

# POST-SURGICAL COMPLICATIONS OF THE TRANSSPHEOIDAL SURGERY FOR PITUITARY ADENOMAS

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**Abstract:** This article reviews the complications of the transsphenoidal approach with regard to mechanical, visual, endocrine risks relative to pituitary surgery. We have to emphasize that the risks of this surgical approach, if it is properly performed, are minimum, mortality being of 0,2% after 1985.

**Keywords:** pituitary adenomas, transsphenoidal surgery, complications

**Rezumat:** În prezentul articol se face o trecere în revistă a complicațiilor abordului transsfenoidal mecanice, vizuale, afectarea mușchilor oculomotori precum și riscurile endocrine legate de chirurgia hipofizei. Trebuie remarcat faptul că riscurile legate de această tehnică de abord, corect efectuată sunt minime, mortalitatea fiind după anul 1985 de 0,2%.

**Cuvinte cheie:** tumori hipofizare, chirurgie transsfenoidală, complicații

## INTRODUCTION

### The complications of the transsphenoidal approach:

Complications:

- mechanical:
  - LCR fistula: 2%
  - Empty sella syndrome: 0,2 %
- transitory oculomotor paralyzes: 1,5%
- visual acuity aggravation:
  - in microadenomas: 0%
  - in macroadenomas:
    - first intervention: 2,8 %
    - re-intervention for reoccurrence: 18 %
- endocrine: rare, in the absence of the pre-surgical pituitary insufficiency: 0,1%
  - post-surgical pituitary insufficiency
  - secondary hyponatremia
  - diabetes insipidus

Mortality - before 1985: 1% - after 1985: 0,2% .

Complications are rare, but they must be mentioned, as well as the fact that expertise in this type of surgery decreases their number. (1,2)

**Mortality** – decreased from 1%, which was before 1985 to 0,2 %, which is today. The most important risk of mortality is in the Cushing disease, due to subacute meningitis with fatal evolution, despite treatment, as well as due to

vascular thrombosis, especially the profound venous thromboses, as a consequence of the vascular alterations of this kind of disease. In the Cushing disease, the treatment with antibiotics and anticoagulants is suggested. Death may also be caused by the hypothalamic haematomas, as a result of certain invasive macroadenomas.

### Mechanical complications

**LCR fistula** – It is the most important mechanical complication. It occurs especially after the exeresis of certain invasive macroadenomas that destroyed and traversed the sellar diaphragm, or during the exeresis of certain intrasellar craniopharyngiomas. This situation is otherwise predictable and the patient must be warned about this possibility. It may occur in two different circumstances.

The first situation occurs pre-surgically, when the exeresis of the adenoma or craniopharyngioma brings about the occurrence of a fistula. The rehabilitation is provided through a fragment of fascia lata, sampled extemporaneously and applied on the pituitary fossa. The sealed assembly is completed by the application of muscles and by the closing of the anterior wall of the pituitary fossa with an osseous fragment sampled during surgery. A more complex assembly, involving the filling in of the entire sphenoidal sinus will be performed in case the pituitary fossa is completely destroyed.

The second possibility is represented by the early or delayed pre-surgical rhinorrhea (1%). The reasons of this affection are the following: not recognizing the fistula during surgery, secondary detachment of the residual pituitary tissue after the exeresis of a macroadenoma, subsequent local alteration brought about by the tumoral fissure under medical treatment or radiotherapy on a pituitary fossa, already destroyed and improperly recovered. Regarding macroadenomas, the dilemma is to better obdurate the fistula without producing a visual compression again. (2)

**Empty sella** (3) – This complication has become exceptional due to the fact that it is prevented systematically. It may occur in three conditions: empty sella largely opened upwards, voluminous suprasellar expansion and adherences in the stretched sellar diaphragm and visual paths. In this case, the chiasm is progressively drawn into the pituitary fossa. The prevention of this syndrome is provided by the raise of the sellar floor and the decrease of the volume of the pituitary fossa.

**Visual acuity aggravation** (2,4). – Regarding the

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microadenomas surgery, this possibility has not been signalled, yet. Visual aggravation occurs after the exeresis of macroadenomas, with severe visual damages during surgery, especially during the interventions for voluminous recurrences (18%).

In such a case, the patients will be informed about the risks and homeostasis will be extremely rigorous. This visual acuity aggravation is most of the time transitory, but it may justify an emergency re-intervention, when the post-surgical tomography reveals a compressive intra- and suprasellar haematoma. The mechanisms of the visual aggravation are multiple: (2) direct traumatism of the visual paths, devascularisation of the optical tract, orbit fractures, post-surgical haematoma, cerebral vasospasm.

Oculomotor paralysis – It is always unilateral, reaching the common oculomotor nerve, more frequently than the abducens nerve and it is the appanage of the partial exeresis of adenomas that invade the cavernous sinus. It is brought about by edema or by a hemorrhagic sub-fusion in the portion of the intracavernous tumour. It is usually regressive in a few weeks.

### ENDOCRINE AND METABOLIC COMPLICATIONS

*The endocrine complications are the following:*

- post-surgical pituitary insufficiency;
- diabetes insipidus;
- secondary hyponatremia.

Post-surgical pituitary insufficiency (1) – It is exceptional in the conditions in which the pituitary function was normal before surgery. Regarding the microadenomas surgery, the purpose of the intervention is to accomplish a selective exeresis of the tumour, with the preservation of the normal pituitary tissue. Most often, the limit between the healthy tissue and the pathologic one is visible, authorising thus the preservation of a normal pituitary function after surgery. This statement is valid even after the surgery of the macroadenomas with pituitary function preserved before surgery. In this case, the healthy tissue is found on one of the walls of the sella, under the form of a normal pituitary red and adherent band. On the other hand, if there is any pituitary insufficiency, more or less complete before the operation, the surgery does not often change a thing. At the same time, the pituitary disorders are not always irreversible, a certain degree of recovery of the hormonal deficit being possible. (5)

Diabetes Insipidus – The transitory occurrence of a diabetes insipidus after the surgery is estimated to be between 10-60 %. (6) The risk of a permanent diabetes insipidus is rare (0,6). This possibility is usually the appanage of the basophile adenomas of the Cushing disease or the enlarged exeresis of the post-hypophysis. The careful supervision of diuresis, of the fluids quantity during the 48 hours after the surgery, allows an early diagnosis and a proper treatment.

Secondary hyponatremia (7) – It is assigned to an improper secretion of the antidiuretic hormone and occurs one week after the surgery. Hyponatremia is symptomatic: headaches, vomiting, natremia around 130 mmol/l. Because of this, patients are required to make a systematic dosage of

natremia on the seventh day after the surgery.

The list of other complication is long. (2,8). Surgical experience diminished a lot the type and the incidence of these complications: anaesthesia complications, injuries of the intracavernous carotid, injuries of the sphenopalatine artery, hemorrhagic contusions of the diencephalon, loss of vision.

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