Pituitary neuroendocrine tumor case series

2023

A retrospective cohort study of patients with pituitary adenomas and Rathke's cleft cysts was conducted. All patients were aged 75 years or over and treated by a single expert neurosurgical team. A control population included 2379 younger adult patients operated by the same surgeons during the same period.

Between 2008 and 2022, 155 patients underwent surgery. Indication was based on vision impairment in most patients (79%). Median follow-up was 13 months (range: 3-96). The first surgery was performed with an endoscopic transsellar approach, an extended endonasal transtuberculum approach and a microscopic transcranial approach in 96%, 3%, and 1% of patients, respectively. Single surgery was sufficient to obtain volume control in 97% of patients. From Kaplan-Meier estimates, 2-year and 5-year disease control with a single surgery were 97.3% and 86.2%, respectively. Resection higher than 80% was achieved in 77% of patients. No vision worsening occurred. In acromegaly and Cushing's disease, endocrine remission was obtained in 90% of non-invasive adenomas. Surgical complications were noted in 5% of patients, with 30-day mortality, hematoma, cerebrospinal fluid leak, meningitis, and epistaxis occurring in 0.6%, 0.6%, 1.9%, 0.6%, and 1.3% respectively. New endocrine anterior deficits occurred in only 5%, while no persistent diabetes insipidus was noted. Compared with younger patients, the complication rate was not statistically different.

Surgery beyond the age of 75, mainly relying on an endoscopic endonasal transsellar approach, is effective and safe, provided that patients are managed in tertiary centers [1)].

Cossu et al. performed a retrospective analysis in a series of 86 PitNETs. Clinical presentation and radiological features of the preoperative period were collected, as well as pathological data and follow-up data. The rate of PD-L1 expression was immunohistochemically evaluated and expressed as a tumor proportion score (TPS). We assessed its relationship with cavernous sinus invasion and Trouillas' classification as primary outcomes. Secondary outcomes included the TPS' relationship with histopathological markers of proliferation, hormonal expression, tumor size and long-term recurrence rates. We calculated the optimal cut-point for the primary outcomes while maximizing the product of the sensitivity and specificity and then we evaluated the significance of secondary outcomes with logistic regression analysis.

Results: Eighty-six patients were included in the analysis; 50 cases were non-functional PitNETs. The TPS for PD-L1 showed a highly right-skewed distribution in our sample, as 30.2% of patients scored 0. Using Trouillas' classification, we found that “proliferative” cases have a significantly higher probability to express PD-L1 in more than 30% of tumor cells (OR: 5.78; CI 95%: 1.80-18.4). This same cut-point was also associated with p53 expression. A positive association was found between PD-L1 expression and GH expression (p = 0.001; OR: 5.44; CI 95%: 1.98-14.98), while an inverse relationship was found with FSH/LH expression (p = 0.014; OR = 0.27, CI 95%: 0.10-0.76). No association was found with CS invasion, tumor size, bone erosion or dura invasion. We could not find any association between PD-L1 expression and recurrence.

Conclusions: PD-L1 expression was associated with proliferative grades of Trouillas' classification and

p53 expression. We also confirmed a higher expression of PD-L1 in somatotroph tumors. Larger studies are necessary to investigate the relationship between PD-L1 expression and aggressive behaviors [2].

Between August 1997-June 2022, a total of 3256 patients underwent endoscopic transsphenoidal surgery for pituitary adenoma at the Department of Neurosurgery and Pituitary Research Center of the Kocaeli University School of Medicine. Of these, 70(2.1%) pediatric patients (25 male,45 female)(age ≤18 years) with a pathological diagnosis of pituitary adenoma were retrospectively reviewed.

The mean age of patients was 15.5±2.3 years.Among the hormone-secreting adenomas, 19(34.5%) were adrenocorticotrophic hormone (ACTH)-secreting, 13(23.6%) were growth hormone (GH)-secreting, 19(34.5%) were prolactin (PRL)-secreting, and 4(7.2%) were both GH- and PRL-secreting.Gross total resection was achieved in 93.3% of nonfunctional tumors.The early/late surgical remission rates for hormone-secreting adenomas were 61.5%/46.1%(mean follow-up:63.7±49.3 months) for acromegaly, 78.9%/68.4%(47.8±51.0 months) for Cushing's disease, 57.8%/31.5%(72.2±59.5 months) for prolactinoma, and 25%/25%(35.2±31.4 months) for GH+PRL-secreting adenomas.Five sparsely-granulated corticotroph tumors, 5 sparsely-granulated somatotroph tumors, and 11 densely-granulated lactotroph tumors were classified as aggressive histopathological subtypes.

The unique characteristics of the pediatric population and the aggressiveness of the disease in this population pose considerable therapeutic challenges. To increase treatment success, current adjuvant therapies that are appropriate for the morphological and biological characteristics of the tumor are required in addition to surgical treatment [3].

2022

Guo et al. assessed the safety of withholding hydrocortisone during the perioperative period of pituitary neuroendocrine tumor surgery for patients with an intact hypothalamus-pituitary-adrenal (HPA) axis.

A parallel-group, triple-masked, noninferiority randomized clinical trial was conducted at Peking Union Medical College Hospital from November 1, 2020, to January 31, 2022, among 436 patients aged 18 to 70 years with an intact HPA axis undergoing surgery for pituitary neuroendocrine tumors.

Interventions: Hydrocortisone supplementation protocol (intravenous and subsequent oral hydrocortisone, using a taper program) or no-hydrocortisone protocol.

Main outcomes and measures: The primary outcome was the incidence of new-onset adrenal insufficiency (morning cortisol level, <5 µg/dL with adrenal insufficiency-related symptoms) during the perioperative period (on the day of operation and the following 2 days). The secondary outcome was the incidence of adrenal insufficiency in postoperative month 3. Analysis was on an intention-to-treat basis.

Results: Of the 436 eligible patients, 218 were randomly assigned to the hydrocortisone group (136

women [62.4%]; mean [SD] age, 45.4 [13.0] years) and 218 to the no-hydrocortisone group (128 women [58.7%]; mean [SD] age, 44.5 [13.8] years). All patients completed a 3-month postoperative follow-up. The incidence of new-onset adrenal insufficiency during the perioperative period was 11.0% (24 of 218; 95% CI, 6.9%-15.2%) in the no-hydrocortisone group and 6.4% (14 of 218; 95% CI, 3.2%-9.7%) in the hydrocortisone group, with a difference of 4.6% (95% CI, -0.7% to 9.9%), meeting the prespecified noninferiority margin of 10 percentage points. The incidence of adrenal insufficiency at the 3-month follow-up was 3.7% (8 of 218) in the no-hydrocortisone group and 3.2% (7 of 218) in the hydrocortisone group (difference, 0.5%; 95% CI, -3.0% to 3.9%). Incidences of new-onset diabetes mellitus (1 of 218 [0.5%] vs 9 of 218 [4.1%]), hypernatremia (9 of 218 [4.1%] vs 21 of 218 [9.6%]), hypokalemia (23 of 218 [10.6%] vs 34 of 218 [15.6%]), and hypocalcemia (6 of 218 [2.8%] vs 19 of 218 [8.7%]) were lower in the no-hydrocortisone group than in the hydrocortisone group. Lower preoperative morning cortisol levels were associated with higher risks of the primary event (<9.3 µg/dL; odds ratio, 3.0; 95% CI, 1.5-5.9) and the secondary event (<8.8 µg/dL; odds ratio, 7.8; 95% CI, 2.6-23.4) events.

Conclusions and Relevance: This study found that withholding hydrocortisone was safe and demonstrated noninferiority to the conventional hydrocortisone supplementation regimen regarding the incidence of new-onset adrenal insufficiency among patients with an intact HPA axis undergoing pituitary adenomectomy.

