ABSTRACT

Objective: The etiology and outcomes for patients with acquired subglottic stenosis (SGS) are highly variable. This study aimed to (1) identify risk factors for SGS, and (2) identify patient characteristics that would help predict long-term clinical outcomes.

Methods: A retrospective chart review was performed on 62 patients with SGS and 62 age-matched controls without SGS from the same laryngology practice. Patient demographics and clinical characteristics were compared using an unpaired student’s T-test with significance set at p<0.05. Binary data was evaluated using a Chi Square Test for significance. SGS patients were further grouped according to tracheostomy status: 1) never required a tracheostomy 2) initially required tracheostomy but since decannulated 3) tracheostomy dependent. Patient factors from these three SGS groups were then compared using a one-way ANOVA to evaluate risk factors for long-term tracheostomy dependence.

Results: Compared to controls, patients with SGS had a significantly higher Body Mass Index (BMI) (25.9 vs 20.9, p<0.001) and were more likely to have diabetes (p=0.01). Comparing tracheostomy outcomes within the SGS group, BMI trended towards significance (p=0.08). Age, gender, socio-economic status, etiology of subglottic stenosis, and other comorbidities were not found to correlate with outcome.

Conclusion: Obesity is both a significant risk factor for acquiring subglottic stenosis as well as a predictor for failed decannulation once acquired. Weight loss should be an integral part in these patients’ management. Diabetes is also a risk factor for SGS, although it was not shown to correlate with tracheostomy outcome.

METHODS AND MATERIALS

A retrospective chart review was performed including all patients 18 years of age and older with a diagnosis of subglottic stenosis and age-matched controls seen at the University of Pennsylvania between January 1, 2001 and December 31, 2010.

Extracted data included demographic information (age, gender, race) and comorbidities (body mass index (BMI), gastroesophageal reflux disease (GERD), diabetes mellitus (DM), and ASA score as a measure of overall health). Analysis included the number of procedures required by each patient, need for a tracheostomy, ability to decannulate and time to decannulation.

Statistical Analysis: Patient demographics and clinical characteristics were compared to those of controls using an unpaired student’s T-test with significance set at p<0.05. Binary data was evaluated using a Chi Square Test for significance.

Analysis among the 3 outcome groups was performed using Graph Pad Software. Between-group mean comparisons were calculated using ANOVA and Tukey post hoc multiple comparisons test.

RESULTS

Sixty-three patients with SGS were identified who met our inclusion criteria. Forty patients never required a tracheostomy for their SGS, 15 had a tracheostomy but were successfully decannulated, and 8 patients remained tracheostomy-dependent at last follow-up.

Compared to controls, patients with SGS had a significantly higher BMI (25.9 vs 30.9, p<0.001) and were more likely to have diabetes (p=0.02) (Table 1).

Comparing tracheostomy outcomes within the SGS group, higher BMI approached significance (29.25 [7.95] vs 32.01 [8.18] p=0.08). Age, gender, and other comorbidities were not found to correlate with outcome (Table 2).

DISCUSSION

The pathophysiology of SGS is currently understood to be a process of abnormal wound healing and a proliferation of granulation tissue. The upregulation of inflammatory markers has been demonstrated in animal models of SGS as well as in samples of human granulation tissue.

To our knowledge, no other literature exists relating obesity to subglottic stenosis. However, if we accept that SGS is the result of persistent pathologic inflammation, then this conclusion should not be surprising. Obesity triggers a chronic inflammatory state that promotes the production of proinflammatory markers, thus potentially lowering the threshold to acquire SGS. Higher BMI’s were seen in patients requiring tracheostomy, though this difference only approached significance. This could be due to the relatively low number of patients requiring tracheostomy in our study.

Diabetes mellitus, another condition associated with inflammation, was found more commonly in our SGS patients than in our controls, but was not found to correlate with tracheostomy status. The role of DM in SGS has been discussed in prior studies. One retrospective review found that diabetic SGS patients did not recur more than patients without but they had a significantly shorter time to recurrence. A 2007 review by Etterma et al showed diabetes to be associated with more severe stenosis, 5.3% of patients with a Myers Cotton grade III stenosis compared to 36.4% of patients with a Myers Cotton grade IV.

Gastroesophageal reflux (GERD) is widely believed to contribute to subglottic stenosis, but was not a significant finding in this review. The majority of SGS patients in our practice are placed on antireflux medication as part of their management strategy. In the absence of pH testing, we cannot define who truly had extraesophageal reflux. Furthermore, since our controls are also laryngology patients, one could imagine that they are more likely to be on antireflux medications than the general population.

CONCLUSIONS

Obesity is a significant risk factor for acquiring subglottic stenosis, and may be a predictor for poor outcomes once acquired. Diabetes is also associated with SGS. The common denominator between these 2 factors is pathologic inflammation. Weight loss and glucose control should be integral parts in these patients’ management.

REFERENCES