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Original Article

Changes of Impedance Audiometry before and after Adenoidectomy in a Clinically Normal Ear

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Abstract:

Background: *The nasopharyngeal tonsil, universally known as adenoids is to be found at the crossroads of roof along with posterior wall of nasopharynx. Adenoid is gift next to birth. Adenoid mass may block the eustachian tube, retracted tympanic membrane leads to conductive hearing loss. Impedance audiometry helps to assess the condition.*

Objective: *To observe the changes of impedance audiometry before and after adenoidectomy in a clinically normal ear.*

Methods: *This longitudinal study was done in Cumilla Medical College & Hospital, Cumilla during a period of one year. 50 Cases of enlarged adenoids of 3-12 years admitted in ENT ward were included in this study. All cases underwent adenotonsillectomy. Impedance Audiometry was done before and one month after adenotonsillectomy. Collected data were classified, edited, coded and statistical analysis was done.*

Results: *Total 50 cases, mean age was 6.95(±1.77) years. Majority 33(66%) were male and 17(34%) were female. Middle ear pressure of both ears was increased after adenotonsillectomy. After operation 40(80%) was type A curve and 09(18%) was type B in right ear and 42(84%) was type A curve and 08(16%) was B curve in left ear.*

Conclusion: *Majority tympanometry was type B in both ears before adenotonsillectomy and after operation majority tympanometry curvature was type A in both ears .*

Key words*: Adenotonsillectomy, pre-operative, post-operative, impedance audiometry.*

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Introduction:

The nasopharyngeal tonsil (adenoid) is a median mass of mucosa-associated lymphoid tissue. It is fashioned resembling a truncated pyramid, habitually with a vertically oriented center cleft, so that its tip point towards the nasal septum amid its base at the crossroads of the roof in addition to posterior wall of the nasopharynx. Adenoids form part of lymphatic Waldeyer's Ring. Lymphoid tissue of adenoids might expand to the fossa of Rosenmüller in addition to the eustachian tube, wherever it is puffed-up like the Gerlach's tonsil.[1] The adenoid can be identified from early gestation. Its growth continue quickly throughout infancy as well as plateaus stuck between two and 14 years of period. Degeneration of adenoids occur hastily later than 15 years of age in the majority children. The adenoids appear to be biggest at the times of seven. However, clinical symptoms are a lot of regular in younger kids, this is often thanks to the relative little volume of bodily cavity and hyperbolic frequency of higher tract infections amid younger kids.[2] Adenoidal hypertrophy may perhaps block up the cavum and expand through the posterior choanae into the nose, foremost to mouth breathing, rhinorrhea, obstructed sleep apnoea, speech anomalies, feeding difficulty, chronic sinusitis, OME and craniofacial growth anomalies. [2] Adenoid hypertrophy as well as ET dysfunction are by and large well thought-out contributory factor for OME, and OME is a composite multifactorial progression, thus mastoid gasification and gas diffusion variation in recirculation engage in recreation an chief negative role in the middle ear.[3] The connection of OME among the ET dysfunction as well as the disease of the nose have repetitively been long-established.[4,5] Adenoid hypertrophy be able to put in to the prevalence of OME throughout cause obstacle of ET.

Impedance audiometry is an goal take a look at extensively utilized in scientific exercise and is specifically beneficial in children. It is of kinds tympanometry and acoustic reflex measurement. Tympanometry discover the compliance or stiffness of the tympano-ossicular device and accordingly discover the healthful or diseased reputation of center ear. The tympanograms had been labeled consistent with changed Jerger's class as kinds A, B, or C.[6]

Normal middle ear pressure can vary between +50 to -150 decapascals. The ordinary center ear compliance is 0.39 ml to 1.30 ml. In otitis media effusion center ear pressure typically reduces underneath normal. It is related to discount of compliance of center ear underneath ordinary variety and conductive deafness of variable degree. After adenoidectomy the eustachian tube come to be patent and the capabilities of eustachian tube and center ear is improved. In this look at the compliance and center ear stress is measured in a affected person of enlarged adenoid earlier than and after adenoidectomy. Our research targets to offer a reference in Adenoidectomy surgical treatment along with affected person demographics and to assess the adjustments of postoperative effects following surgical treatment .

Materials and methods:

This Longitudinal study was done in Cumilla Medical College & Hospital, Cumilla during a period of one year. 50 Cases of enlarged adenoids of 3-12 years was admitted in ENT ward were included in this study. The protocol of this study was reviewed by ethical board of Cumilla Medical College & Hospital. All cases underwent adenotonsillectomy. Impedance Audiometry was done before and one month after adenotonsillectomy. Estimated population was calculated by using the following statistical formula: n=z2p (1-p)/

d2. when n is the preferred pattern size. Z=the usual ordinary deviate, typically set at 1.ninety six at 5 % degree which corresponds to 95% self assurance degree. Patients having enlarged adenoids of 3-12 years of both sex group and with normal tympanic membrane were included in the study. Patients who was not fit for surgery and established middle ear disease were excluded.