Trial registration: ClinicalTrials.gov Identifier: NCT04621565 [4].

A case-control study included patients with pituitary neuroendocrine tumor in the Neurosurgery Department of Shanxi Provincial People's Hospital, between October 2019 and June 2021. Cranial MRI examination, Three Dimensional Optical Coherence Tomography Imaging, and visual field test (Humphrey Field Analyzer II750) were performed before and at 6months after the surgery.

Fifty-three pituitary neuroendocrine tumor patients (81 eyes) were enrolled; 15 patients (23 eyes) were in the visual field did not recover group (VFNR), and 38 patients (58 eyes) were in the visual field recovered group (VFR). The temporal retinal nerve fiber layer thickness (RNFL) (P = 0.002) and average RNFL (P = 0.009) in the VFNR group were significantly lower than in the VFR group. The superior nasal ganglion cell–inner plexiform layer thickness (GCIPL) (P = 0.001), inferior nasal GCIPL (P = 0.001) and average GCIPL (P = 0.01) were significantly lower in the VFNR group than in the VFR group (all P < 0.01).The multivariable logistic regression analysis showed that nasal inferior GCIPL was an independent risk factor for VF recovery (odds ratio (OR) = 1.376,95% confidence interval (CI):1.089-1.739,P = 0.007). In the received operating characteristics (ROC) analysis, the area under the ROC curve (AUROCs) was the highest for nasal inferior GCIPL (AUROC = 0.739).

In patients who underwent resection of pituitary neuroendocrine tumor, nasal inferior GCIPL was an independent risk factor of visual field defect recovery after surgery [5].

Despite the widespread popularity of navigation and angled endoscopes in endonasal endoscopy, there are hardly few studies on their efficacy with the extent of resection or retreatment. This is probably the first study to assess the independent impact of these adjuncts among pituitary tumors. Patients with pituitary tumors undergoing endonasal endoscopy were prospectively studied for their demographics, clinico-radiological features, intraoperative use of navigation, and angled endoscopes, in relation to gross total resection (GTR), near total resection (NTR), endocrine remission, and retreatment. Pertinent statistical analyses were performed. Among a total of 139 patients, navigation

and angled endoscopes could be used in 54 and 48 patients, respectively, depending upon their availability rather than chosen as per the case. There was no significant difference in baseline characteristics in relation to their use. The surgeon's perception of immediate benefit was noted among 51.9% while using navigation. The use of angled endoscopes towards the end of resection could help with additional tumor removal in 62.5% of patients. Overall, the use of navigation resulted in a significantly higher GTR (80.8% vs. 59.7%, OR 2.83, p = 0.01), a higher GTR/NTR (86.5% vs. 70.8%, OR 2.65, p = 0.04), and a lower retreatment rate (7.7% vs. 20.8%, OR 3.15, p = 0.05) than the others. In functioning tumors with cavernous sinus invasion, navigation had significantly increased remission rates (69.2% vs. 0%, p = 0.03). The use of angled endoscopes yielded a significantly higher GTR/NTR (91.7% vs. 70.6%, p = 0.04) and a lower retreatment rate (0% vs. 15.7%, p = 0.05) among only non-functioning adenomas. In multivariate analyses, the use of neuronavigation had a significant association with both GTR and retreatment rates (p values 0.005 and 0.02 respectively), independent of other confounding factors. The elective intraoperative use of navigation has a significant independent impact on the extent of resection and retreatment overall. While navigation results in better remission rates among functioning tumors with cavernous sinus invasion, angled endoscopy has a significant association with surgical outcomes in non-functioning tumors [6].

The aim of a study of Butenschoen et al. was to analyze the postoperative improvement of visual function after adenoma resection and to identify prognostic factors for the postoperative clinical recovery. They performed a retrospective analysis of all consecutive patients treated via a transsphenoidal approach for pituitary neuroendocrine tumors from April 2006 to December 2019 in a high-volume neurosurgical department. The primary outcome was postoperative visual acuity and visual field impairment; the clinical findings were followed up to 3 months after surgery and correlated with clinical and radiographic findings. In total, 440 surgeries were performed in our department for tumors of the sella region in a time period of 13 years via a transsphenoidal approach, and 191 patients included in the analysis. The mean age was 55 years, and 98% were macroadenomas. Mean preoperative visual acuity in patients with preoperative impairment (n = 133) improved significantly from 0.64/0.65 to 0.72/0.75 and 0.76/0.8 (right eye R/left eye L) postoperatively and at 3 months follow-up (p < 0.001). Visual acuity significantly depended on Knosp classification but not Hardy grading. The strongest predictor for visual function recovery was age. Transsphenoidal pituitary tumor resection remains a safe and effective treatment in patients with preoperative visual impairment. It significantly improves visual acuity and field defects after surgery, and recovery continues at the 3 months follow-up examination [7].

A retrospective analysis of 90-day outcomes of patients undergoing endoscopic pituitary adenomectomy from 2010 to 2019 by a neurosurgical/ENT team was performed. Tumor subtype, cavernous sinus invasion, extent of resection/early remission, endocrinology outcomes, complications, re-operations and readmissions were analyzed. A comparator cohort ≥ 65 years undergoing clinical surveillance without surgery was also analyzed.

Of 468 patients operated on for pituitary neuroendocrine tumor, 123 (26%) were ≥ 65 years (range 65-93 years); 106 (86.2%) had endocrine-inactive adenomas; 18 (14.6%) had prior surgery. Of 106 patients with endocrine-inactive adenomas, GTR was achieved in 70/106 (66%). Of 17 patients with endocrine-active adenomas, early biochemical remission was: Cushing's 6/8; acromegaly 1/4; prolactinomas 1/5. Gland function recovery occurred in 28/58 (48.3%) patients with various degrees

of preoperative hypopituitarism. New anterior hypopituitarism occurred in 3/110 (2.4%) patients; permanent DI in none. Major complications in 123 patients were: Cerebrospinal fluid fistula 2 (1.6%), meningitis 1 (0.8%), vision decline 1 (0.8%). There were no vascular injuries, operative hematomas, anosmia, deaths, MIs, or thromboembolic events. Median length of stay was 2 days. Readmissions occurred in 14/123 (11.3%) patients, 57% for delayed hyponatremia. Intra-cohort analysis by age (65-69, 70-74, 75-79, ≥ 80 years) revealed no outcome differences. Cavernous sinus invasion (OR 7.7, CI 1.37-44.8; p = 0.02) and redo-surgery (OR 8.5, CI 1.7-42.8; p = 0.009) were negative predictors for GTR/NTR. Of 105 patients evaluated for presumed pituitary neuroendocrine tumor beginning in 2015, 72 (69%) underwent surgery, 8 (7%) had prolactinomas treated with cabergoline and 25 (24%) continue clinical surveillance without surgery, including two on new hormone replacement.

This study suggests that elderly patients carefully selected for endoscopic adenoma removal can have excellent short-term outcomes including high resection rates, low complication rates and short length of stay. The experience supports a multidisciplinary approach and the concept of pituitary centers of excellence. Based on observations, approximately 25% of elderly patients with pituitary neuroendocrine tumors referred for possible surgery can be monitored closely without surgery [8].

