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GROMMET EXTRUSION IN CHILDREN-TIMING AND OUTCOME OF EXTRUSION

ABSTRACT

Objective:

The aim of this study was to observe the time of extrusion of grommet and the effect which was observed after grommet extrusion.

Material and Methods:

Retrospective review of 75 children who underwent grommet insertion for persistent OME was done in the Department of ENT & Head Neck surgery, Institute of Medicine, Tribhuvan University Teaching Hospital, Kathmandu, Nepal from April 2015 to December 2016. Children who underwent grommet insertion for persistent OME were evaluated and time of extrusion of grommet was noted. The outcome after grommet extrusion like complete healing of tympanic membrane, myringosclerosis, retracted tympanic membrane were noted

Results:

In 40% of cases grommet extruded after 6- 9 months of insertion. Twelve patients had early extrusion. In 59 cases there was healed tympanic membrane after the extrusion of grommet. Eight cases had persistent perforation. Myringosclerosis was seen in seven cases, whereas grossly retracted pars tensa was seen in eight cases.

Conclusion:

The consequences which may occur after the extrusion of grommet like persistent perforation of tympanic membrane, recurrence of OME retracted tympanic membrane purulent otorrhea, myrtrgoscletasis should be monitored regularly so that early management can be implemented

Keywords: Extrusion, Grommet, Otitis Media with Effusion

INTRODUCTION

Otitis media with effusion (OME) is one of the most common diseases in the pediatric population. Approximately 80% of all children will have a single episode of OME before the age of 3 years and 40% will have three or more episodes.[1]

OME is characterized by the presence of fluid within the middle ear (ME) cavity. There are various factors for the development of OME such as viral or bacterial infections, eustachian tube dysfunction (ETD), immunologic conditions and allergy.[2] If OME is bilateral and not treated for longer period of time then it may cause long-lasting cognitive and language problem especially in children.[3,4] Once OME has persisted in both ears for 3 months or longer and the chance of spontaneous resolution is low and surgical treatment is the best modality of management.[5,6] Myringotomy and grommet insertion is one of the modality to treat persistent OME in children. Tympanostomy tube insertion is the most common ambulatory surgery performed in the US with an annual insertion of 670 000.[7] In some cases, after grommet insertion, complications like purulent otorrhea, residual perforation of tympanic membrane, tympanic membrane atrophy, myringosclerosis and relapse of effusion may occur.[8]

If the grommet is extruded too early then there will be chances of recurrence of OME and the main aim of performing myringotomy and grommet insertion is not fulfilled. If the grommet is retained for too long then there will be high chance of residual perforation and myringosclerosis. So the timing of extrusion of grommet is very important.

Changes in tympanic membrane after grommet extrusion should be addressed on time. Most of the perforation heals on its own but if the perforation persist then it results in recurrent ear discharge and conductive hearing loss which should be treated with myringoplasty.

Myringosclerosis is the sequelae of healing. If the myringosclerosis is extensive then it may result in the conductive hearing loss. The rationale of this study is to observe the time of grommet extrusion and outcome after its extrusion so that we can manage the recurrence of OME and changes on tympanic membrane properly on time so that further complications can be avoided. The aim of our study is to observe the time of grommet extrusion and outcome of extrusion in children.

MATERIALS AND METHODS

In this study, we reviewed charts of 75 children who underwent myringotomy with grommet insertion for persistent OME which was not resolved with usual conservative treatment. The study was done in the Department of ENT & Head Neck surgery, Institute of Medicine, Tribhuvan University Teaching Hospital, Kathmandu, Nepal from April 2015 to December 2016 after obtaining ethical clearance from institutional review board. Grommet insertion done for chronic Eustachian dysfunction excluded from the study. We used Shepherd grommet only and other types of grommet insertion were excluded from the study. Children who underwent grommet insertion for persistent OME were evaluated and time of extrusion was noted.

All the cases were done under general anaesthesia. The children underwent myringotomy in anteroinferior quadrant of pars tensa. Paediatric size Shephard grommet was introduced after aspiration of middle ear fluid. All the cases received post operative antibiotics.

The outcomes which occur after grommet extrusion like complete healing of tympanic membrane, persistent OME, residual tympanic membrane perforation, tympanic membrane atrophy, purutent otorrhea, myringosclerosis, retracted tympanic membrane were evaluated.

RESULTS

A total of 95 myringotomy with grommet insertion were done in our department during this period. Twenty cases lost to follow up, 75 children who came for regular follow up were included in the study. There were 36 female children and 39 male children. Children 6- 10 years of age had maximum number of grommet insertion (Figure I).

In 40% of cases grommet extruded in 6- 9 months of insertion. Twelve patients had early extrusion.

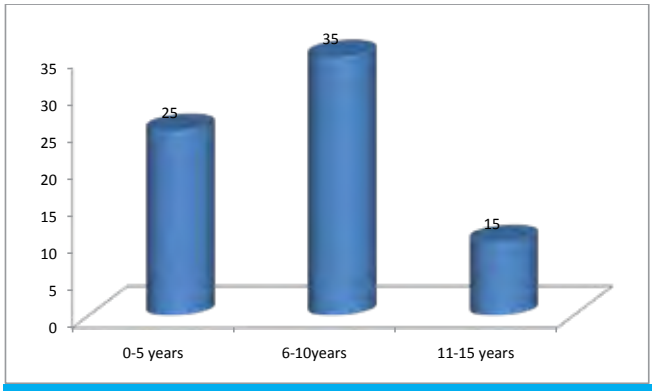

Fig I. Age distribution of Patient who had grommet insertion

Out of 12 early extrusion cases, five cases had acute otitis media in early postoperative period (Table 1).

Table 1. Time of extrusion of grommet (n=75)

Time of extrusion	No of cases
<3months	12 (16%)
3-6 months	18 (24%
6-9 months	30 (40%)
9-12 months	15 (20%)

In 52 cases the tympanic membrane healed after grommet extrusion. Eight cases had persistent perforation. Myringosclerosis was seen in seven cases, whereas grossly retracted pars tensa was seen in eight cases (Table 2).

Table 2. State of tympanic membrane after grommet extrusion (n=75)

State of tympanic membrane	No of cases
Healed	52 (69.3%)
Persistent perforation	8 (10.6%)
Myringosclerosis	7 (9.3%)
Retracted tympanic membrane	8 (10.6%)

DISCUSSION

OME is one of the common problems in children. OME may present with hearing loss, delayed speech and language development or poor social behavior in younger children.

Ventilation tubes of different materials are available; Shepard grommets are usually used in our department. Shepard grommet stays for shorter period of time and mostly extruded within 6 months of insertion.[9,10]

In our study, most of the grommets extruded within 6 to 9 months of surgery. Similar result was also seen in the study done by Feibach et

al, where they operated 319 ears and most of the extrusion occurred in about 7 months after surgery.[11] We observed that in 12 cases (16%), there was early extrusion of grommet within 3 months of surgery. Out of which six cases had extrusion within 1 week post surgery without any sign of infection which may be because of faulty surgical technique. Mackenzie study showed that there was no significant difference between consultants and junior doctors results in the extrusion rates of the grommets.[12] Erdoglija et al. suggested that one of the reasons for premature extrusion of grommet was iatrogenic, such as too big myringotomy, which can be avoided by careful otomicroscopy work, they also mentioned that early extrusion in 1.6% of ears was due to otorrhea, which did not respond to medical treatment, and in 0.5% of ears the cause of early extrusion was not known.[13] In our study also five cases had otorrohea because of acute otitis media within one month of surgery. Extrusion is also dependent on the type of grommet used. In our study, we used only Shephard grommet but the literature shows different extrusion rate for various types of grommet. Gibb et al. did the comparison of the extrusion rates for the various grommets showed that grommet design Shepard and Exmoor grommets extruded quickly, 50% by 6 and all grommet by 15 months.[14] The site of insertion of grommet is also related to early extrusion. In our study, all the cases had grommet insertion in anteroinferior quadrant of tympanic membrane. Mackenzie study showed the extrusion rate for insertion in the anterior tympanic quadrant is likely to be slower than insertion in the posterior quadrant. Highly significant differences in extrusion rates quadrants were observed in his study.[12]

In our study, we did not evaluate the nasopharyngeal pathology but adenoid and recurrent respiratory tract may be one of the factors for recurrent OME. Fiebach et al. observed that recurrent upper respiratory tract infection and adenoid hyperplasia was associated with recurrent OME. Adenoidectomy and treatment of upper airway infections were indispensable parts of the therapy of OME.[11]

The consequences which may occur after grommet extrusion is very important. In our study, 52 patients had healed perforation and persistent perforation was seen in eight patients whereas Curley observed only 1% has residual perforation in his study.[15] In a review Matt et el, reported early extrusion in 13-18% of patients.[16] McLelland reported 3.1% of patients had early extrusion.[17] Allen et al recorded mucoid discharge in 36% of operated ears and reported early extrusion of grommet in 1.6% of ears, and also observed there was recurrence of OME in four (1%) ears.[18] Ahmad et al noticed residual perforation in 12 (3.2%) ears.[19]

Myrinosclerosis was seen in seven cases in our study. Systematic review concluded that myringosclerosis was more common with long-term tubes.[20] Myringosclerosis was reported as high as 52% by Pichichero et al. [21] and 32% by Kay et al. [22] whereas it was only 1.6% in study by Ahmed et al. [19]

CONCLUSION

Grommet extrusion is a natural physiological phenomenon which depends on the type of grommet, site of insertion, experience of surgeon and post-operative infection. The consequences which may occur after the extrusion of grommet like persistent perforation of tympanic membrane, myringosclerosis , recurrence of OME should be monitored regularly so that early management can be implemented.

