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## Introduction

Little is known about possible predictors of hormone function following pituitary surgery. Tumor consistency recently emerged as a key factor in surgical planning for pituitary adenomas, but its impact on postoperative endocrine function has yet to be explored. The primary aim of our study was to evaluate the impact of tumor consistency on endocrine and surgical outcomes following transsphenoidal adenomectomy (TSA).

## Material and Methods

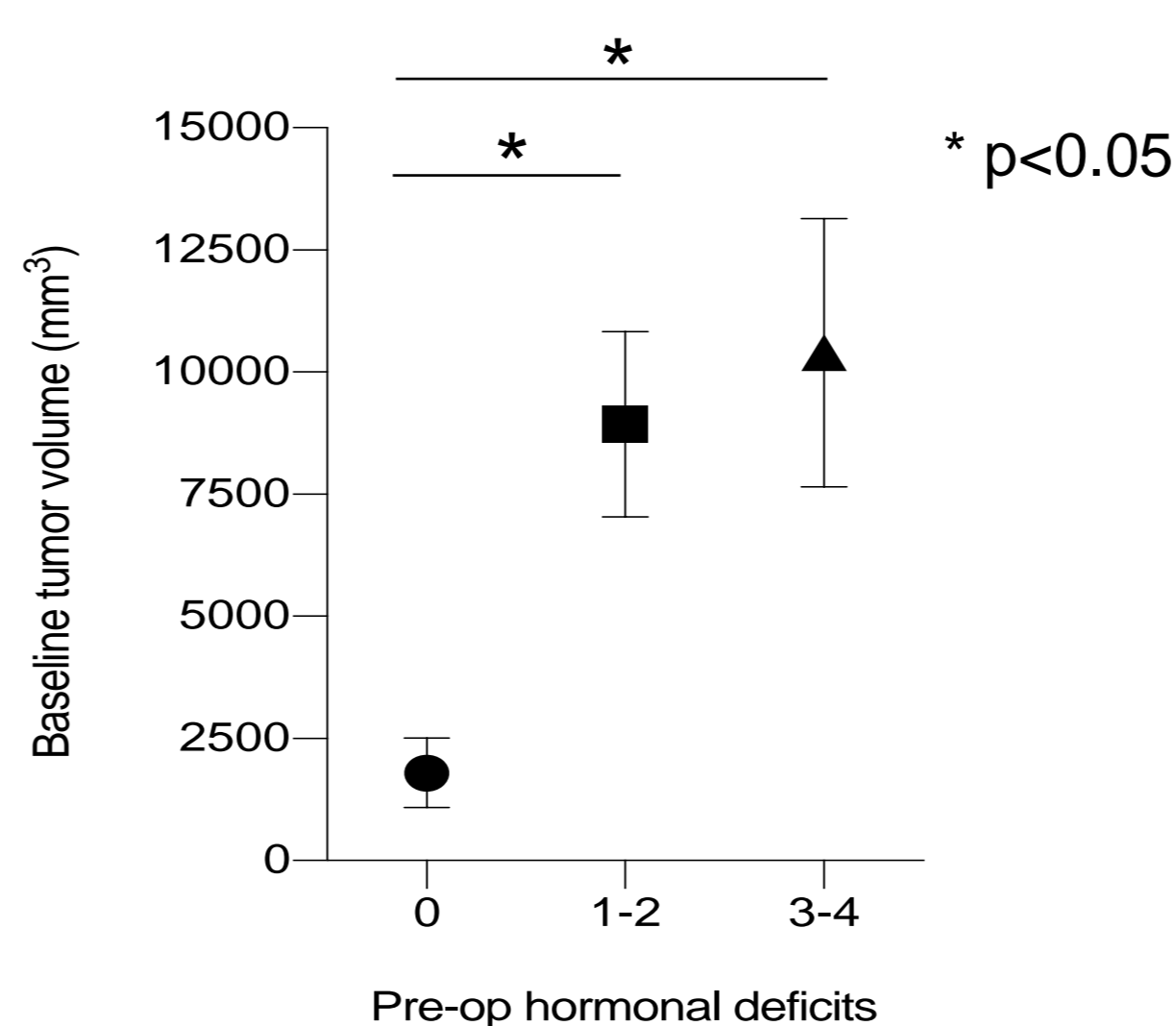
Our study was a single-center, retrospective analysis of consecutive pituitary adenomectomies performed at Policlinico Umberto I in Rome. All patients underwent radiological and biochemical evaluations at baseline, and hormone assessments 3 and 6 months after pituitary surgery. Postoperative MRI studies were used to determine the resection rates following TSA. A single surgeon performed all surgical procedures and provided data on tumor consistency, macroscopic appearance, neurosurgical approach and intraoperative complications.

