Introduction

• Chronic rhinosinusitis with nasal polyps (CRSwNP) accounts for 20-33% of cases of chronic rhinosinusitis (CRS)\(^1\)
• Healthcare burden associated with CRS is well-documented\(^1,2\), and may be more intense for CRSwNP
• Evidence regarding the added burden of nasal polyps compared to CRS without nasal polyps (CRSsNP) is mixed\(^3\), but suggests a relatively high frequency of extensive sinus surgeries\(^4\); further investigation of CRSwNP-related burden in relation to surgical procedures using newer data is needed

Objective

To compare characteristics of sinus surgery visits associated with CRSwNP vs. CRSsNP

Methods

Study Design and Data Source

• Retrospective, cross-sectional analysis of administrative data from 7 states in the State Ambulatory Surgery and Services Databases (SASD)\(^*\) from 2012-2015
• Visit-level data from outpatient and hospital-owned ambulatory surgery facilities in Colorado (CO), Florida (FL), Iowa (IA), Kentucky (KY), North Carolina (NC), New York (NY), and Wisconsin (WI)
• All payer types represented in data

Patient Population

• Visits for patients ≥18 years old were included if they:
  o Had a diagnosis of CRSwNP (ICD-9-CM: 471.x; ICD-10-CM: J33.x) or CRSsNP (ICD-9-CM: 473.x; ICD-10-CM: J32.x) and without a code of ICD-9-CM: 471.x; ICD-10-CM: J33.x
  o Received a selected surgical procedure according to Current Procedural Terminology® (CPT) code for commonly performed interventions\(^5\):
    - Endoscopic sinus surgery (ESS): 31233, 31235, 31254, 31255, 31256, 31267, 31276, 31286, 31287, 31295, 31296, 31297
    - Maxillary antrostomy (MA): 31256, 31267
    - Ethmoidectomy: 31200, 31201, 31205, 31254, 31255
    - Sphenoidotomy: 31287, 31288
    - Frontal sinusotomy (FS): 31276
    - Septoplasty: 30520
• Visits were located in the following states: NY (32.9%), NC (14.2%), KY (11.8%), CO (10.4%), FL (8.6%), WI (6.2%), IA (5.9%), and MA (5.4%)
• Visits associated with CRSwNP more frequently involved surgeries on 3 or 4 sinus types vs. those for CRSsNP (59.1% vs. 41.4%) ($p<0.0001$ for all)\(^6\)
• Other payer types used to cover visits (CRSwNP vs. CRSsNP) included Medicare (8.3% vs. 8.4%), Self-pay (1.5% vs. 1.4%), No charge (0.2% vs. 0.1%), and Other or Missing (3.9% vs. 3.9%)\(^7\) (Table 1)
• Mean [SD] number of chronic conditions was similar for CRSwNP visits vs. CRSsNP (2.1 [1.7] vs. 2.2 [1.7]; $p=0.2102$)

Results

Demographics and Comorbidities

• A total of 142,313 visits associated with CRSwNP (n=41,346) or CRSsNP (n=100,967) involving a selected surgical procedure were identified
• Visits were located in the following states: NY (32.9%), NC (14.2%), KY (6.2%), FL (30.1%), WI (11.8%), CO (1.1%), and IA (3.8%) (Figure 1)
• Mean [SD] age was higher for visits associated with CRSwNP vs. CRSsNP (49.9 [15.6] vs. 47.9 [15.9]; $p<0.001$)\(^8\) (Table 1)
• Patients with visits associated with CRSwNP (vs. CRSsNP) were predominantly male (59.1% vs. 45.0%), White (74.8% vs. 77.8%) and privately-insured (65.9% vs. 67.6%) ($p<0.0001$ for all)\(^8\) (Table 1)
• Other payer types used to cover visits (CRSwNP vs. CRSsNP) included Medicare (8.3% vs. 8.4%), Medicaid (6.3% vs. 6.2%), Self-pay (1.5% vs. 1.4%), No charge (0.2% vs. 0.1%), and Other or Missing (3.9% vs. 3.9%)\(^8\) (Table 1)
• Mean [SD] number of chronic conditions was similar for CRSwNP visits vs. CRSsNP (2.1 [1.7] vs. 2.2 [1.7]; $p=0.2102$)

Comorbidities

• Measures
  - Healthcare resource utilization, by CRS subtype
    - Proportions of visits involving above selected surgical procedures
    - Number of operated sinus types (1-4; maxillary, ethmoid, sphenoid, or frontal) per surgery visit
    - Proportion of peri-operative complications (indicated by ICD-9/10-CM or CPT code)
      - Orbital hemorrhage, orbital edema, cerebrospinal fluid (CSF) leak, blood transfusion
      - Length of stay (LOS), days
      - Ambulatory follow-up visits
      - Discharge status
  - Baseline measures, by CRS subtype
    - Demographic characteristics
      - Age, sex, race
      - Primary payer (Medicare, Medicaid, Private, Self-pay, No charge, Other or Missing)
    - Comorbidities
      - Chronic Condition Indicator (number of chronic conditions)\(^7\)

Statistical Analysis

• Descriptive statistics generated for all measures for visits associated with CRSwNP vs. CRSsNP
• Means and standard deviations (SD) used to summarize continuous variables; frequencies and percentages summarized categorical variables

Healthcare Resource Utilization

• CRS-related surgery visits (CRSwNP vs. CRSsNP) involving a selected procedure were most commonly for ESS (95.0% vs. 93.8%), MA (83.1% vs. 77.5%), and ethmoidectomy (85.1% vs. 72.7%), followed by septoplasty (39.4% vs. 53.7%), frontal sinusotomy (46.2% vs. 33.6%), and sphenoidotomy (45.2% vs. 26.5%)\(^8\) (Figure 2)
• Visits associated with CRSNP were more frequently involved on 3 or 4 sinus types than those for CRSwNP (59.3% vs. 41.4%)\(^8\) (Figure 3)
• Visits associated with CRSwNP were more likely to have 30 days of follow-up visits (19.9%, not shown), had routine discharges (91.9%), and mean LOS of less than one day\(^8\) (Table 2)
• Most procedures were without peri-operative complications (>99%) in either subtype\(^8\) (Table 2)
• Less than 15% of visits associated with either subtype (CRSwNP vs. CRSsNP) had follow-up visits within 30 days (14.9% vs. 13.9%)\(^8\) (Table 2)

Limitations

• SASD are a collection of encounter-level data. Reported counts and proportions for any SASD database are for visits and do not necessarily reflect individual patients; hence, individuals may have multiple visits recorded in the databases

Conclusion

• Surgical visits associated with chronic rhinosinusitis with nasal polyps involved more of the selected sinus surgery procedures (known to be common surgical interventions) vs. visits without polyps
• Visits associated with CRSwNP involving the selected surgical procedures also involved more sinus types vs. those for CRSsNP

References

1. Hamilos DL. UpToDate [Internet]. 2016.