Abstract

Objective: To determine 1. The predictors of the final outcome of persistent perforation after removal of long stay ventilation tubes. 2. Whether, the time for perforation to heal was related to the initial size of the perforation and the time from initial insertion to removal.

Method: 20 patients and 23 ears were studied over a study period of 2003 to 2006. Variables recorded included the size of the perforation as a percentage of the total drum area and the time taken to heal in months. A Kaplan-Meier analysis was performed stratifying the initial size of perforation. Logrank test and a Cox’s proportional hazard model were performed to formally analyse the relation between the predictors and outcome.

Results: Kaplan-Meier analysis appeared to show that the patients with larger perforation took longer to heal. Using the Logrank test with size of the perforation as the predictor variable, this relationship between the initial size of the perforation and the time to heal was shown to be statistically significant. Cox’s proportional hazard model, with length of time ventilation tube remained in place as the predictor variable, also showed the longer the tube was left in, the longer the perforation took to heal.

Conclusions: The initial size of the perforation will predict the length of time taken for the perforation to heal. Although tubes that have been in place longer are associated with a longer time to heal, the size of this effect is marginal.

Introduction

Long stay ventilation tubes on removal, are associated with high incidence of persistent perforation of the ear drum. Most heal by themselves but some takes a long time to heal or don't heal at all.

Objective: of this study was to analyse the predictors of the final outcome of the persistent perforations and whether the time taken for the perforations to heal was influenced by the size of the perforation and the time interval between insertion of the ventilation tube and its removal.

Method

Patients were selected, who had removal of long stay ventilation tubes, during the period 2003 to 2006. Details were extracted from clinical and operating notes. The presence of perforation was noted. In patients with perforations the following variables were recorded: size of the perforation as a percentage of the drum area, time taken to heal in months calculated by the date of last clinic at which the patient had an unhealed drum, and the date of first clinic at which drum was noted as healed. Other variables which could determine the time to healing were recorded such as whether myringoplasty was performed. A Kaplan-Meier analysis was performed stratifying by the initial size of the perforation. Logrank test and a Cox’s proportional hazard model were performed to formally analyse the relationship between the predictors and the outcome.

Results

Perforations of the ear drum on removal of the ventilation tubes was seen in 19 of the 23 ears. The majority of the perforations were between 10%-15% of the eardrum area in size. Myringoplasties were done in 2 cases. Follow up after one year showed, all but 6 patients had healed perforations. The Kaplan-Meier analysis appeared to show the patients with larger perforations took longer to heal (Figure 2). Median time to heal was 104 days in those with less than 10% perforation size, compared to a median 274 days in those with 15-25% sized perforations. Using the Logrank test with size of the perforation as a predictor variable, this relationship between initial size of perforation and the time to heal was shown to be statistically significant (p=0.03). The Cox’s proportional hazard model with length of time ventilation tube remained in situ as the predictor variable also showed the longer the tube was left in, the longer the perforation took to heal (p=0.026). However the effect size (likelihood ratio of 0.996) was negligible.

Conclusions

Long stay ventilation tubes are associated with high incidence of tympanic membrane perforations. Most heal in the first year.

Immediate minor repair of the perforation on removal of the ventilation tubes may improve the chance of healing.

Initial size of the perforations will predict the length of time taken for the perforations to heal.

Although the tubes that have been in place longer are associated with a longer time to heal, the size of this effect is marginal.

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