A total of 140 children and adolescents with pituitary neuroendocrine tumors were admitted to Peking Union Medical College Hospital from December 1987 to December 2014, and their clinical manifestations, hormone secretions, images, pathological types, surgical complications and follow-up characteristics were analyzed. Fifty-eight (41.4%) males and 82 (58.6%) females with a mean age of 12.5 years old (range, 6-14 years old) were included. Regarding tumor type, adrenocorticotropic hormone (ACTH), prolactin (PRL), growth hormone (GH), non-functioning and multiple-secreting adenomas accounted for 35.7%, 25.7%, 12.2%, 25.7%, and 0.7% of the tumors, respectively. Microadenomas, macroadenomas and giant pituitary neuroendocrine tumors accounted for 33.6%, 60.0% and 6.4% of the patients, respectively. Approximately 19.3% of the adenomas included in this study were invasive. Transsphenoidal approach surgery (TSS) was commonly used and accounted for 97.9% of the cases in this study. Total resection was achieved in 93.6% of the patients, and subtotal resection was performed in the remaining patients. Finally, 113 patients underwent a full-term follow-up until 2 years after surgery, and tumors recurred in 32 patients. TSS is the most commonly used surgical procedure in patients younger than 14 years old. No significant differences in surgical outcomes, mortality during the perioperative period or complications were observed between patients younger than 14 years old and similar patients in the general population [9].

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pituitary neuroendocrine tumors from 203 patients were collected from January 2013 to April 2017, and immunohistochemical analysis was used to detect the expression of GLUT3 and GLUT1 in tumor specimens. GLUT3-positive expression in the cystic change group was higher than that in the non-cystic change group (P = 0.018). Proportions of GLUT3-positive staining of microadenomas, macroadenomas, and giant adenomas were 22.7% (5/22), 50.4% (66/131), and 54.0% (27/50), respectively (P = 0.022). In cases of prolactin adenoma, GLUT3-positive staining was predominant in cell membranes (P =0.000006), while in cases of follicle-stimulating hormone or luteotropic hormone adenoma, Mei et al. found mainly paranuclear dot-like GLUT3 staining (P = 0.025). In other hormonal adenomas, GLUT3 was only partially expressed, and the intensity of cell membrane or paranuclear punctate staining was weak. In contrast to GLUT3, GLUT1 expression was not associated with pituitary neuroendocrine tumors. Thus, the results indicate that the expression of GLUT3 in pituitary neuroendocrine tumors is closely related to cystic change and hormonal type. This study is the first to report a unique paranuclear dot-like GLUT3 staining pattern in pituitary neuroendocrine tumors [10].

Sixty-three consecutive female patients with a mean age of 29.5 ± 1.1 years. Based on magnetic resonance imaging findings before surgery, 31 (49.2%) patients had microadenoma, and the remaining 32 (50.8%) had macroadenoma. The median follow-up after transsphenoidal surgery was 53 (33-74) months, and long-term surgical remission was achieved in 50 (79.37%) patients with 28 (90.32%) microadenomas and 22 (68.75%) macroadenomas. No meningitis or persistent Cerebrospinal fluid fistulas occurred. Only one case suffered from persistent diabetes insipidus at follow-up. No severe pituitary dysfunction was observed in microprolactinoma patients. Of patients with menstrual disorders, 85% regained regular menstrual cycles after surgery. Nineteen patients in this cohort desired pregnancy and 15 of them successfully gave birth after surgery. All 17 microadenoma patients with modern surgical indications achieved normal prolactin levels and regular menstrual cycles with only one patient on drug therapy at follow-up.

Long-term follow-up showed a high remission rate in female prolactinoma patients, especially in microadenoma patients, after surgery. Transsphenoidal surgery performed by experienced neurosurgeons may offer a valuable approach to treat female microprolactinoma patients of child-bearing age with modern indications for surgery [11].

Pietro Mortini et al. from the Department of Neurosurgery and Gamma Knife Radiosurgery, IRCCS Ospedale San Raffaele, Milan published a total of 2145 consecutive patients undergoing first surgery for a pituitary neuroendocrine tumor (PA):

795 (37.1%) had a nonfunctioning pituitary neuroendocrine tumor (NFPA), 595 (27.7%) acromegaly, 496 (23.1%) Cushing's disease, 208 (9.7%) a prolactinoma, and 51 patients (2.4%) a Tyrotroph adenoma. Remission was achieved when strict hormonal and radiological criteria were met.