Researcher himself turned into continue to be cautious on each issue of the look at beginning from case selection, comply with up, investigating patients, records sheet filling up, protection of all records, records checking, records entry, evaluation and document writing. He turned into for my part look at every and each case and turned into continuously manual the intending as some distance as possible.

Results:

Table I:
Mean difference of compliance of tympanic membrane of right ear before and after adenotonsillectomy (n=50)

	Right ear		p value
	Before	After	
Compliance (ml)	0.55(±0.52)	0.76(±0.48)	<0.001

Table II:
Mean difference of compliance of tympanic membrane of left ear before and after adenotonsillectomy (n=50)

	Left ear		p value
	Before	After	
Compliance (ml)	0.43(±0.42)	0.77(±0.48)	<0.001

Table III:
Mean difference of middle ear pressure of right ear before and after adenotonsillectomy (n=50)

Middle ear pressure (dapa)	Right ear		p value
	Before	After	
	-124.76(±77.90)	-13.26(±42.91)	<0.001

Table IV:
Mean difference of middle ear pressure of left ear before and after adenotonsillectomy (n=50)

Middle ear pressure(dapa)	Left ear		p value
	Before	After	
	-68.10(±118.07)	-06.56(±31.30)	<0.001

Table V :

Relation between tympanometry curve of right ear before and after adenotonsillectomy (n=50)

Types of tympanometry curve before adenotonsillectomy	Types of tympanometry curve after adenotonsillectomy		Total	p value
	A	B		
A	09	03	12	0.78
B	29	06	35	
C	03	00	03	
Total	41	9	50	

Table VI :

Relation between tympanometry curve of left ear before and after adenotonsillectomy (n=50)

Types of tympanometry curve before adenotonsillectomy	Types of tympanometry curve after adenotonsillectomy		Total	p value
	A	B		
A	05	00	05	0.03
B	33	05	38	
C	04	03	07	
Total	42	8	50	

Discussion:

Nasopharyngeal tonsil, generally known as adenoid is located on the junction of roof as well as posterior wall of nasopharynx. Adenoid tissue is gift at start indicates physiological expansion as much as the age of 6 years, after which has a tendency to atrophy at puberty and nearly absolutely disappears through the age of 20. Adenoid mass may also block the eustachian tube main to retracted tympanic membrane and conductive listening to loss. Impedance audiometry helps to identity the condition. The present study is to see the changes or impedance audiometry before and after adenoidectomy in a clinically normal ear.

In present study mean age was 6.95(±1.77) years, minimum age was 4 years and maximum age was 11 years. Male were predominant majority 3366% were male and 17(34%) were female. Compared with Unlu et al.[07] observe confirmed 35 have been male and 29 have been woman, and the common age changed into 91.01 ± 37.4 (35-178) months. Regarding gender distribution with inside the observe group, with inside the modern-day observe it changed into determined to be barely greater in man 69% than woman 62% even though it changed into now no longer statistically significant. This changed into just like the end result received via way of means of Farhad et al[8] who

determined that that 55% have been male, and 45% woman and Orji et al who determined a occurrence of 36.53% in male and 32.5% in females . This distinction can be due to increase distinction or normal male predominance for formative years infection. [09]

In present study relation of condition of tympanic membrane before and after adenotonsillectomy. Majority 25(67.7%) patients condition of tympanic membrane was normal after adenotonsillectomy (<0.05). In current study significant difference of mean compliance in both ear before and after adenotonsillectomy (<0.001). Compliance was higher after adenotonsillectomy.

The study showed significant difference of mean middle ear pressure of right ear before and after adenotonsillectomy (<0.001). Middle ear pressure of both ears was increased after adenotonsillectomy. Earlier research in adults three and sufferers elderly 10 years or older four have proven that approximately 39 to 60% of the sufferers might also additionally expand poor center ear stress following tonsillectomy, which back to everyday inside some days. In this study, 30% of kids more youthful than 10 years present process adenotonsillectomy confirmed comparable results. Although otalgia after tonsillectomy, regularly going on in the first week, is usually taken into consideration to be because of referred ache from the throat[9,10]. those findings advise a probable contribution of poor center ear stress. Therefore, in younger kids present process adenotonsillectomy, with otalgia or threat elements for center ear disease, a observe up assessment of center ear pressure behind surgical treatment is suggested.

