Virtual Measurement of Mastoidectomy Volume in Pre-operative Decision Making

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RESULTS
The decision to perform a canal wall up (CWU) or canal wall down (CWD) mastoidectomy is guided by a number of factors, including the extent of disease and the presence or absence of complications. The absence of medical contraindications and the recent history of middle ear surgery is another factor which needs to be considered, since very large volume mastoid cavities may cause subsequent chemical meningitis. A greater need for office cleaning. Surgical techniques that are associated with higher risk of post-operative complications, such as mastoidectomy, are known to have a negative impact on the immediate outcomes. In this study, we have examined the relationship between high resolution computed tomography (CT) of the temporal bones and the surgical outcomes associated with mastoidectomy. The study was conducted at the practice of a fellowship-trained neurotologist. All virtual mastoidectomies were performed by the same neurotologist to best approximate the amount of bone removal during surgery. While great care was taken to accurately measure mastoid cavity volumes, the Dextroscope® software depends upon the variable quality of the original images. Standardization using the same high resolution CT scanner should reduce this source of variability. Limitations of this investigation include the retrospective nature and small sample size. Each participant was required to have a mastoidectomy or a revision of a mastoidectomy and have outcome data that was minimally 3 months post-operative, however, there was a large variation in the time from surgery to final clinical examination. Virtual reality technology is a promising tool for pre-surgical planning. The availability of high-quality CT images allows for the detailed pre-operative evaluation of the temporal bone. Virtual reality-based planning can provide a visual representation of the surgical strategy and can help the surgeon to identify potential complications. This approach has the potential to improve surgical outcomes and reduce the rate of revision surgery. It is an important tool in the surgical planning process and can be used in combination with other imaging modalities.

METHODS AND MATERIALS

1. A chi-square analysis was performed. No correlation was found between volume of mastoid cavity and long-term post-operative outcomes of individuals undergoing a canal wall up (N=14, p=0.460) or canal wall down (N=22, p=0.386) mastoidectomy.

2. The calculated volume of a canal wall down mastoidectomy cavity by itself does not predict surgical outcome.

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CONCLUSIONS

The volume of a canal wall down mastoidectomy cavity by itself does not appear to predict the surgical outcome. We anticipate continuation of this study with additional cases to improve statistical power.

REFERENCES

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