## Results

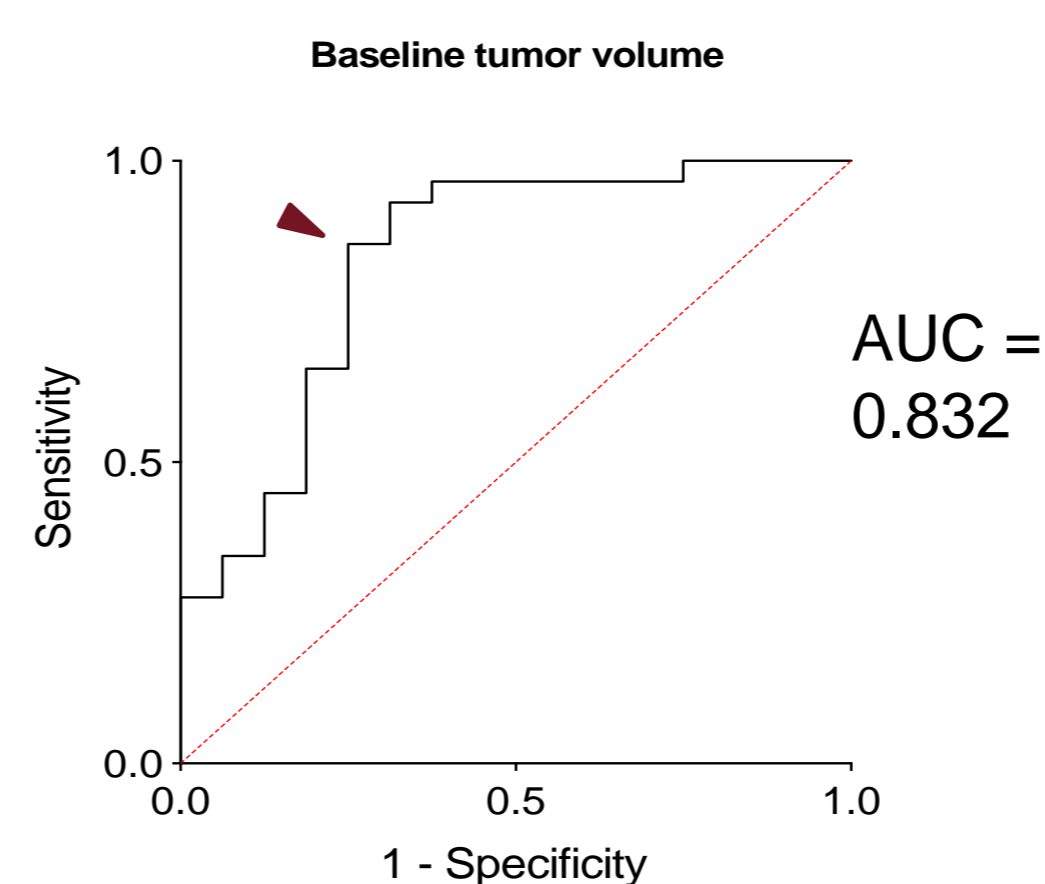
50 patients [24 women, mean age  $57 \pm 13$  years, median tumor volume 4800 mm<sup>3</sup> [95% CI; 620–8828], were included. