

A Review of 2399 Ears for Post-Myringotomy Tube Otorrhea

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Abstract

Objectives: The objective of this study was to review consecutive tympanostomy tube surgeries for last 5 years from 2005-2011.

Methods: Retrospective chart analysis of the last 2399 consecutive ears for myringotomy tube surgery from July 2005 to December 2011.

Results: Out of 2399 total ears reviewed, the total rate of otorrhea was 4.1% with 5.7% with no intervention developing immediate postmyringotomy tube otorrhea, 2.3% with ointment coated onto the tube developing otorrhea, 3.8% with ofloxacin instilled at time of surgery developing otorrhea, and 4.6% with cortisporin instilled at time of surgery developing otorrhea.

Purulent middle ear effusions developed immediate post myringotomy tube otorrhea in 7.3% of the ears, but no middle ear effusions developed otorrhea in only 2.8% of the ears. Sheehy collar button tube had the least amount of post myringotomy tube otorrhea at 2.8%.

Conclusion: Early post-myringotomy tube otorrhea is a frequent complication of myringotomy tube insertion with a rate of 4%, and the type intervention at time of surgery with ointment or drops along with the type of tubes placed made a difference in the incidence of post-tympanostomy otorrhea.

Introduction

Tympanostomy is the leading procedure performed by otolaryngologists. It was first performed in 1760 by Eli. The procedure was then modified in 1954 by Armstrong, who introduced the use of a transtympanic plastic tube. Tympanostomy tubes, followed by adenoidectomy, have been observed to be the most effective way in preventing otitis media as well as produce large changes in quality of life¹. Otorrhea is a benign sequelae, but also the most common complication of this procedure, occurring at a rate of 2% to 17%. There are two postoperative periods in which otorrhea can occur in. The first, early otorrhea, happens in the first two weeks following the procedure². The late period is the time between 2 weeks and the time of the tube extrusion. Higher rates of otorrhea have also been seen in ears with mucoid or purulent fluid at the time of the surgery³. Postoperative otorrhea could develop into chronic suppurative otitis media and a diseased middle ear state⁴. It also affects the quality of life, especially for the children that it commonly occurs to. Therefore it is important to develop a method to prevent otorrhea.

The cause of otorrhea is multifactorial, including the type of material of the tube, the type of postoperative treatment, as well as background of patient, such as age or living environment. Studies have been done to prevent otorrhea, such as using phosphorylcholine-coated fluoroplastic Armstrong beveled TTs⁵. However, there was no statistically significant difference that indicated prevention. Surgeons have also tried to lower contamination by using the non-touch technique while performing the surgery. However, studies show no difference between non-touch technique and touch⁶. In addition, the non-touch technique is costly and time consuming. This indicates that early PTTO is more likely caused by preexisting middle ear condition than by external contamination.

There have also been studies that have succeeded in finding a treatment that will help prevent post operative otorrhea. Studies have shown that the use of systemic antibiotic is most effective. Prophylactic antibiotic drops after tympanostomy tube placement have shown a significant decrease in the incidence of otorrhea after tympanostomy. For ears with mucoid or purulent fluid, the drop treatment lasts five days after surgery⁷.

The prevention presented here includes a one-time "dose" of antibiotic. One-time dose is cost effective and does not rely on patient compliance. Erythromycin is an ophthalmic ointment that is resistant against strains of bacteria that are often found in middle ear fluid, such as *H. influenzae*, *M. catarrhalis*, and *S. pneumoniae*⁸. Ofloxacin is another otic treatment that is also treated against those bacteria. In addition, a study by Poetker et al⁹ concludes that the use of prophylactic otic drops such as ofloxacin eases the pain of the patients. Fluoroplastic tubes are a common type of tympanostomy tube used. Fluoroplastic tubes last longer in patients 10 years and older compared to subannular tubes, such as T tubes¹⁰.

Methods

A retrospective chart analysis from July 2005 to Dec. 2011 of the last 5 years of consecutive tympanostomy tube surgery was done, with examination of the patients' age, ethnicity, previous tube insertion, adenoidectomy, and type of tube. The fluid drained from the middle ear at the time of surgery was recorded as either serous, purulent, mucoid or no fluid. During the surgery, the fluoroplastic tube was either coated with the erythromycin ophthalmic ointment at the flange end of the tube or drops of ofloxacin 0.3% otic solution or cortisporin otic suspension was instilled once at the time of tube insertion. Some ears had ofloxacin 0.3% otic solution instilled for 5 days post myringotomy. The control group did not have any intervention of either drops or ointment during surgery. One week after surgery, the ears were examined for signs of otorrhea.

Results

A total of 1876 consecutive ears were studied. Of the 797 ears that had no treatment, 47(5.9%) developed otorrhea within 1 week. Of the 621 ears that had erythromycin ointment, 12(1.9%) developed otorrhea and of the 425 ears that were treated with ofloxacin, 15(3.4%) developed otorrhea. There were 22 ears with cortisporin otic instilled at time of surgery and 1 (4.5%) developed otorrhea. There was one case of saline irrigation at the time of surgery which did not develop any otorrhea post surgery.

In addition, the type of fluid found during surgery was observed corresponding to the presence or absence of otorrhea 1 week post-op. Out of the 50 ears with purulent middle ear effusion at the time of surgery 4 ears (8.0%) had early post-tympanostomy tube otorrhea. Mucoid effusions were the most common or 784 ears and 36 (4.6%) had post tube otorrhea. There was 632 ears with no fluid and 19 (3.0%) had post tube otorrhea. Lastly, 410 ears had serous fluid and 16 (3.9%) had post tube otorrhea.

The type of tube was also noted and the most common tube used was 7mm fluoroplastic tube 1056 of which 45 ears (4.3%) had post tube otorrhea. The next most common tube was Shepard 611 of which 22 (3.6%) had post tube otorrhea. Sheehy tube had the least post tube otorrhea at 1% or 1 out of 99 ears followed by Donaldson silver-oxide coated tube at 1.9% or 1 out of 52 ears. The results are in Table 1.

TABLE 1

Intervention	Total	Otorrhea	Percent Otorrhea
no drops	979	56	5.7%
ointment	795	18	2.3%
ofloxacin otic 1 dose	200	12	6.0%
cortisporin otic suspension	22	1	4.6%
saline	1	0	0.0%
ofloxacin otic 5 days	400	11	2.8%
Middle Ear Effusion			
purulent	69	5	7.3%
mucoid	1033	49	4.7%
serous	499	22	4.5%
no fluid	798	22	2.8%
Type of Tube			
fluoroplastic	1274	54	4.2%
shepard grommet	816	29	3.6%
sheehy collar button	141	4	2.8%
reuter bobbin	51	4	7.8%
sheehy silver oxide	4	0	0.0%
donaldson (silver oxide)	96	3	3.1%
goode t-tube	17	4	23.5%

Discussion

This was a retrospective chart analysis that showed when doing a tympanostomy surgery, if the antibiotic ophthalmic ointment, erythromycin is applied to the 7mm fluoroplastic tube, there will be reduced risk of the complication otorrhea. Although the incidence of otorrhea is influenced by many factors such as the type of tube., in our study silver oxide tubes and sheehy collar button tubes have the lowest incidence of immediate post tympanostomy tube otorrhea. As in other studies, the type of middle ear effusion at the time of surgery was another factor in the incidence of which "no fluid" was the lowest and "purulent fluid" was the highest. As in the study by Thomas et al¹² which suggests that biofilm formation was reduced by topical antibiotics and therefore decreased the incidence of post tympanostomy tube otorrhea, our study substantiates his theory on biofilm since the antibiotics by drops or ointment decreased the incidence of immediate post tympanostomy tube otorrhea.

Our objective was to compare methods of preventing myringotomy otorrhea. Erythromycin was chosen as an ointment because of its effect against the bacteria commonly found in the middle ear, such as *S. pneumoniae*. In addition, fewer patients are allergic or resistant to erythromycin. The neutrality of the erythromycin ointment made it milder on the middle ear mucosa compared to other antibiotic ointments. The ointment also made it easier to slip the tube into the incision by lubricating the flange end of the tube. According to Cunningham¹¹, applying the ointment to the tube will prevent the clogging of the tube postoperatively by covering the opening until the ointment melted away. Ofloxacin for 5 days had comparable results in reduction of otorrhea to erythromycin. Ofloxacin is another antibiotic used to treat the bacteria commonly found in the middle ear.

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