ABSTRACT

Objectives: To assess for the presence of new bone formation and bone remodeling leading to a reduction in sinus volume (auto-oblation) on computed tomography (CT) in patients with a history of cystic fibrosis (CF) related recalcitrant maxillary sinusitis who have undergone aggressive and repeat endoscopic sinus surgery (ESS) for treatment.

If there is increased osteoneogenesis as a result of aggressive surgery, we hypothesize that this will lead to a swelling and eventual obliteration of the sinus (auto-oblation). An obliterated sinus leads to decreased symptoms and decreased associated morbidity.

Study Design: Retrospective review of radiographic data of patients who have undergone ESS for management of CF related chronic rhinosinusitis (CRS). 36 patients undergoing ESS for CF related CRS between 5/2012-5/2014 were identified. The horizontal and vertical length of maxillary sinus on coronal images, and depth on axial images were measured in standardized anatomic locations in serial CT scans over time. Subsequently the volumes and percentage change over time were calculated.

Results: Significant decrease in overall maxillary sinus volume due to osteoneogenesis occurred in the 7 patients who met inclusion criteria: average volume decrease of the right maxillary sinus 35% P< 0.05 and left maxillary sinus 39% P< 0.05.

Conclusions: Significant decrease in overall maxillary sinus volume due to osteoneogenesis occurred in all patients that met inclusion criteria. This preliminary data supports sinus auto-oblation following aggressive endoscopic surgical management in recalcitrant maxillary sinusitis in CF patients.

INTRODUCTION

Chronic Rhinosinusitis (CRS) in patients with Cystic Fibrosis (CF) can have a dramatic impact on their quality of life and be associated with worsened overall pulmonary status including increased hospitalizations, pneumonia and acute exacerbations. >90% of patients with CF have radiologic findings on CT consistent with CRS. Currently standard of care of CRS in CF patients consists of systemic and topical antibiotics, systemic and topical steroids, nasal saline irrigations, and endoscopic sinus surgery (ESS). However, there is no current standard on when surgical management should be initiated. Currently 20-25% of CF patients undergo surgical intervention. The recurrence rate post operatively is very high, and often multiple surgeries are required. The need for repetitive ESS can range from 47-72% within the first two years post op and can range up to 89% overall. As a result, many CF patients have undergone repetitive surgical interventions as they reach adulthood. This has lead to the exploration of possible alterations to the current surgical approach to treat CRS in CF patients. There is little consensus in the literature on specific paradigms of maxillary sinus CT radiologic findings in cystic fibrosis patients. This is in part due to minimal literature and studies available.

There is a significant amount of literature supporting that there is a presence of neo-osteogenesis with new bone formation and increased bone density in non-CF patients with CRS. Similar findings are likely in patients with CF due to the chronic inflammatory state of their paranasal sinuses, contributing to the need for recurrent surgical management as well. If there is increased osteoneogenesis as a result of aggressive surgery, we hypothesize that this will lead to a swelling and eventual obliteration of the sinus (auto-oblation).

METHODS AND MATERIALS

Retrospective review of radiographic data of patients who have undergone ESS for management of CF related CRS. Vertical height of maxillary sinus (defined as the longest distance from the lowest point of the sinus floor to the highest point of the sinus roof) on coronal images, width (transverse): as the longest distance perpendicular from the medial wall of the sinus to the most lateral wall of the lateral process of the maxillary sinus on the axial view. Depth (A/P) was defined as the longest distance from the most anterior point to the most posterior point of the medial wall in axial view. These were measured twice and averaged. They were measured in serial CT scans over time. Volumes and percentage change over time were calculated.

RESULTS

Total of 36 patients undergoing ESS for CF related CRS between 5/2012-5/2014, 7 met inclusion criteria. Calculated using Student’s t-test. Average volume decrease Right maxillary sinus 35% P< 0.05. Average Volume decrease Left maxillary sinus 39% P< 0.05.

DISCUSSION

Significant decrease in overall maxillary sinus volume due to osteoneogenesis occurred in all patients that met inclusion criteria.

Recently, there has been a suggestion in the literature for the development of a more definitive surgical approach with medial maxillectomies in patients with recalcitrant maxillary sinusitis due to adequate endoscopic surgical management with antrostomies. Patients who undergo medial maxillectomies for recalcitrant maxillary sinusitis have increased openings for application of topical medications and easier debridement in clinic. With increased osteoneogenesis as a result of aggressive surgery, this appears to lead to a swelling and eventual obliteration of the sinus (auto-oblation). An obliterated sinus could lead to decreased symptoms and decreased associated morbidity.

CONCLUSIONS

This preliminary data supports sinus auto-oblation following aggressive endoscopic surgical management in recalcitrant maxillary sinusitis in CF patients.

REFERENCES

11. Kountakis SE. Sinonasal Osteoneogenesis in Cystic Fibrosis Causing Auto-Obliteration of Maxillary Sinuses
12. Lindsey Pennington, MD ; Anil Gungor, MD

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*CT scan on one of our patients from January 2012 on left to September 2013 on right