ABSTRACT

Objectives
To retrospectively review the presentation, management and treatment outcomes associated with laryngeal trauma treated at a level I trauma center over a twenty-year period.

Study Design
Retrospective Case Series

Methods
All records of patients seen in two hospitals in a single institution that included an International Classification of Diseases (ICD) diagnosis code involving laryngeal trauma during a ten-year period were identified. Retrospective chart review was performed and data regarding demographics, presentation, treatment details, and clinical outcomes were extracted. Descriptive statistical analysis was applied.

Results
Clinical records from 240 patients were reviewed with 122 meeting inclusion criteria. Over half had undergone surgical intervention. Males represented 82% of cases, and mean age was 43.3 years. Caucasians represented the majority of the cohort. Dysphonia was an initial presenting symptom in about half of subjects, and less than half presented with airway complaints. Isolated laryngeal trauma represented 58.7% of cases while the remainder associated injury. Plate fixation was used in 29.2% of surgical cases while 31.7% had suture fixation. Stents were used in 19.5% of cases, stent use was more frequent in the earlier cases in the cohort, though these differences did not reach statistical significance.

Conclusion
Though laryngeal trauma is uncommon, presenting symptoms may underestimate the severity of disease. Approach to management may be changing over time, and may reflect changes in diagnostic and therapeutic technology.

INTRODUCTION

Neck injury is common, accounting for 2.5% of injury-related deaths in the US annually,1 but external laryngeal trauma is relatively uncommon.2 Given the potential for life-threatening airway complications in a setting of laryngeal injury, robust treatment algorithms for management of laryngeal trauma were developed in the 1990s.3-5,6

Harborview Medical Center serves as a Level I trauma center for four states and sees a relatively high volume of external laryngeal trauma. The reported literature regarding external laryngeal trauma describes primarily smaller or older series.6,7 The objective of this study was to describe the Harborview experience with laryngeal trauma over a twenty-year period.

We hypothesized that with the advent of newer techniques for airway management, and fracture repair, the second decade would show a decreased rate of surgical intervention after correcting for severity of injury, and a higher rate of plate use and lower incidence of stent use in more recent cases.

METHODS

Institutional review board permission was obtained from the University of Washington (UW) Human Subjects Division for this study. All consecutive cases of laryngeal trauma seen between 1993 and 2003 in two hospitals within a single institution were identified using International Classification of Diseases (ICD) diagnosis codes through the UW Institute of Translational Health Sciences Amaiga Clinical Data Repository. Patients with isolated internal injury (e.g. from chronic intubation, inhalation), those with presenting age less than 16, and for whom initial management of a fracture took place prior to presentation at UW were excluded from data extraction and analysis.

A retrospective chart review was performed and data regarding demographics, presentation, treatment details, and clinical outcomes were extracted. Descriptive statistical analysis was applied to the entire cohort, and comparative analysis with risk stratification using propensity scoring was performed using Stata (StataCorp LP, College Station, TX) to compare the first and second decade cohorts in regards to frequency of surgical intervention.

RESULTS

Inclusion criteria were met by 122 cases. Figures 1 and 2 demonstrate an example of a laryngeal trauma case, with disruption of the anterior framework from a box cutter. Figure 3 and 4 demonstrate repair options, namely suture fixation, titanium plating, and endolaryngeal stent placement. Figure 5 summarizes the demographics characteristics of the entire cohort. Hoarseness was the leading symptom (Figure 6), followed by dysphagia and dyspnea. Extremity injury and facial fractures were the most commonly associated injuries (Figure 7).

The cohort was then divided into two groups based on date of injury. Propensity scoring was performed using 16 criteria associated with presentation. Only four of 16 factors were found to influence disease severity: type of injury (blunt versus penetrating), presence of airway symptoms, presence of subcutaneous emphysema, and presence of an associated head injury. The rate of surgical intervention was similar between groups (Figure 8). However, of those fractures that underwent surgical repair, there was less tendency to use an endolaryngeal stent in the later group, and a greater tendency to use plating. Neither of these differences reached statistical significance, however. Rates of repair with suture only were similar.

CONCLUSIONS

Though laryngeal trauma is uncommon, hoarseness, dyspnea, and/or dysphonia with an appropriate clinical history should raise the index for suspicion for laryngeal injury. Approximately two thirds undergo surgical intervention, and plates may be used more frequently than in the past. A prospective study with monitoring of outcomes would be of benefit to better understand ways to optimize management of this condition in the current era of technological advancement.

REFERENCES
