Abstract: The surgical indication in pituitary adenomas is determined by 2 major things: the anatomical particularity of the pituitary region and the limits of the medical conservative treatment. We emphasise the clinical considerations regarding the surgical indications in secretory pituitary tumours and the most important prognostic factors influencing the postoperative outcome from the endocrine and visual point of view.

Keywords: pituitary adenomas, surgical indication, results

Rezumat: Indicația chirurgicală în adenoamele hipofizare este determinată de două lucruri fundamentale: situația anatomică a regiunii hipofizare și limitele tratamentului medicamentos. Se realizează câteva considerații clinice asupra indicației chirurgicale în adenoamele secretate, se menționează factori cei mai importanți care influențează rezultatul postoperator implicând în primul rând rezultatele endocrine și prognosticul vizual.

Cuvinte cheie: adenom hipofizar, indicație chirurgicală, rezultate

The surgical indications are adapted taking into account two fundamental notions:
- The vascular and nervous structures and the adjacent ones;
- The possibilities and the limits of the medical treatment according to the secretory or non-secretory character of the adenoma.

Anatomical data

The anatomic data treat two essential characteristics brought about by the presurgical detailed radiological analysis: “is the adenoma included?”, “is the adenoma invasive?”

The included adenoma is a tumour that remains, although it is macro, within the limits of the walls of the pituitary fossa, even if the pituitary diaphragm is detached by a suprasellar expansion. Its complete exeresis is possible, allowing the preservation the healthy pituitary tissue.

The invasive adenoma has traversed the walls of the pituitary fossa, penetrating the dura mater, the pituitary diaphragm and sometimes, the sphenoidal body. Its complete exeresis will be rather aleatory from the hormonal point of view, if it is about a secretory tumour.

The possibilities and the limits of the medical treatment

With a few exceptions, the medical treatments do not remove the adenoma. Under the control of their efficiency, the treatment will be instituted for the entire life. This efficiency is differently appreciated taking into account certain criteria and not taking into account the type of adenoma: hormonal normalization and/or the reduction of the tumoral mass.(1-4)

The surgical indications may be summarized as follows:
- Non-secretory adenoma with visual signs: the surgical indication is absolute, taking into account the visual threat and the absence of the medical treatment possibilities. Choosing the surgical approach is brought about by the anatomical conditions. Regarding the elderly, only the transsphenoidal approach is possible. Age is not counter-indicated in this surgery. Only an anaesthetic counter-indication or the firm disagreement from the patient or from his/her family may determine us to renounce the transsphenoidal approach.
- Non-secretory pituitary adenoma without visual signs, more frequently an “incidentalome” – what is the therapeutic conduct?(5,6) It is about an issue, the neurosurgeon frequently confronts with, after accomplishing the MRI or the CT for different reasons (traumas, dizziness, headaches or others), without a relation with the endocrine pathology. In this case, a pituitary hormonal balance is recommended, in order to detect a possible hormonal hypersecretion, justifying a specific treatment or a pituitary deficit, even partial. A pituitary microadenoma discovered as “incidentalome” does not justify the surgery of first intention, as the risk of significant tumoral expansion is low.(5,7) MRI control will be made every year and the intervention will be suggested only in case of tumoral expansion.

In case of macroadenomas discovered accidentally, the surgical indication is delayed only in the case in which, there are visual signs or a pituitary insufficiency. In the absence of these symptoms, the patient may be kept under observation, after having been warned about the necessity of a radiological consultation every 6 months. In the elderly, the decision may be difficult, due to the frequent concomitance of an associated ophthalmologic pathology.

Surgical indications in secretory adenomas
Included adenomas

Either micro or macro, the secretary included adenoma, irrespective of the type of secretion, represents a good indication for the surgical exeresis transphenoidally, due to the fact that its complete and selective exeresis is possible and the endocrine healing may thus be obtained in a large number of cases, without altering the pituitary function.

**Invasive adenomas**

They traverse the walls of the pituitary fossa and their exeresis will be more often incomplete and will justify a complementary medical treatment and/or radiotherapy. Generally, the surgical indication is only secondary, being brought about by the partial inefficiency of the medical treatment or by the absence of the volume reduction of the tumour. In these cases, surgery often accomplishes a satisfactory tumoral reduction and is integrated in a more complete therapeutic strategy.

**Adenomas with normal imaging**

They are the appanage of hyperprolactinemas or of the Cushing’s disease. In case of hyperprolactinemia with normal imaging, the surgical indication cannot be retained. In return, in Cushing’s disease, the attitude is more stressed because it is about a very serious disease. There is a large number of possible attitudes in such a case:

- The drug treatment in the accomplishment of a MRI supervision up to the visualization of an adenoma, a very rare possibility;(8)
- Practising a catheterisation of the stony sinus with ACTH dosage, an examination whose accomplishing, interpretation and results are sometimes under debate;(9)
- Proposing a systematic pituitary surgical exploration, preceded or not by a catheterisation of the stony sinus. This attitude in specialized centres may lead to favourable results.