REFERENCES

1. Teele DW, Klein JO, Rosner B. Epidemiology of otitis media during the first seven years of life in children in greater Boston: a prospective, cohort study. J Infect Dis.1989; 160: 83–94.
2. Yaman H, Yilmaz S, Alkan N, Subasi B, Guclu E, Ozturk O. Shephard grommet tympanostomy tube complications in children with chronic otitis media with effusion. Eur Arch Otorhinolaryngol. 2010;267(8):1221-4.
3. Roark R, Petrofski J, Berson E, Berman S. Practice variations among pediatricians and family physicians in the management of otitis media. Arch PediatrAdolesc Med.1995; 149 :839-844.
4. Bluestone CD, Swarts JD. Human evolutionary history: consequences for the pathogenesis of otitis media. Otolaryngol Head Neck Surg.2010; 143 :739-744.
5. Zulkiflee S, Asma A, Philip R, SitiSabzah MH, Sobani D, NikKhairulddin NY, et al. A systematic review of management of otitis media with effusion in children. Br J Med Med Res.2014; 4:2119-2128.
6. American Academy of Otolaryngology-Head and Neck Surgery. Clinical practice guideline: tympanostomy

tubes in children. Available at: http://oto.sagepub.com/content/149/1_suppl/S1. Accessed 1 July 2013

7. Cullen KA, Hall MJ, Golosinskiy A. Ambulatory surgery in the United States, 2006. Natl Health Stat Report.2009; 11 :1-25.
8. Kenna MA. Diagnosis and management of acute otitis media and otitis media with effusion. In: Wetmore RF, Muntz HR, McGill TJ, Postic WP, Healy GB, Lusk RP, editors. Pediatric otolaryngology: Principles and practice pathways. New York: Thieme; 2000. pp. 272-7.
9. Weigel MT, Parker MY, Goldsmith MM, et al. A prospective randomised study of four commonly used tympanostomy tubes. Laryngoscope.1989; 99: 252–6.
10. Richards SH, Kilby D, Shaw JD, Campbell H. Grommets and glue ears: a clinical trial. J Laryngol Otol.1971; 85: 17–22.
11. Fiebach A, Matschke RG. Duration and complications following grommet insertion in childhood.HNO.1987 Feb;35(2):61-6.
12. Mackenzie I J. Factors affecting the extrusion rates of ventilation tubes. Journal of the Royal Society of Medicine.1984Sep; 77: 751-53.
13. Erdoglija M, JelenaSotirovi J, Baleti N. Early postoperative complications in children with secretory otitis media after tympanostomy tube insertion in the Military Medical Academy during 2000-2009. Vojnosanit Pregl.2012; 69:409-413.
14. Gibb AG, Mackenzie IJ. Extrusion rate of grommets. Otolaryngology head and neck 1985 Dec;93(6):695-9.
15. Curley JW. Grommet insertion: some basic questions answered. ClinOtolaryngol Allied Sci.1986; 11:1-4.
16. Matt BH, Miller RP, Campbell JM, Cotton RT. Incidence of perforation with Goode t-tube. Int J paediatrOtorhinolaryngol.1991; 21:1-6.
17. McLelland CA. Incidence of complications from use of tympanostomy tubes. Arch Otolaryngol.1980; 106:97-99.
18. Allen J, Morton RP, Ahmad Z. Early post-operative morbidity after tympanostomy tube insertion. J Laryngol Otol.2005; 119:699-703.
19. Ragab A, Mohammed AA, Abdel-Fattah AA, Afifi AM.Prevalence of complications associated with tympanostomy tube insertion. Memoufia Med J.2015;28(4):918-922.
20. Hellström S, Groth A, Jörgensen F, et al. Ventilation tube treatment: a systematic review of the literature. Otolaryngol Head Neck Surg.2011;145: 383–95.
21. Pichichero ME, Berghash LR, Hengerer AS. Anatomic and audiologic sequelae after tympanostomy tube insertion or prolonged antibiotic therapy for otitis media. Pediatr Infect Dis J.1989;8:780-787.
22. Kay DJ, Nelson M, Rosenfeld RM. Meta-analysis of tympanostomy tube sequelae. Otolaryngol Head Neck Surg.2001;124:374-380.