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

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OBJECTIVE: To study the regional oxygen saturation (rSO(2)) of pituitary adenomas, in comparison with that of the pituitary gland. METHODS: Microspectrophotometric (MSP) measurements of rSO(2) in adenomas and pituitary tissue were performed for a series of patients undergoing first-time transsphenoidal pituitary adenoma surgery, in a standardized anesthesia setting. The areas of measured tissue were sampled for histopathological and immunohistochemical (CD34 and CD45) assessments. The results of MSP measurements were compared with the results of the histopathological and immunohistochemical assessments. RESULTS: Thirty-six MSP measurements and tissue samples were obtained among 22 patients with pituitary macroadenomas, including 14 from adenoma tissue, 17 from the anterior pituitary lobe, and 5 from the posterior pituitary lobe. The rSO(2) of adenoma tissue (mean +/- standard deviation, 43.3 +/- 23.2%) was statistically significantly (P = 0.001) lower than the values for the anterior pituitary lobe (mean +/- standard deviation, 71.8 +/- 18.3%) and posterior pituitary lobe (mean +/- standard deviation, 74.9 +/- 4.8%). The difference between the rSO(2) values for the anterior pituitary lobe and posterior pituitary lobe was not significant. There were no statistically significant differences in microvessel density (as assessed with CD34 staining) or lymphocyte density (as assessed with CD45 staining) among the three tissue types. CONCLUSION: As assessed with MSP measurements, the rSO(2) of adenoma tissue was significantly lower than that of the pituitary gland, indicating differences in their blood supply and/or metabolism in pituitary macroadenomas. Further studies are needed to determine whether MSP measurements can reliably facilitate intraoperative delineation of adenoma and pituitary tissue, in the effort to achieve complete tumor removal with minimal injury to pituitary tissue.

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