INTRODUCTION

Treatment of Eustachian tube (ET) dysfunction has been an area of study with increasing interest over the past few decades. Dysfunction of the Eustachian tube is related to the cartilaginous portion of the ET, which contains mucosa that opposes itself and opens with dilation (1). If there is dysfunction with dilation, either due to mucosal inflammation or inherent difficulty with the musculature that opens the tube, the middle ear is not properly aerated (2).

Treatment of ET dysfunction has traditionally focused on aeration of the middle ear, such as with tympanostomy tubes. This does not however fix the inherent dysfunction of the ET. Recent literature has demonstrated successful use of balloon dilation of the ET (3). Cadaver studies have shown changes in the histology of the ET with dilation as well as increase in the diameter of the tubal system. Poe et al have also shown promising results in live patients, including ability to Valsalva and change to type A tympanogram in adults (3,4).

The inherent risk of dilation of the ET lies in injury to surrounding structures located in the bony ET canal, including carotid artery injury. The use of dilation in children has been precluded due to this limitation of knowledge of how the tube grows and progresses in length throughout the years until adulthood. The ET has been extensively studied throughout the years, noting its increase in length and angle as age increases. Clinical observations note the decline of otitis media around 6-7 years of age (5). We seek to add to the growing body of literature of ET anatomy and growth during childhood using a modality that is readily available and utilized, the CT scan. In developing a standard methodology in understanding ET development in a child, balloon dilation may be a feasible, safe treatment option in all ages.

METHODS AND MATERIALS

Routine computed tomography (CT) scans obtained at UC Davis Medical Center radiology database were examined. Using this database, CT scans were selected for the University of California, Davis Medical Center without temporal bone pathology were selected.

These CT scans were used to determine the length of the cartilaginous ET (LCET), the diameter of the bony ET (DBMET), and the angle of the ET with respect to the skull base (AET) on the right and left sides in individuals from 0 to 18 years. Sex and race are recorded and will be analyzed.

RESULTS

Evaluation of the growth of the ET appears to progress in a stepwise fashion. To date, 32 CT scans have been following data has been obtained to date.

Table 1 demonstrates the basic demographic information obtained from the patients used for measurements in this study. Table 2 demonstrates the data measured from each CT scan reviewed. Angle measurements were only obtained for a total of 9 patients.

Figures one, two and three demonstrate trends in the growth of the ET. The correlation coefficients for this data approximates 0.7. More patients are needed for statistical significance of this observed trend.

CONCLUSIONS

ET development appears to progresses in an orderly fashion. Knowledge of the changes in the LCET and the DBMET with age may be used to develop alternative methods for treatment of ET dysfunction, such as balloon dilation. Change in AET appears to increase in angle as described by prior literature, although more patients are needed in this study for statistical analysis.

REFERENCES