Early surgical remission was achieved in 66% of acromegalic patients, 79.6% of patients with Cushing's disease, 64.4% of prolactinomas, 74.5% of patients with a TSH-secreting adenoma, and 66.9% of NFPAs. The mean (±SE) follow-up was 60.1 ± 1.3 months. The recurrence-free survival at 10 years was 78.2% in acromegalic patients, 68.1% in prolactinomas, 74.3% in Cushing's disease, 70.3% in TSH-secreting adenomas, and 75.3% in NFPAs. Preoperative hypoadrenalism recovered in 35.3%, hypogonadism in 43.3% and hypothyroidism in 37.4% of patients with impaired function before surgery. The mortality rate was 0.2% and major morbidity 2.1%. New onset hypoadrenalism occurred after surgery in 2.5% of patients at risk, hypogonadism in 4.1%, and hypothyroidism in 1.8%. Permanent diabetes insipidus (DI) occurred in 0.9% of patients.

In experienced hands, transsphenoidal microsurgery for PAs achieves remission in most patients with a low complication rate. Pituitary function is preserved in most cases and can recover in more than one-third of patients with preoperative hypopituitarism [12].

2017

A total of 160 patients who underwent surgical resection of pituitary neuroendocrine tumors between February 2004 and December 2016 were reviewed. Eighty-one patients had hormone-secreting pituitary neuroendocrine tumors, and 79 patients had nonfunctioning pituitary neuroendocrine tumor.

Among these 160 patients, cases with radiological calcifications on preoperative neuroimaging were included in this study, and clinical characteristics with intraoperative findings were analyzed, retrospectively.

pituitary neuroendocrine tumor with calcification on preoperative neuroimaging was observed in only nine cases (5.6%). The study population consisted of these nine patients with nonfunctioning pituitary neuroendocrine tumor (n = 5), mixed growth hormone and prolactin-secreting pituitary neuroendocrine tumors (n = 3), and a prolactinoma (n = 1). In 89% of cases (n = 8), calcified pituitary neuroendocrine tumor was soft enough for suction despite the presence of a granular gritty texture intraoperatively. Besides, in a single patient (11%), evidence of hard thick capsular calcification was seen surrounding a soft tumor component; however, it did not interfere with adequate removal of the soft part, and tumor resection was possible in all cases without any complications.

pituitary neuroendocrine tumor presenting with calcification is relatively rare, but should be kept in mind to avoid making a wrong preoperative diagnosis. As not all pituitary neuroendocrine tumors with calcification are hard tumors, preoperative radiological calcification should not affect decision-making regarding surgical indications [13].

Between 2004 and 2014, 94 patients with pituitary tumors were enrolled in this retrospective study. All patients underwent transsphenoidal surgery and received magnetic resonance imaging (MRI). The pre- and postoperative volumes calculated using the traditional formula were termed A1 and A2, and those calculated using the proposed method were termed O1 and O2, respectively. Wilcoxon signed rank test revealed no significant difference between the A1 and O1 groups ($P = 0.1810$) but a significant difference between the A2 and O2 groups ($P < 0.0001$). Significant differences were present in the extent of resection ($P < 0.0001$), high-grade cavernous sinus invasion ($P = 0.0312$), and irregular shape ($P = 0.0116$). Volume is crucial in evaluating tumor status and determining treatment. Therefore, a more scientific method is especially useful when lesions are irregularly shaped or when treatment is determined exclusively based on the tumor volume [14].

2016

Eighteen patients with pituitary macroadenomas underwent transsphenoidal surgery during 2013-2014 under low-field iMRI control (PoleStar N20, 0.15 T). Intrasellar balloons were used in all of them to assess the presence of tumoral remnants. They compared the findings in iMRI and postoperative high-field MRI control scans and also analyzed the number of intermediate imaging controls needed during surgery using this technique.

In total, of the 18 patients, 14 underwent a complete resection. In the remaining four patients, a safe maximal resection was performed, leaving a remnant because of cavernous sinus invasion. In all cases, the balloons were a major help in distinguishing the anatomical structures from the tumoral remnants. Fewer imaging controls were required, and there were no false-positives or negative intraoperative findings. No complications related to the technique were registered.

