Case-Control Study of Perforations from Ventilation Tubes

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Abstract

One of the complications of placement of ventilation tubes is a persistent perforation in the tympanic membrane (TM). Many different types of ventilation tubes are currently used for middle ear disorders. A retrospective case-control study was performed investigating risk factors for tympanoplasty following tube placement. Records were reviewed for 51 ears in 45 patients who required tympanoplasty for persistent tympanic membrane perforation following placement of ventilation tubes. The control population consisted of 128 ears in 68 patients. Results were categorized according to tube material, tube shape, and presence or absence of middle ear effusion at the time of myringotomy. Patients receiving fluoroplastic tubes were significantly more likely to require tympanoplasty than patients receiving silicone tubes. The presence of middle ear fluid did not increase the risk for tympanoplasty, and there was no difference between the two type of silicone tube.

Background

Tympanic membrane perforation with resulting need for tympanoplasty is a known complication of placement of ventilation tubes.

Overall perforation rates are about 1.8% from grommet style tubes and 12-18% from T-tubes.

The most common materials for grommet-style tubes are fluoroplastic or silicone.

Little is known about the difference, if any, between perforation rates for fluoroplastic and silicone ventilation tubes.

Purpose

The purpose of this study is to determine if the rate of perforations requiring tympanoplasties differs following placement of a silastic tube versus placement of a fluoroplastic tube.

The effect of the presence of middle ear fluid at the time of myringotomy will also be examined.

Materials and Methods

A case control study comparing the type of tube used and other intra-operative findings between a case group of patients who required tympanoplasty following tube placement and a control group of patients who had a healed tympanic membrane following placement and extrusion of ventilation tubes.

The case population consisted of 51 tympanoplasties performed on 45 patients (six patients had bilateral perforations).

The control population consisted of 128 ears in 68 patients who underwent placement of a grommet ventilation tube and had complete healing of their tympanic membrane after tube extrusion.

Patients with pre-existing perforations at the time of tube placement were excluded. Perforations were present for at least one year prior to tympanoplasty.

Factors studied were: tube material, tube flange, and presence or absence of middle ear fluid.

Tube Styles

Silicone

Armstrong

Silicone

Sheehy

Fluoroplastic

Results

Contingency Tables:

Fluoroplastic vs. Silicone

Fluoroplastic vs. Armstrong

Fluoroplastic

Silicone

(95% CI 0.7-5.7, p=0.28) (95% CI 0.6-2.1, p=0.87)

Armstrong

(95% CI 1.2-4.7, p=0.013) (95% CI 1.3-8.7, p=0.009)

Sheehy vs. Armstrong

Wet vs. Dry middle ear

Sheehy

Armstrong

Wet

Dry

Odds ratio = 1.9

Odds ratio = 1.1

(95% CI 0.7-5.7, p=0.28) (95% CI 0.6-2.1, p=0.87)

Conclusions

The odds ratio for eventual tympanoplasty following placement of ventilation tube is significantly higher for patients receiving a fluoroplastic tube compared with a silicone tube.

There is no difference in the odds ratio for tympanoplasty following placement of a silicone Sheehy-style tube and an Armstrong-style ventilation tube.

The presence or absence of middle ear fluid has no effect on the likelihood of requiring tympanoplasty following placement of a ventilation tube.

References