Montaño-Velázquez BB et al.[12] examine confirmed earlier than surgery, the center ear pressure turned into in the variety of 0 ± ninety nine daPa. On day 1 of the observe up examine, the common proper and left center ear pressure reduced much less than -ninety nine daPa. Unlu et al.[7] examine confirmed pathological decreases with inside the center ear pressures of as a minimum one ear have been decided in 48 (75%) sufferers on the primary postoperative day and in 10 (15.6%) sufferers at the 1/3 postoperative day. Middle ear pressures lower back to preoperative values through the 7th postoperative day besides in sufferers. There have been statistically large differences (p<0.0001) amongst preoperative and first, 1/3, and 7th postoperative day suggest center ear pressure.

In present study majority 35(70%) tympanometry curvature was B, followed by 12(24%) was A and 3(6%) was C. After adenotonsillectomy 40(80%) was A and 09(18%) was B. 38(78%) tympanometry curvature in left ear was B, followed by 05(10%) was A and 7(14%) was C. After adenotonsillectomy 42(84%) was A and 08(16%) was B. Allocation of tympanogram sorts turned into kind A 14 children (26.9%), kind B 35 children (67.3%), and sort C three children (5.8%) with inside the look at organization and sort A forty two children (80.8%), kind B eight children (15.4%), and sort C 2 children (3.8%) withinside the organization. Farhat et al[8] simplest observed sorts of tympanogram i.e. kind B 70% and sort C 30%. Orji et al[13] observed kind A in 43.47%, kind B in 34.78% and sort C in 21.73% with inside the look at organization and sort A 84%, kind B 6.66% and sort C 9.25% with inside the manage organization. Kamal-Eldin Ahmed look at confirmed 57% of patients 20 evolved kind C tympanogram someday postoperatively with entire recuperation one month postoperatively. No one evolved kind B tympanogram.[14]

Conclusion:

Appreciably greater than before of mean compliance and middle ear pressure in each

ear after adenotonsillectomy. Majority Tympanometry curve was type B inside in each ear earlier adenotonsillectomy and post operation mainstream tympanometry curvature be type A in both ear .

References:

1. Gross CW, Harrison SE. Tonsils and Adenoids. Pediatr. Rev. 2000; 21(3): 75-8.
2. Robb PJ. The adenoid and adenoidectomy. In: Gleeson M, Browning GG, Burton MJ, Clarke R, Hibbert J, Jones N, Lund V, Luxon L, Watkinson J (eds.). Scott-Brown's Otolaryngology, Head and Neck Surgery, 7th edition. New York: Hodder Arnold. 2008; p 1094.
3. da Costa JL, Navarro A, Branco Neves J, Martin M. Otitis medias with effusion: association with the Eustachian tube dysfunction and adenoiditis. The case of the Central Hospital of Maputo. Acta Otorrinolaringol Esp. 2005 Aug-Sep; 56(7):290-4.
4. Bluestone ChD, Klein JO. Otitis media in infants and children. 2nd ed. Philadelphia: W.B.Saunders Comp. 1995; 1–201.
5. Williamson I. Otitis media with effusion. Clin Evid.2000; 7: 469–476.
6. Müderris T, Yazýcý A, Bercin S, Yalçýner G, Sevil E, Kýrýs M. Consumer acoustic reflectometry: accuracy in diagnosis of otitis media with effusion in children. Int J Pediatr Otorhinolaryngol 2013;77: 1771-4.
07. Unlu I, Unlu EN, Kesici GG, Guclu E, Yaman H, Iihan E et al. Evaluation of middle ear pressure in the early period after adenoidectomy in children with adenoid hypertrophy without otitis media with effusion. Am J Otolaryngol. 2015; 36(3):377-81.
08. Farhad J. Khayat Lana Sh. Dabbagh Incidence of otitis media with effusion in children with adenoid hypertrophy. Zanco J. Med. Sci., Vol. 15, No. (2), 2011
09. Maw AR. Otitis media with effusion; Evans JNG ed. Scoots browns otolaryngology.5th ed.Butterworth int ed.1987;159-172.
10. Hone SW, Moodley S, Donnelly MJ, et al. The effect of tonsillectomy on Eustachian tube function. Clin Otolaryngol Allied Sci 1997; 22: 511-4.
11. Tay HL. Post-operative morbidity in electrodissection tonsillectomy. J Layngol Otol 1995; 109: 209-11.
12. Montaño-Velázquez BB, Villanueva-Padrón LA, Conde-Vázquez E, Álvarez-Romero E, Romero-Asato JG, Jáuregui-Renaud K. The middle ear pressure does not change after adenotonsillectomy in children younger than 10 years old, RevInvest Clin es 2014; 66 (2): 152-156
13. Orji FT, Okolugbo NE, Ezeanolue BC,et al . The role of adenoidal obstruction in the pathogenesis of otitis media with effusion in Nigerian children. Niger J Med 2010; 19: 62-8.
14. Ahmed K, Abou-Elhamd MD. Effect of tonsillectomy, adenoidectomy or adenotonsillectomy on Eustachian tube function, Saudi Journal of Oto-Rhino-Laryngology Head and Neck Surgery, 2007;9(1).