Introduction:

While the early decades of the 20th century witnessed attempts at resecting pituitary lesions, including a transsphenoidal approach developed by Cushing, many advances in the management of growth hormone-secreting adenomas have been developed since, including improvements in transsphenoidal approaches for surgical intervention, stereotactic radiotherapy, somatostatin analogue medical treatment, and pituitary hormone replacement. Transsphenoidal surgery (TSS) morbidities and complications, far less than those of transcranial approaches, include the possibility of postoperative endocrineopathies, diabetes insipidus, cerebrospinal fluid (CSF) rhinorrhea, as well as other general risks associated with surgical intervention. While first-line therapy of patients with acromegaly is surgery, it is unclear whether any postoperative complications have a stronger association with this diagnosis relative to other pituitary neoplasms for which patients undergo resection. Anecdotally, some surgeons may potentially be more aggressive with intrasellar tumor resection in order to achieve biochemical cure, leading to a potentially higher rate of iatrogenic hypopituitarism, although there is little literature definitively illustrating this. In the senior authors’ skull base surgery practices (J.A.E., J.K.L., and A.J.F.), we have encountered numerous acromegaly patients. Our objective was to use a nationally representative database, the Nationwide Inpatient Sample (NIS), to evaluate whether any postoperative complications are more or less likely among patients who undergo TSS for growth hormone adenomas. In addition to analyzing complications, we also examine and compare patient demographics, hospital costs, and length of stay among both of these cohorts.

Methods and Materials

The NIS database was accessed by the authors in October 2014. Examining inpatient hospitalizations between 2002 and 2010 using the primary diagnosis code “Benign Pituitary Neoplasm” (ICD-9 Code 227.3) and primary procedure codes 07.14, 07.62, and 07.65 (leptoscopy of pituitary gland transphenoidal approach, total excision of pituitary gland transphenoidal approach, respectively), we searched for patients with and without the comorbidity code for “Acromegaly and Gigantism” (253.0). Patient entries were evaluated for age, length of stay, total charges, obesity, and the presence or absence of the complications detailed in Table 1.

Figure 1. Temporal Trends in Transsphenoidal Surgery for Benign Pituitary Lesions

Figure 2. Postoperative Complications in Acromegaly and Non-Acromegaly Patients

Figure 3. Annual Trends of CSF Leak Rate Events

Results

Analyzing the incidence of complications noted in Table 1, several statistically significant differences were noted in the presentation of these two cohorts (Table 2). In the univariate logistic regression analysis, acromegaly patients had a statistically lower rate of postoperative urinary and renal complications, thromboembolic events, fluid and electrolyte abnormalities, and iatrogenic pituitary disorders (i.e., hypopituitarism) (Figure 2, Table 4) (p-values < 0.05). Acromegaly patients had a trend towards greater rates of CSF leak, a finding that bordered but did not reach statistical significance (2.6% vs. 1.7%; p = 0.054) (Figure 3). Unadjusted rates of other complications are detailed in Figure 2. However, when corrected for age, CSF leaks, iatrogenic pituitary disorders, and urinary and renal complications did not meet the threshold for statistical significance. Acromegaly patients had higher odds of developing fluid and electrolyte complications following TSS, a finding that was statistically significant after adjusting for age (p = 0.007) (Table 4).

Conclusions

Upon comparison of inpatient hospitalizations for patients undergoing TSS resection for growth hormone adenomas causing acromegaly and for other benign pituitary neoplasms, acromegaly patients had a lower incidence of postoperative urinary and renal complications, thromboembolic events, fluid and electrolyte abnormalities, and iatrogenic hypopituitarism. Acromegaly patients had shorter hospitalizations and subsequently fewer total charges. This analysis used a nationally representative resource, providing significant external validity. It is important for practitioners to be mindful of the complications outlined and include these issues in a comprehensive preoperative discussion with patients considering surgical intervention.