

COMPARISON OF RECOVERY RATE AND SEQUELAE OF VARIOUS LOCATION OF VENTILATION TUBE INSERTION

S.Abbas Safavi Naini and M. Shayani Nasab

Department of Otolaryngology, Bootali Hospital, School of Medicine, Shaheed Beheshti University of Medical Sciences, Tehran, Iran

Abstract- Ventilation tube (VT) insertion is the most common otologic operations performed in children, which has great importance in recovery and prevention of hearing loss in children with Eustachian tube dysfunction in critical ages of growth development. The location of the VT insertion varies in different studies; the differences are in the recovery rates and sequelae of VT insertion. This study is performed to compare results of various locations of VT insertion in hearing recovery rate and postoperative sequelae in the Bootali Hospital from 1999 to 2000 (one-year period). This investigation is a clinical trial in 34 patients with Eustachian tube dysfunction; cases were selected according to history, otologic examination, adenoid radiography, audiometry (SRT, PTA- GAP) and tympanometry. The operating time consumed in the VT insertion and postoperative sequelae were recorded. Recovery rates of SAR and PTA- Gap were 25.14 dB and 18.41 dB in anterosuperior (AS) versus 18/67 dB and 14/85 dB in anteroinferior (AI) VT insertion respectively. Obstruction and otorrhea after VT insertion were 0, 4 and 13, 11 in AS and AI, respectively. Time difference in the AS versus AI was not significant.

The assessment confirmed that anterosuperior VT insertion has better hearing recovery rate and lower postoperative sequelae.

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COME like acute otitis media (AOM) is a bacterial disease (7). For children with asymptomatic COME, a course of appropriate antibacterial agents followed by observation is recommended (5). Surgical treatment may be considered if effusion persists and with associated hearing loss (1,5,9,10), although rising bacterial resistance to oral antimicrobial agents may greatly alter the indication for VT insertion (5). Moreover risks versus effectiveness should be considered and VT insertion is a temporary replacement of the eustachian tube (5). Audiometric testing is useful for validation of the need for surgery in older children (5,9,11). There are classic dogma states that suggest VT insertion in either anterosuperior (AS) quadrant or anteroinferior (AI) quadrant of the tympanic membrane (TM) (5). Anterosuperior placements is better matched to the natural anatomy of bony eustachian tube for ventilation of the middle ear (1,12) and anteroinferior placement is associated with easier performing (4). However, predilection have shown in TM sequelae and retention time based location of insertion (1,5,13,14,15-17). This study, was performed to compare hearing recovery rate and sequelae including of the otorrhea and obstruction after VT insertion of the anterosuperior versus anteroinferior of the TM quadrant.

INTRODUCTION

The need to establish artificial ventilation in the middle ear is by no means a new idea. Eli first performed myringotomy to relieve deafness and Politzer first described the use of VT insertion in 1869, then Armstronges began the modern era of VT insertion with newer plastic tubing and antibiotics consumption in 1954 (1,3,5). Eustachian tube dysfunction is a nearly universal finding in children with chronic otitis media with effusion (COME) which has adverse effects on hearing and on development, especially language, speech and cognition(6-8).

MATERIALS AND METHODS

Thirty-four patients older than 5 years were selected due to history and physical examination. They had bilateral Eustachian tube dysfunction and thus were referred for complete ENT preoperative evaluation and surgery was recommended for them. Adenoid radiography and audiometry (SRT, PTA-Gap and tympanometry) performed for all patients and all data were recorded. The study was a randomized single blind controlled clinical trial, if one ear was operated for AS VT insertion the same person's another ear would be operated for AI VT insertion; then they were followed up at 1 month intervals. Cases were seen for otologic symptoms and signs and audiometric evaluation, the operation time of the VT insertion was also recorded for each ear. Indicated data were analyzed in each of the records. Statistical analysis of the data was performed with t-test.

Correspondance:

SA. Safavi Naini, Department of Otolaryngology, Bootali Hospital, School of Medicine, Shaheed Beheshti University of Medical Sciences, Tehran, Iran
Tel: +98 21 2078970
Fax: +98 21 2414130

Table 1. PTA – Gap recovery rate relation to VT location, AS versus AI of the TM

P Value	Post operative X ± SD	Pre operative X ± SD	Recovery rate PTA Gap
			Groups
P < 0.01	16.9 ± 11.5	26.8 ± 7.33	Anterosuperior (AS) n= 34
P < 0.01	18.9 ± 10.33	24.5 ± 7.79	Anteroinferior (AI) n= 34

Table 2. SRT recovery rate related to VT location AS versus AI of the TM

P Value	Post operative X ± SD	Pre operative X ± SD	SRT Recovery Rate
			Groups
P < 0.01	9.6 ± 3.97	34.6 ± 9.05	Anterosuperior (AS) n= 34
P < 0.01	11.5 ± 9.75	34.5 ± 10.53	Anteroinferior (AI) n= 34

Table 3. Frequency distribution of the VT insertion sequelae AS versus AI of the TM

P Value	Anterosuperior (AS) n=34	Anteroinferior (AI) n= 34	Groups
			Sequelae
P < 0.01	13 (%38.2)	-----	Anterosuperior (AS) n= 34
P < 0.01	11 (%32.4)	4 (% 11.8)	Anteroinferior (AI) n= 34

RESULTS

This study was performed in 34 patients with mean age of 9 years. In patients operated for AS VT insertion, preoperative mean of SRT and PTA-Gap were 34.65 dB and 26.79 dB respectively, and in patients operated for AI VT insertion, there were 34.5 dB and 24/53 dB. Post-operative results of SRT and PTA-Gap in AS VT insertion were 9.65 dB and 16.88 dB in comparison to the AI VT results of 11.53 dB and 18.91 dB, respectively. The differences were significant ($p < 0.01$) (Table 1, 2). The incidence of VT obstruction and otorrhea in AI were 13 and 11 in comparison to 0 and 4 in AS and the difference was significant ($P < 0.01$) (Table 3). The difference between time of operation in AS versus AI was not significant ($p > 0.01$).

DISCUSSION

Otitis media is the most common disease encountered in the pediatric age group aside from common cold (2), and ventilation tube insertion has become the most common otologic operation performed in children, although operation is relatively benign but it has some complications (1,3,5). Children are especially vulnerable to hearing loss, that causes defect of development (e.g. Language and cognition) (6,18). Therefore the increase of recovery of the middle ear function is of importance

in presentation of developmental disorders due to hearing loss (6,8,15). The purpose of the present study was to determine whether there was any difference in the site of VT of the tympanic membrane. The previous study didn't find any difference of the sequelae or retention time (17). Although some authors thought that the placement of the anterosuperior (AS) quadrant reintroduced better middle ear and eustachian tube function. In addition AS quadrant insertion was associated with increasing retention time and perforation (4) and AI quadrant with easy performance (4). The results of our study, showed AS placement with associated better recovery rate and low sequelae and easier performance versus placement AI. We recommend, in COME, VT insertion should be performed in AS quadrants and it is an excellent replacement for eustachian tube dysfunction. However this investigation suggests larger samples, longer follow up and more exact methods for confirmation.

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Various location of ventilation tube insertion

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