group 50% cases underwent adenoidectomy alone and 50% underwent adenotonsillectomy. Recovery time was the number of days required for the child to return to normal activities as judged by the child and parents during the follow up at 7 days.

Operative method

The conventional surgery group was placed in rose position with a Boyle Davis mouth gag fixed with Draffin bipod stand and a St. Clair Thompson adenoid curette with guard was used to curette out the tissue. Adenoids are not visualised but

blindly palpated by passing a finger under the soft palate and head is supported during curettage with the non dominant hand.

In microdebrider assisted adenoidectomy since it was not possible to pass both the endoscope and microdebrider blade through the small nose the child was kept in the roses position and 0 degree endoscope was passed through the nose (after using 4% xylocaine and 1 in 1 lakh dilution adrenaline packs) to visualise the adenoids and the microdebrider blade was passed through the mouth and carefully removing the remnants around Eustachian tube and superior part of nasopharynx. The microdebrider used was hummer model by stryker in oscillating mode 2400 rpm with saline irrigation using a curved blade.

Figure showing parts of a microdebrider with 0 degree endoscope

Both cases were packed with gauze in nasopharynx to achieve hemostasis. In endocopic group bleeding points could be rechecked. Both cases were extubated following complete hemostasis.

RESULTS

Pre op Xray showed 53.3%cases with grade 3 adenoid hypertrophy. 26.7% had grade 2 hypertrophy and 20% had grade 4 hypertrophy. In the above 6 age group pre op endoscopy showed 63.4% had gade 3 hypertrophy, 21.9% had grade 2 hypertrophy and 14.6% had grade 4 hypertrophy.

Figure-1:

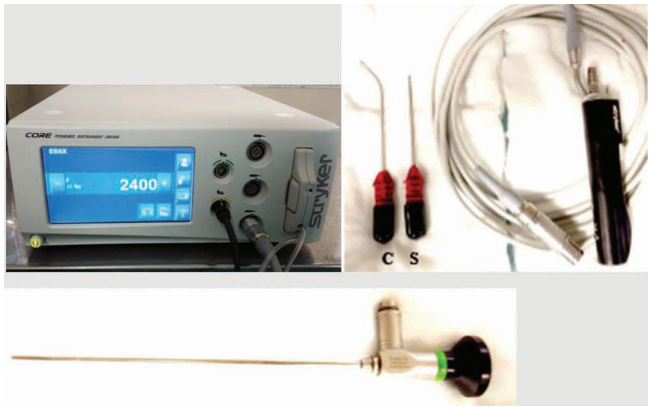


Figure-2:

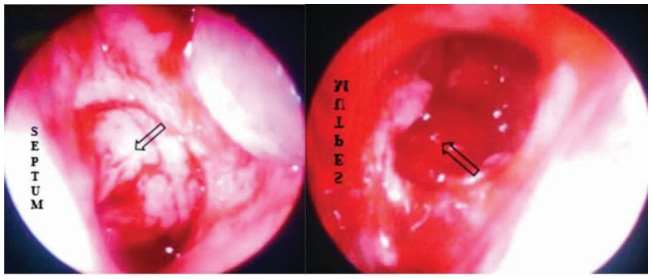
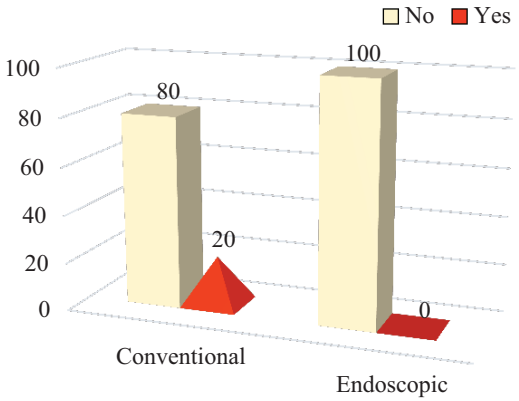
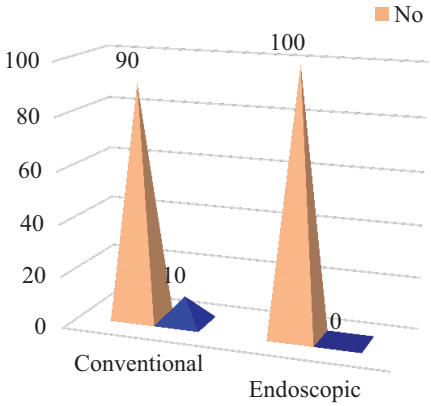


Figure-3: Showing pre-op and post op procedure with microdebrider



Graph-1: Residual tissue



Graph-2: Collateral damage

	N	Recovery time in days		p
		mean	Sd	
Conventional	30	4.1	1.2	0.005
Endoscopic	30	3.2	1.1	

Table-1: Shows the recovery period in both the groups.

