The regional oxygen saturation of pituitary adenomas is lower than that of the pituitary gland: A microspectrophotometry study with potential clinical implications

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Purpose: To study the regional oxygen saturation (rSO₂) of pituitary adenomas in comparison to the pituitary gland.

Method: Microspectrophotometric (MSPHO) measurements of rSO₂ of adenoma and pituitary tissue were performed in a series of patients undergoing transsphenoidal adenoma surgery for the first time. The areas of measured tissue were sampled for histopathologic and immunohistochemical (CD34 and CD45) assessment. The results of MSPHO were compared to those of histopathology and immunohistochemistry.

Results: Thirty-six MSPHO measurements and tissue samples were obtained from 22 patients: 14 from adenomas, 17 from the anterior pituitary lobe (APL) and five from the posterior pituitary lobe (PPL). The rSO₂ of the adenomas (mean: 43.3 %, range: 6.9 - 83.6 %) was significantly (p = 0.001) lower than that of the APL (mean: 71.8 %, range: 33.6 - 97.4 %) and PPL (mean: 74.9 %, range: 69.6 - 81.1 %). The difference of the rSO₂ of the APL and PPL was not significant. There were no significant differences in the microvessel density (as assessed by CD34) and lymphocyte density (as assessed by CD45) between the three tissue types.

Conclusions: As assessed by MSPHO, the rSO₂ of adenoma tissue is significantly lower than that of the pituitary gland, indicating differences in their blood supply and/or metabolism. Further studies have to disclose if MSPHO can reliably help to better delineate intraoperatively adenoma and pituitary gland, in the effort to achieve complete tumour removal, while injury to pituitary tissue is minimized.