GENIOTUBERCLE ADVANCEMENT (GTA) EFFECT ON SWALLOW FUNCTION
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ABSTRACT

Objectives: 1. Evaluate swallowing characteristics before and after geniotubercle advancement (GTA). 2. Determine if GTA’s effects on tongue-base position could be useful for patients who have dysphagia without OSA.

Methods: Patients with AHI greater than 10, scheduled for GTA were enrolled consecutively. Video fluoroscopic swallow study (VFSS) was performed preoperatively and four months postoperatively. Imagej64 software was used to measure hyolaryngeal elevation and displacement. Video recordings assessed valgacular pooling, aspiration and bolus movement. Studies were reviewed by a Speech Pathologist and an Otolaryngologist.

Results: Pre-operative demographics AHI range 12.4-72 with a mean of 51.4 and median 65. Post operatively AHI 3.8-22.4 Mean 11.6 and median 11.2. There was no reported pre or post-operative dysphagia or aspiration. No radiographic evidence of silent aspiration. Hyolaryngeal superior elevation 0.40, 0.39 (p = 0.85) anterior displacement changes 0.27, 0.17 (p = 0.23) total motion 0.50, 0.43 (p=0.13).

Conclusions: While geniotubercle advancement surgery was effective at reducing the AHI in all patients in this series, the procedure did not significantly affect the swallowing function of patients. It also did not appear to significantly alter the hyolaryngeal movement making it unlikely to assist with patients suffering from dysphagia.

METHODS

Patients with AHI greater than 10, scheduled for GTA were enrolled consecutively. Video fluoroscopic swallowing study (VFSS) was performed preoperatively and four months post-operatively. This was performed by our speech language pathologist in the Radiology fluoroscopy suite. Thin Barium was used as a bolus. Fluoroscopic videos were recorded and still frames were then captured. NIH freeware Imagej4 software was then used to analyze the images. Each patient had a baseline measurement from the superior portion of C2 to the inferior portion of C4. This was used as the reference value. This was chosen as an easily obtainable measurement that also was unlikely to have significant congenital variation and would also help eliminate scale variance from tall to short subjects. Once the baseline was taken this was used as a reference distance. The Hyoid bone was then identified and marked at the resting state. Additional marks were annotated at the level of maximal anterior displacement and of maximal superior displacement. Using pythagorean’s theorem total maximal distance was calculated. These measurements were performed on all image series indepdently with patient blinding during measurements. The data was imported into a spreadsheet and the student t-test was performed looking for significance. The video recordings were also assessed for valgacular pooling, aspiration and bolus movement per our institutions standard swallow study protocol. Studies were reviewed by a Speech Pathologist and an Otolaryngologist.

RESULTS

Pre operative demographics 5 patients mean age 50.4 (26-68) mean BMI 30.2 (27-33). AHI range 12.4-72 with a mean of 51.4 and median 65. Post operatively AHI 3.8-22.4 Mean 11.6 and median 11.2. There was no reported pre or post-operative dysphagia or aspiration. Subjectively patients did not experience any changes in their swallowing. With no significant change in EAT-10 questionnaire. There were no radiographic evidence of silent aspiration in any patient. Pharyngeal bars or strictures were not seen. Hyolaryngeal superior elevation Pre operatively was 0.40% of the C2-C4 height and .39% post operatively (p = 0.85) anterior displacement changes were 0.27% and 0.17% respectively (p = 0.23) total motion was 0.50% vs 0.43% (p=0.13).

DISCUSSION

Dysphagia is a very common problem affecting 10-40% of the elderly population and about 1% of the middle age population. One of the more common observations is poor hyolaryngeal complex elevation and reduced opening of the oropharyngeal muscle, which is the upper esophageal sphincter. There are very few strategies currently available to improve these measures of swallowing function. Obstructive Sleep Apnea (OSA) is a fairly prevalent condition affecting approximately 4% of adult males and 2% of adult females in the US. This is due to narrowing and/or excessive hypophatonia of the upper airway during sleep resulting in occlusion of the airway. This causes sleep disruption and neurobehavioural disturbances and can result in increased risk for cardiovascular diseases. There is a wide spectrum of treatment options available, ranging from continuous positive airway pressure (CPAP) treatment, maxillo-mandibular advancement, dental splints, to various forms of surgery to the airway. There is no universally successful, well tolerated and accepted form of treatment to date.

Pre and post operative changes in AHI. All patients had a reduction in their AHI following Geniotubercle advancement surgery; 5 patients mean age 50.4 (26-68) mean BMI 30.2 (27-33). AHI range 12.4-72 with a mean of 51.4 and median 65. Post operatively AHI 3.8-22.4 Mean 11.6 and median 11.2. There was no reported pre or post-operative dysphagia or aspiration. No radiographic evidence of silent aspiration. Hyolaryngeal superior elevation 0.40, 0.39 (p = 0.85) anterior displacement changes 0.27, 0.17 (p = 0.23) total motion 0.50, 0.43 (p=0.13).

CONCLUSIONS

While geniotubercle advancement surgery was effective at reducing the AHI in all patients in this series, the procedure did not significantly affect the swallowing function of patients. It also did not appear to significantly alter the hyolaryngeal movement making it unlikely to assist with patients suffering from dysphagia.

REFERENCES

4. References: