Tonsillectomy is one of the oldest procedures performed, with the first report attributed to Roman surgeon Cornelius Celsus dating 30 AD. Over 250,000 adenotonsillectomies are completed each year in the United States, making it the third most common procedure performed.

Post-tonsillectomy bleeding is a significant post-operative morbidity and can be life-threatening, with a mortality rate of 1 death per 20,000 procedures. The reported incidence of post-tonsillectomy hemorrhage (PTH) is 1.6%, but ranges from 1-10%. Bleeding is categorized as either primary (onset less than 24 hours post-operatively) or secondary (onset greater than or equal to 24 hours post-operatively).

Environmental factors, including the effect of seasonal variation, have also been hypothesized to alter complication rates after tonsillectomy. In an analysis of over 250,000 tonsillectomy procedures, Chaubal et al reported that more secondary bleeds occur in the winter months, during which there is an increased incidence of upper respiratory infections. Despite several studies showing a significant association between season and weather patterns and PTH, there are inconsistencies.

One risk factor for PTH is recurrent tonsillitis as an indication for tonsillectomy. A history of chronic or recurrent tonsillitis represents a risk factor due to increased fibrosis, scarbing, and neovascularization, that creates friable tonsillar tissue.

The purpose of the study is to investigate the effects of seasonal variation on PTH in the pediatric population. A secondary objective is to investigate whether the indication for tonsillectomy, be it chronic and recurrent tonsillitis or hypertrophy, plays a role in the incidence of PTH.

Of the 71 patients who bled, there was no significant difference between incidence of PTH in patients who had the initial procedure for tonsillitis (26/1355, 1.92%) and those who underwent the procedure for hypertrophy (45/3619, 1.24%) (p=0.074).

One patient who suffered a PTH had known VWD disease. Six patients with PTH underwent hemostatic workup, of which one was diagnosed with VWD.

Only 8.4% (4/77; 4 tonsillitis, 2 hypertrophy) of total PTH were primary bleeds. Most bleeds (65/71; 91.5%) were categorized as secondary bleeds in both the tonsillitis and hypertrophy groups.

The most number of bleeds, both groups combined, occurred on post-operative day (POD) 6, 7, 8 with 18.3% (13/71), 14.1% (10/71), and 19.7% (14/71) of patients who bled, respectively (Figure 3).

Patients who bled were significantly older than those who did not (p = 0.001). The average age for those who bled was 8.66 years and the average age of those that did not bleed was 6.44 years (Figure 4).

The year was divided into quarters to evaluate seasonal variation in PTH. The first quarter, January through March, had the most number of bleeds overall (32.4%). The second, third, and fourth quarters had 22.5%, 26.8%, and 18.3% of bleeds. Both groups had the most number of bleeds in the first quarter, the tonsillitis group had 30.8% bleed compared to 33.3% of the hypertrophy group (Figure 5). The following three quarters of the year had comparable number of bleeds in both groups.

The average temperature on the day of post-operative bleeding was 48 degrees and the average maximum temperature was 60 degrees Fahrenheit. There was no significant difference in maximum temperature (tonsillitis 58.68 degrees Fahrenheit, hypertrophy 57.73 degrees Fahrenheit; p=0.86) or average temperature (tonsillitis 48.6 degrees Fahrenheit, hypertrophy 48.69 degrees Fahrenheit; p=0.98) of the day of bleed between the tonsillitis and hypertrophy group (Figure 6).

In this study, we report a PTH incidence of 1.43% at our institution.

The statistically significant difference in the age of patients who bled compared to those who did not raises the importance of pre-operative counseling and identification of risk factors for bleeding. We hypothesize that older children are more likely to have cryptic scarred tonsils with hypervascularity, which have been previously demonstrated to be associated with increased risk of PTH.

Additionally, our study demonstrated that 1 out of 6 patients having undergone hematologic workup after PTH was diagnosed with VWD. Routine pre-operative laboratory screening for bleeding diatheses is expensive and leads to high rates of false positive results. Obtaining a thorough bleeding history is a cost-efficient and effective means of screening.

Our study demonstrated that most bleeds occurred on post-operative day 6, 7, and 8, which suggests that sloughing of the superficial eschar may be an inciting event.

The increase in PTH in the winter months, January through March, in both groups, fosters the question whether an increase in prevalence of viral URI affects the incidence of secondary PTH during the winter months.

The limitations of this study include PTH managed at outside facilities, variable climates of the location of patient at the time of bleed, and indoor environmental conditions. Future studies should investigate other climate factors, i.e. barometric pressure, humidity, and indoor conditions to further characterize risk factors for PTH.

With advances in technology, the rate of PTH remains between 1-3%. Our study demonstrates a statistically significant influence of age on risk for PTH. Daily temperature and indication for tonsillectomy did not influence risk of PTH. Overall, there was an increase in frequency of PTH in the winter months, January through March, which supports the belief that incidence of URI may influence the risk of PTH.

REFERENCES