Published in final edited form as:

Nat Rev Endocrinol. 2010 November ; 6(11): 606–608. doi:10.1038/nrendo.2010.170.

Risks of pituitary surgery in the elderly

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Abstract

Surgical resection of pituitary tumors is the treatment of choice for patients with hormone-secreting tumors or those that impair vision and other neurological functions. A recent study by Grossman *et al.*, however, found transsphenoidal surgery to be associated with increased mortality and morbidities in elderly patients, which suggests the need for careful individualized decision-making in this vulnerable population.

Pituitary tumors are generally benign and slow-growing lesions that vary in clinical manifestations and the need for treatment depending on the type of tumor and its anatomic characteristics. Clinical manifestations can range from signs and symptoms of overproduction of specific hormones to a mass effect on structures adjacent to the pituitary (such as the optic chiasm or the pituitary gland itself) that can lead to hypopituitarism. Approximately 7% of pituitary tumors occur in patients >65 years,^{1,2} and most pituitary lesions in this age group are clinically nonfunctioning adenomas.¹ Diagnosis in the elderly is made predominantly as a result of symptoms caused by a mass effect of the lesion. Visual abnormalities, the most common symptoms, are present in 60%¹ and 84%² of patients, depending on the case series.

Surgery is the clear treatment of choice for patients with visual or neurological symptoms that arise from a mass effect. Prompt tumor removal offers the best chance of vision recovery, although complete restitution cannot be assured. Beyond these clear-cut indications for transsphenoidal surgery, clinical judgment plays a major role in the decision on whether to proceed with surgery. Hypopituitarism, although common—this disorder can be found in 36–50% of elderly patients with pituitary tumors—^{1,2} is not by itself an indication for transsphenoidal surgery, as it may not resolve despite tumor removal. Another factor that complicates initial management is that, at presentation, the etiology and proliferative potential of the pituitary and/or sellar lesion are unknown. Surgery, however, is dictated less by a particular tumor size, but rather by its anatomic characteristics, as well as its pattern and rate of growth. Strong surgical indications include lesions that grow towards the optic chiasm or those that develop over a short time period (1–2 years).

Care of the elderly patient with a pituitary tumor may not always be straightforward, and few data describe the mortality and morbidity associated with transsphenoidal surgery in this patient population. To better define these surgical risks, Grossman *et al.*³ used the Nationwide Inpatient Sample (1985–2000), a database from a stratified, random sample of

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Competing interests

The authors declare no competing interests.

20% of all nonfederal hospitals in 37 US states, to conduct a retrospective analysis of patients aged >65 years who underwent pituitary tumor resection. The investigators identified 8,400 patients (53.7% men) with a mean age of 72.2 years, 2.6% of whom were surgically treated with a transcranial approach, whereas the rest underwent transsphenoidal resection. The results showed that mortality and complication rates of transsphenoidal surgery increase with advancing age, and risk factors for surgery are associated with worse outcome in this age group compared with individuals <65 years of age. These findings highlight the importance of carefully weighing the potential benefits of transsphenoidal surgery against its risks when deciding the management plan for an elderly patient with a pituitary lesion.

Overall, transsphenoidal surgery is a procedure with very low associated mortality and morbidity. In those aged >65 years, these risks clearly increase progressively with advancing age as has previously been shown for other types of surgery.⁴ Grossman *et al.* report an overall mortality of 3.8% with a 5% higher mortality risk for every 1-year increase in age. In patients >80 years of age, the risk of death is significantly higher (OR 1.85, $P = 0.009$) relative to those aged 65–69 years. A second study that employed the same Nationwide Inpatient Sample as Grossman *et al.*, but included patients aged <65 years, found an overall mortality rate for transsphenoidal surgery of 0.6%, which also increased with advancing age.⁵ In other single center studies,^{2,6,7} the mortality rate of transsphenoidal surgery in the elderly was as low as 0%.

The reason behind the higher mortality rate determined by Grossman *et al.* is not entirely evident. The study, however, included a small number of patients who underwent a craniotomy for tumor removal—a procedure with a mortality rate 2.24-fold higher than that of transsphenoidal surgery. In addition, given the study's retrospective design, details on certain clinical characteristics that could influence outcome, for example, tumor size or the expertise of the surgeon and hospital, were limited. Others have demonstrated a decrease in morbidity and mortality when transsphenoidal surgery is performed by experienced pituitary surgeons at high-volume hospital facilities.⁶ Higher cure rates are also observed in patients with acromegaly when transsphenoidal surgery is performed by a surgeon with a vast amount of experience in performing this procedure.⁸ Furthermore, optimal care of the patient undergoing surgery is best accomplished by an experienced multidisciplinary team that is able to recognize and manage postoperative complications, such as diabetes insipidus.⁹ Despite the improved outcome in specialized or experienced centers, most transsphenoidal surgery procedures are performed by surgeons and at centers that perform only few of these surgeries per year,⁵ so the true risks and morbidity may indeed be in line with the findings of Grossman and co-workers.

In patients >65 years of age, the complication rate of transsphenoidal surgery, as well as the length of hospital stay, seems to be increased compared with patients aged <65 years. Grossman *et al.* found an overall complication rate of 32.6%, whereas Barker *et al.*⁵ determined a rate of complications of 33.2% for all age groups combined; however, complication rates in some single center studies were lower than these values.^{1,6} Fluid and electrolyte abnormalities were the most common complication (14.3%) reported by Grossman *et al.*, with an increasing incidence in those aged >70 years. Another single center study in the elderly² reported a higher incidence of diabetes insipidus (37.9%) than Grossman *et al.* (2.2%), which suggests that the nature of the Nationwide Inpatient Sample database study may have lead to underreporting of this disorder. Not surprisingly, the complication rate was markedly higher with increasing comorbidity score and lower in patients who underwent elective procedures. These findings highlight the importance of careful preoperative and perioperative management of comorbid conditions, particularly in the elderly. The mean length of hospital stay after transsphenoidal surgery was 8.5 days and

was significantly increased in those aged >75 years. This figure is high for transsphenoidal surgery in our experience and could represent the contribution of a significantly higher length of hospital stay in craniotomy cases that were included in the study cohort of Grossman and colleagues. Other single center studies in the elderly report lengths of hospital stay of 2.4 days,⁶ 11.6 days² and 12.4 days,² which may reflect regional differences in hospital practice and variations in the availability of early postoperative outpatient follow-up.

In conclusion, despite some limitations owing to the retrospective nature of the study, Grossman *et al.* demonstrate that transsphenoidal surgery poses substantial risks to the elderly. Although these risks can be minimized by surgeons and centers experienced in this procedure, this study highlights the importance of a careful assessment of the true indications for transsphenoidal surgery in the individual patient, particularly in hospitals in which this procedure is performed sporadically. Considering that many lesions may not become clinically relevant over the lifetime of the very elderly patient, the true expected benefits of surgery must be carefully weighed. Nonsurgical conservative management with prospective follow-up and imaging studies can be proposed for some patients and should be considered more strongly in the elderly, in light of the increased risks of transsphenoidal surgery described by Grossman and colleagues. Given the influence of comorbidities on surgical risk, comorbid conditions need to be addressed preoperatively, and surgery should be performed on an elective basis whenever possible.

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Practice points

- Transsphenoidal surgery is associated with increased mortality and morbidity in elderly patients
- Nonsurgical conservative management should be considered more strongly in the elderly
- Surgical risks can be minimized by centers experienced in pituitary surgery
- Comorbid conditions need to be addressed preoperatively in the elderly
- Transsphenoidal surgery should be performed on an elective basis whenever possible