



Radiologic Predictors for Extent of Resection in Pituitary Adenoma Surgery. A Single-Center Study

José L. Sanmillán¹, Alberto Torres-Díaz¹, Juan José Sanchez-Fernández², Ruth Lau¹, Cristina Ciller³, Paloma Puyalto⁴, Andreu Gabarrós¹

■ **BACKGROUND:** Preoperative radiologic evaluation of pituitary adenomas is essential. Despite the efforts made to determine the achieved resection grade after pituitary adenoma surgery, there is a high level of disagreement among all the available classifications and measurement methods used. Our study aimed to determine pituitary adenoma imaging features, easily obtained from preoperative magnetic resonance, which could be used as resection predictor variables. Second, we analyzed the usefulness of the ellipsoid method in pituitary adenoma volume determination.

■ **METHODS:** Two-hundred and ninety-four pituitary adenomas, which were surgically treated in our department, were retrospectively analyzed. Age, gender, surgical approach, hormonal status, greater tumor diameter, volume, cavernous sinus invasion, and extent of resection were evaluated.

■ **RESULTS:** One-hundred and forty-eight surgical procedures were conducted with a microsurgical transsphenoidal approach whereas 146 were conducted with an endoscopic endonasal approach. Gross total resection was achieved in 54.08% of cases. There were no significant differences in the extent of resection regarding the approach used, age, gender, or hormonal production by the tumor. Only Knosp grade ($P < 0.001$) and tumor volume ($P < 0.05$) had a statistically and independent significant relationship with the extent of resection. Furthermore, we found a high correlation between the calculated volume, using the ellipsoid method, and the volume measurement obtained with complex planimetry methods.

■ **CONCLUSIONS:** Pituitary adenoma volume and cavernous sinus invasion, graded with the Knosp scale, are 2 pituitary tumor features that, when used in combination, predict the complexity of the surgery and the difficulty of achieving gross total resection in pituitary adenoma surgery.

INTRODUCTION

In recent years, great effort has been made to characterize pituitary adenomas (PAs) using several tumor features with the aim of determining the surgical complexity and predicting the surgical outcome and the presence of tumor remnants. Beyond the hormonal production characteristics of the PA, the features most used to describe these neoplasms are size and assessment of the cavernous sinus invasion, both obtained from the preoperative radiologic studies. Magnetic resonance (MR) is the imaging modality of choice for this purpose. Although preoperative expected invasion of cavernous sinus is defined with the Knosp scale by most investigators,¹ controversy exists concerning the classifications used for defining PA size. To our knowledge, these classifications are intended to guide the surgeon through possible surgical technical difficulties, and thus must be clearly related to surgical complexity. Although definition of “large” is not clear,² classically, PAs were classified as “giant” if the greater diameter was more than 4 cm.³ However, several investigators^{4,5} disagree on the threshold size of maximal diameter for a PA to be considered as giant. Furthermore, in contrast to those investigators who consider the measurement of only 1 diameter to make the differentiation

Key words

- Cavernous sinus
- Endoscopic endonasal
- Pituitary adenoma
- Preoperative evaluation
- Tumor volume

Abbreviations and Acronyms

- CI:** Confidence interval
- MR:** Magnetic resonance
- OR:** Odds ratio
- PA:** Pituitary adenoma

From the Departments of ¹Neurosurgery and ²Radiology, IDI, Hospital Universitari de Bellvitge, Hospitalet de Llobregat, Barcelona; ³Universitat de Barcelona, Barcelona; and ⁴Universitat Internacional de Catalunya, Barcelona, Spain

To whom correspondence should be addressed: José L. Sanmillán, M.D.
[E-mail: Sanmillan.joseluis@gmail.com]