The “intrasellar balloon technique” is a useful tool that facilitates surgeons' intraoperative decision making. It is an important contribution to overcome the limitations of low-field iMRI as it provides a precise delineation of the resection margins, reduces false-positives and -negatives, and decreases the number of intermediate imaging controls required [15].

Thirty patients with pituitary neuroendocrine tumor were recruited from Huashan Hospital between September 2010 and January 2014. The examination included pupil examination, anterior and posterior segment examination, standard automated perimetry (SAP), RNFL and mfVEP. At three months and nine months after transsphenoid surgery, follow-up measurements were conducted in twenty-three patients, and at 18 months after surgery, the same examinations were performed in seven patients.

The average age of patients was 42.6±12.1years, with 23 males and 7 females. The mean score of SAP improved significantly: 1.75 before surgery; 0.62 at three months after surgery (p=0.00) and 0.50 at nine months after surgery (p=0.00). No significant improvement in RNFL thickness was observed at three months or nine months after surgery. The mean score of mfVEP also improved significantly: 0.85 before surgery; 0.53 at three months (p=0.00) and 0.38 at nine months after surgery (P=0.00). No statistical difference was observed in the outcome of patients at nine months of follow-up and 18 months of follow-up.

Visual field and mfVEP recovery with unchanged RNFL thickness was observed in patients after transsphenoid pituitary neuroendocrine tumor resection [16].

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79 patients with pituitary neuroendocrine tumors underwent endoscopic transsphenoidal resection and completed the Headache Impact Test (HIT-6) and the 36-Item Short Form Health Survey (SF-36) QOL questionnaire preoperatively and at 6 weeks and 6 months postoperatively.

Preoperatively, 49.4% of patients had mild headache severity, 13.9% had moderate severity, 13.9% had substantial severity, and 22.8% had intense severity. Younger age and hormone-producing tumors predisposed greater headache severity, while tumor volume, suprasellar extension, chiasmal compression, and cavernous sinus invasion of the pituitary tumors did not. Preoperative headache severity was found to be significantly associated with reduced scores across all SF-36 QOL dimensions and most significantly associated with mental health. By 6 months postoperatively, headache severity was reduced in a significant proportion of patients. Of the 40 patients with headaches causing an impact on daily living (moderate, substantial, or intense headache), 70% had improvement of at least 1 category on HIT-6 by 6 months postoperatively, while headache worsened in 7.6% of patients. The best predictors of headache response to surgery included younger age, poor preoperative SF-36 mental health score, and hormone-producing microadenoma.

The results of this study confirm that surgery can significantly improve headaches in patients with pituitary neuroendocrine tumors by 6 months postoperatively, particularly in younger patients whose preoperative QOL is impacted. A larger multicenter study is underway to evaluate the long-term effect of surgery on headaches in this patient group [17].

2015

278 patients with PAs who underwent surgical interventions were evaluated. Most of the patients were aged 40-50 years with an average of 41 ± 14. The most prominent complaint was pressure effect, which was detected in 153 cases (55.2%). At the second place, hormonal disorders were

observed in 125 cases (44.8%). Type of pituitary tumors were: Prolactinomas (29.1%), growth hormone (GH)-producing tumors (25%), nonfunctioning PAs (28.4%), adrenocorticotropic hormone (ACTH)-producing tumors (2.1%), thyroid stimulating hormone (TSH)-producing tumors (0.7%), GH/prolactin (13.6%), GH/ACTH (0.3%), and TSH/ACTH (0.3%). Fifty-seven patients presented with recurrent adenomas. Pituitary apoplexy was found in 11 patients. One case of Sheehan syndrome was recorded among these. The correlations between clinical symptoms and patients, age and sex were not significant.

The overview of demographic characteristics in Iranian patients with PAs with surgical indication has been discussed in the present investigation. The prevalence of different types of PAs and the most common clinical symptoms have been demonstrated [18].

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