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INTRODUCTION

Orbital cellulitis is primarily a complication of acute sinusitis that mainly affects the pediatric population. Since the 1970’s, the Chandler classification system has been used to stratify orbital complications, using the orbital septum as an important landmark that divides pre- and post-septal disorders. Post-septal complications are of the most concern due to risks of rapid progression, visual compromise, or life-threatening intracranial involvement. Diagnosis is based on both physical exam findings and imaging, with contrast-enhanced CT used most commonly.

The organisms responsible for orbital cellulitis mimic those seen in acute sinusitis including Streptococcus spp., Haemophilus influenza, and Staphylococcus spp. Children affected 10 years and older may have a more mixed infection with organisms including anaerobes such as Peptostreptococcus, Fusobacterium, and Bacteroides. Community-acquired methicillin-resistant S. aureus is an increasing concern with an escalating incidence of head and neck infections in children.

While surgery was previously the mainstay of treatment, therapy today varies based on signs/symptoms and classification of severity. Medical management includes hospital admission, serial ophthalmologic exams, and intravenous antibiotics targeted towards common microorganisms with good cerebrospinal fluid penetration. Surgical interventions are reserved for complicated infections and include endoscopic and open drainage with ethmoidectomy or orbitotomy.

For this study, we investigated the national demographic characteristics, surgical treatment variation, and cost and resource utilization related to orbital cellulitis over time.

METHODS AND MATERIALS

We queried the Healthcare Cost and Utilization Project 2003, 2006 and 2009 Kid Inpatient Databases (KID) created by the Agency for Healthcare Research and Quality. Compiled every three years, the KID is the only all-payer inpatient care database for children in the U.S. The 2009 KID contained a stratified sample pooled from 44 State Inpatient Databases on children 20 years of age and younger.

We identified all cases with a primary diagnosis of International Classification of Disease, ninth revision, clinical modification (ICD-9-CM) code 376.01, orbital cellulitis. We analyzed total discharge numbers, length of stay (LOS), data, total hospital charges, and basic demographic information including age, sex, and geographic region. We utilized Statistical Analysis Software for our analysis. We obtained U.S. population data used for the calculation of incidence. This study used a publically available, de-identified database allowing exemption from the Institutional Review Board.

RESULTS

- From 2003-2009, incidence of hospital admissions with orbital cellulitis codes remained relatively stable at 2.8-3.2/100,000 population.
- Younger children were more commonly afflicted, with 0-4yo 1.92 times more likely than other age groups (RR 1.92, 95% CI 1.87-1.95).
- Males had a higher incidence when compared to females, making up 60% of the total cases (RR 1.18, 95% CI 1.16-1.20).
- Incidence showed a seasonal variation consistent from 2003-2009, with more cases seen during the winter and spring months compared to the warmer summer months.
- Mean and median lengths of stay remained constant (3-4 days), though median unadjusted hospital charges increased during this period ($6,225-10,290).
- Surgical interventions were not often performed; however, in these cases, orbitotomy was performed more often than ethmoidectomy (7.2% vs 1.3%, p<0.001).

CONCLUSIONS

- The number of cases and incidence of orbital cellulitis remained constant.
- Numbers of cases decreased with increasing age.
- Males were affected more frequently.
- Costs per hospitalization increased but lengths of stay remained constant.
- Orbitotomy was performed more frequently than ethmoidectomy; however, both procedures were infrequent. This suggests most providers follow recommendations of conservative treatment with antibiotics.

LIMITATIONS

- Use of ICD-9 coding may represent misclassification in some cases, utilizing only the primary diagnosis field may lead to an underestimation this may be more pronounced in children less than five years old. This issue will be explored further in additional analyses.
- Several cases within the database did not have all the proper information; therefore, these cases were omitted during our in-depth analysis.
- Ethmoidectomy occurred in so few cases, it was excluded as a surgical procedure.
- Laboratory and other data that may impact management and LOS are not available in the database.

REFERENCES