Pituitary null cell adenoma

The 2017 World Health Organization classification of tumors of the pituitary gland redefined pituitary null cell adenomas (NCAs) by restricting this diagnostic category to pituitary tumors that are negative for pituitary transcription factors and adenohypophysis hormones. The clinical behavior of this redefined entity has not been widely studied, and this is a major shortcoming of the classification.

A study of Almeida et al. evaluated the imaging and clinical features of NCAs from two pituitary centers and compared them with those of gonadotroph adenomas (GAs).

Imaging, pathologic, and clinical characteristics of NCAs and GAs were retrospectively reviewed. Tumor immunohistochemistry was performed to confirm absence of adenohypophyseal hormones and pituitary transcription factor expression.

Thirty-one NCAs were compared with 38 GAs. NCAs were more likely to invade the cavernous sinus (15/31 [48%] vs. 5/38 [13%], P = .003) and had a higher proliferative index (i.e., MIB-1 > 3%, 11/31 [35%] vs. 5/38 [13%], P = .04). Gross total resection was less likely in the NCA group (19/31 [61%] vs. 33/38 [87], P = .02). Progression-free survival was worse in the NCA cohort (5-year progression-free survival, 0.70 vs. 1.00; P = .011, by log-rank test).

Compared with GAs, NCAs are more invasive at the time of presentation and have a more aggressive clinical course. This study provides evidence that NCAs represent a distinct clinicopathologic entity with behavior that differs adversely from that of GAs. This may inform clinical decision-making, including frequency of postoperative tumor surveillance and timing of adjunctive treatments [1].

Among 343 surgically-removed pituitary neuroendocrine tumors, 56 tumors were unassociated clinically or biochemically with increased hormone secretion and contained no adenohypophysial hormones by the immunoperoxidase technique, except for 10 cases in which a few scattered cells showed positive immunostaining for beta-TSH or beta-FSH, beta-LH, prolactin and/or alpha-subunit. These tumors were chromophobic adenomas with no PAS, lead hematoxylin or carmoisine positivity and electron microscopy failed to reveal their morphogenesis. The term null cell adenoma of the pituitary is proposed to designate this tumor type. This term recognizes the most obvious features of these tumors: the absence of markers which would permit the disclosure of their cellular origin. Null cells are also found in the nontumorous adenohypophysis, suggesting that null cell adenomas derive from preexisting nonneoplastic null cells. The question of whether pituitary null cells are hormonally inactive committed precursors, uncommitted stem cells or dedifferentiated cells remains to be elucidated [2].

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Almeida JP, Stephens CC, Eschbacher JM, Felicella MM, Yuen KCJ, White WL, Mooney MA, Bernat AL, Mete O, Zadeh G, Gentili F, Little AS. Clinical, pathologic, and imaging characteristics of pituitary null cell adenomas as defined according to the 2017 World Health Organization criteria: a case series from two pituitary centers. Pituitary. 2019 Aug 10. doi: 10.1007/s11102-019-00981-9. [Epub ahead of print] PubMed PMID: 31401793.

2)
Kovacs K, Horvath E, Ryan N, Ezrin C. Null cell adenoma of the human pituitary. Virchows Arch A Pathol Anat Histol. 1980;387(2):165-74. PubMed PMID: 7456308.