Postoperative recovery time

Mean recovery time in Group A was found to be 4.1 and in Group B was found to be 3.2. The p value was 0.005.

Collateral damage

In Group A, 3 cases out of 30 was found to have collateral damage where as Group B was found to have no collateral damage. P value was 0.076.

The residual adenoid tissue

In Group A 6 cases had grade 1 residual adenoid tissue (20%),2 cases had grade 2 residual adenoid tissue (20-50%). 4 cases had grade 3 residual tissue (more than 50%). In Group B no cases were found to have residual adenoid tissue.

DISCUSSION

In a study by Ark et al[30] 81% of cases had residual adenoid tissue (112 cases) mainly along roof and torus areas bilaterally. Grade 3 adenoid hypertrophy was the commonest finding in our study which is similar to the study conducted by V Anand et al[31] in Amritsar Delhi.

Our study showed the resection was more complete in endoscopic adenoidectomy with 0% residual adenoid tissue. Whereas presence of residual tissue in conventional method was the main reason of persistence of symptoms in this group. This result is comparable to the results of study by Hussein and Al-juboori S et al in 2012.[32] And also studies by stansilaw et al[33], Havas et al[22], Datta et al[34] and Ezzat et al[35] with an incidence of 20%, 39%, 39%, 30% and 14.5% residual tissue respectively. In the study by V Anand et al[31] in 2013 in Amritsar also showed 25% residual adenoid in conventional group and complete removal in the endoscopic group. When using endoscope and microdebrider the adenoid can be viewed intraoperatively remnant bits could be removed with more accuracy (graph-1).

The recovery time in conventional adenoidectomy was also longer compared to the endoscopic group ie 4.1 in group A and 3.2 in group B was comparable to the study by V Anand et al[31] in 2018. Their study showed 4.3days recovery period in conventional whereas 3.8 in endoscopic group. A study by Somani et al[7] in 2010 showed 3.5 in conventional and 2.9% in endoscopic.

Collateral damage following adenoidectomy is usually to Eustachian tube and posterior pharyngeal wall. The scarring of Eustachian tube leads to Eustachian tube dysfunction and subsequent serous otitis media. The injury to posterior pharyngeal wall is mainy due to repeated curettage with improper head positioning or poor technique. In our study 10% (3) cases in the conventional group had Eustachian tube damage and no collateral damage in endoscopic group. A study by Datta et al[34] in 2009 yielded similar results 5 cases in group A had posterior septal wall or vault region injury and 3 cases had injury to torus tubaris. One case in endocopic group in this study had injury to nasal mucosa whereas in our study the endoscopic group showed no mucosal injuries (graph-2).

Endoscopic microdebrider assisted adenoidectomies had more degree of safety accuracy and patient comfort compared to conventional methods. The main drawback of using microdebrider is that the expensive blade needs to be changed frequently this adds to the cost of the surgery. Using the debrider also requires special skill and training otherwise can lead to more collateral damage which is another drawback. Also in pediatric age group there is a difficulty in passing both the scope and debrider blade through the nose which can be avoided by placing the 2 instruments in different nostrils or transorally.[15] A study with exclusively adenoidectomy with a larger sample size will provide a clearer picture in this aspect. Another disadvantage was that no tissue could be taken for biopsy unless we do a curettage first.

CONCLUSION

In properly trained hands endoscopic adenoidectomy is safe and gives complete clearance and the need for revision surgery is almost nil. It can also be used in patients with cervical spine issues where neck extention has to be avoided. It can be used in cases of cleft palate as a controlled removal of adenoid tissue can avoid velopharyngeal insuffiency. Postoperative morbidity is significantly reduced which is a blessing for small children. The atraumatic dissection also provided faster healing postoperatively. The endoscope provides a magnified view and record the surgery for teaching and filing purposes which is also a boon. We can say that since majority of patients with adenoids are children endoscopic surgery with powered instruments is the future norm and steps are required to find ways to reduce the cost of the procedure so that it is accessible to all children who needs the procedure

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