**Factors that influence the results.**

The results of the surgery are brought about by a certain number of parameters, such as the following:

- Volume of the adenoma: the larger the adenoma the less will be the changes for the exeresis to be total, causing the opposition between the intraseral and the expansive tumours, as well as the contrast between the micro and macroadenomas;
- The invasive character of the tumour at the level of the walls of the selar lodge;
- If the pre-surgical blood hormonal levels in the secretary adenomas are high, the changes for a biological normalization become lower.

A certain number of other factors may equally influence the quality of the intervention in terms of hormonal healing:

- sex: regarding the prolactin adenomas, the results registered in men are more disappointing than those registered in women. This is due to the fact that the large majority of prolactins in men are voluminous, as the diagnosis is established in a late stage. In turn, microprolactins in men have a result as good as that registered in women;
- age: if the adenoma evolved before puberty (primary amenorrhea due to prolactinoma);
- clinical diagnostic: amonorrhea due to prolactinoma, acromegalogiantism in adenoma with growth hormones), the surgical results generally plead for a failure in the surgical healing. This notion is not found in the results after adenomectomia within the Cushing’s disease.(10)
- the extended presurgical treatment in a prolactinoma does not allow a very selective surgery due to the anatomical changes of the lesion that is less delimited by the normal pituitary tissue;
- the absence of a visible adenoma on MRI within the Cushing’s disease is the source of an important certainty regarding the normal healing;
- the existence of a pregnancy: most frequently, pituitary tumour leads to infertility. It is a quite frequent circumstance of detecting an adenoma. The therapeutic sanction is not different and depends on the known and accepted medical possibilities against the surgical treatment, taking into account the pregnancy age. Regarding prolactins, the risks for the tumoral progression in case of microprolactinomas are reduced, being of 3-5%. They are evaluated at 20-30% for the more voluminous prolactinomas.(11)

**Results**

The results comprise two main directions: visual symptomatology and the hormonal healing.

**Visual prognostication (12,13)**

One of the main interest points of the surgery is to bring a rapid decompression of the visual paths, a frequent possibility in the non-functional adenomas. The postoperative results are often good or excellent. Experience shows the following results:

- visual improvement: 80%;
- unchanged: 13,8%;
- visual aggravation: 6,2%

Regarding the aggravation cases, usually, it is about reinterventions for non-secretory recurrent adenomas.

The quality of the visual improvement, of the acuity or of the visual field is proportioned with the presurgical visual condition, with the length of the chiasm compression and with the surgical approach (the cranial approach is more frequently responsible for the visual aggravation due to the presurgical manipulation of the optic nerves).

**Endocrine results**

They are closely related to the surgical experience.(14) To obtain global results regarding surgery means nothing, as long as these refer to different tumours, from microadenomas to important invasive lesions. The results should regard similar lesions.

**Prolactin adenomas (11,15)**

- there is a number of 90% healings regarding microadenomas with the presurgical prolactinemia less than 100ng;
- 75-85% healings regarding the sellar microadenomas or macroadenomas with the presurgical prolactinemia less than 200ng;
- 29-40% healings regarding the expansive macroadenomas, where the possibility of a total exerexis is reduced because of the importance of the suprasellar expansions or due to the invasive character of the tumour
5.

3.

2.

(11,5% in Foch Hospital series).

5, if there are high levels of postoperative cortisol (31) after 3 years, (30) with a risk of recurrence multiplied by

• microadenoma occurs on the MRI;

• cases, after 1995, the immediate healing is obtained in

• percentage of the hypercorticism of 70-80%.(22,25,26);

• Cushing's disease

between 0-14%.

• is below 20 ng;(17);

• cases and in 65% of the cases when the postoperative GH

data show that microadenomas are cured in

(8,22-24)

• the healing is obtained in 70% of the cases (18,19);

• the recurrences percentage remains of 9-20%,(27-29)

(11)

5.7% of the


at the level of the meninx and of the cavernous sinus.

• On long term, 15-25% of the cases register a biological recurrence, the majority being those in which the postoperative prolactin was much above normal.(11) "Adenomas expressing growth hormones (16-21)"

The results of the surgery are more difficult to analyse, as the used categories, especially the healing ones have evolved.

• for a postoperative healing criteria of GH < 5 ng/ml, the healing is obtained in 70% of the cases (18,19);

• with more strict criteria, GH<2 ng/ml and normal IgFl (insulin like growth factor), the analysis of the specialized data show that microadenomas are cured in 51,7% of the cases and in 65% of the cases when the postoperative GH is below 20 ng.(17);

• operated and cured recurrent microadenomas vary between 0-14%.

Cushing’s disease

Regarding the Cushing’s disease, the healing criteria and the postoperative nonrecurring factors after the transsphenoidal intervention have also evolved: the actual consensus assigns an important value to the low undetectable levels of postoperative urinary cortisol, the absence of the cortisol response to CRH and to a long substitutive therapy.

(8,22-24)

• the global results give an immediate remission percentage of the hypercorticism of 70-80%.(22,25,26);

• regarding the Foch Hospital experience on 395 of cases, after 1995, the immediate healing is obtained in 75% of the cases, but it may reach 90%, if a microadenoma occurs on the MRI;

• the recurrences percentage remains of 9-20%,(27-29) after 3 years, (30) with a risk of recurrence multiplied by 5, if there are high levels of postoperative cortisol (31) (11,5% in Foch Hospital series).

REFERENCES