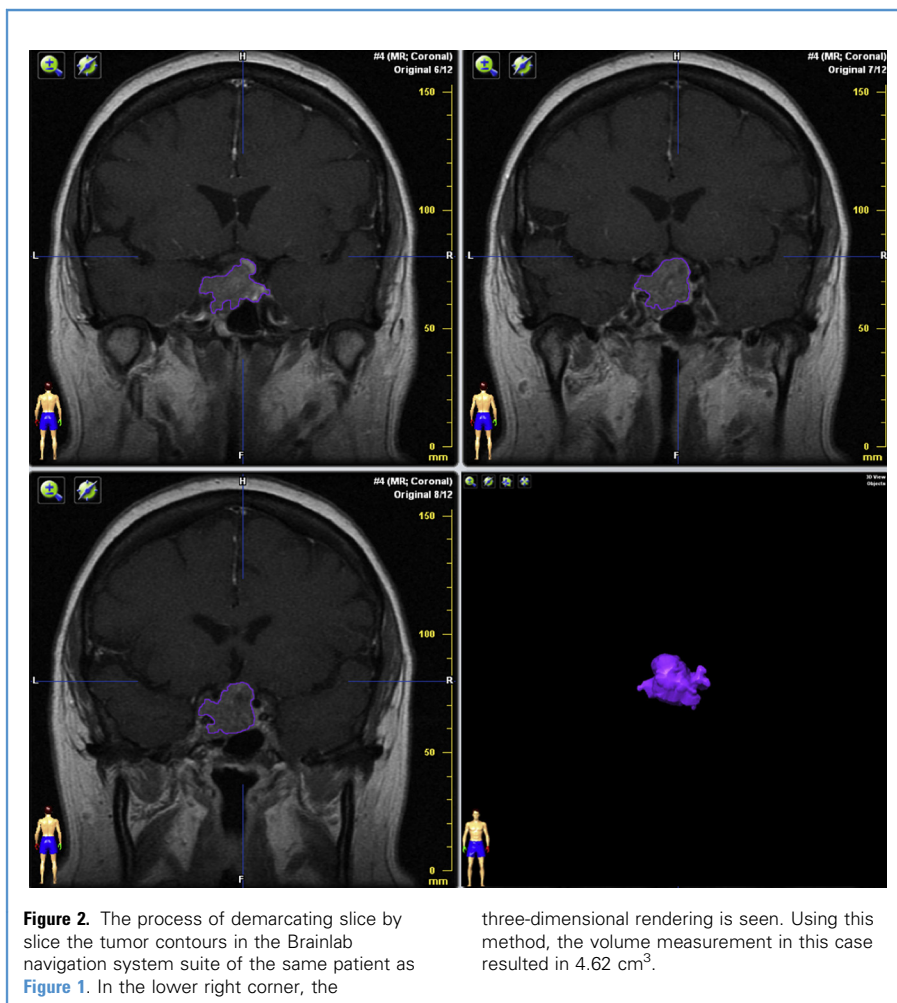
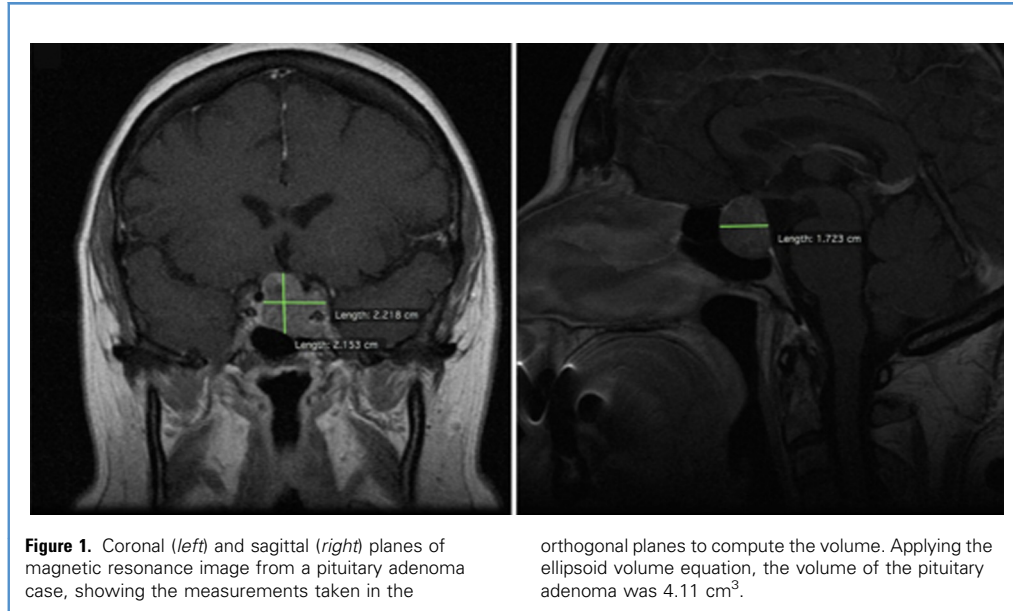
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