Pituitary adenoma classification

They are classified based on size or cell of origin. Pituitary adenoma can be described as microadenoma, macroadenoma, and giant tumors based on size. Microadenoma is tumors less than 10 mm, while macroadenoma includes tumors larger than 10mm. Giant pituitary adenomas are more than 40 mm. There are functional pituitary adenomas in which the cell type that composes them causes increased secretion of one or multiple hormones of the anterior pituitary. Alternatively, there are Non-Functioning Pituitary Adenomas that do not secrete hormones, but they can compress the surrounding areas of the anterior pituitary leading to hormonal deficiencies [1].

The 2017 World Health Organization classification of tumors of the pituitary gland

see The 2017 World Health Organization classification of tumors of the pituitary gland.

In the fourth edition of the World Health Organization classification of endocrine tumors, are two critical changes to the classification for pituitary adenomas.

One is that the term "atypical adenoma," which was characterized based on highly proliferative properties to predict adenomas that carry a poor prognosis, was completely eliminated due to the lack of definitive evidence. The other change is the introduction of more precise cell lineage-based classification of pituitary adenoma that is defined based on lineage-specific transcription factors and hormones produced. Accordingly, null cell adenomas have been re-defined as those that show completely negative immunostaining either for hormones or for adenohypophyseal transcription factors [2].

Somatotroph adenoma.

Lactotroph adenoma.

Tyrotroph adenoma.

Corticotroph adenoma.

Gonadotroph adenoma.

Null cell adenoma

Plurihormonal pituitary adenoma and double adenomas.

The classification is based upon the size, invasion of adjacent structures, sporadic or familial cases, biochemical activity, clinical manifestations, morphological characteristics, response to treatment, and recurrence [3].

Current classification systems for PAs are based primarily on secretory characteristics of the tumor but are also classified on the basis of phenotypical characteristics, including tumor size, degree of invasiveness (e.g., Knosp grade), and immunohistological findings [4].

The anterior WHO classification system for PAs was refined to include designations for benign

adenoma, atypical adenoma, and pituitary carcinoma on the basis of p53 immunoreactivity, MIB-1 index, mitotic activity, and the absence/presence of metastases [5] [6].

These tumor types can be microadenomas or macroadenomas and can either be functional or non-functional.

By Size

Pituitary microadenoma

Pituitary macroadenoma

Giant pituitary adenoma

Volume can be calculated using MRI-guided volumetrics and an ellipsoid approximation (TV × AP × CC/2) transverse (TV), antero-posterior (AP) and cranio-caudal (CC).

By Function

Functioning pituitary adenoma

Nonfunctioning pituitary adenoma

Pituitary adenomas with gangliocytic component are rare tumors of the sellar region that are composed of pituitary adenoma cells and a ganglion cell component. Their histogenesis and hence nosology is not yet resolved because of the small number of cases reported and lack of large series in the literature [7].

Invasive pituitary adenomas and pituitary carcinomas are clinically indistinguishable until the identification of metastases.

Consistency

Although most authors differentiate easily aspirated (soft) tumors from those that are not (fibrous, might require prior fragmentation), there is no universally accepted PA consistency classification. Fibrous PA tends to be hypointense on T2WI and has lower apparent diffusion coefficient (ADC) values. Fibrous tumors seemed to present higher invasion into neighboring structures, including the cavernous sinus. Several articles suggest that dopamine agonists could increase PA consistency and that prior surgery and radiotherapy also make PA more fibrous. The anatomopathological studies identify collagen as being mainly responsible for fibrous consistency of adenomas.

Conclusions: Preoperative knowledge of PA consistency affords the neurosurgeon substantial benefit, which clearly appears to be relevant to surgical planning, risks, and surgery outcomes. It could also encourage the centralization of these high complexity tumors in reference centers. Further studies may be enhanced by applying standard consistency classification of the PA and analyzing a more extensive and prospective series of fibrous PA. [8].

Knosp Grade

Knosp Grade.

Hardy's Classification of Pituitary Adenomas

Hardy's Classification of Pituitary Adenomas.

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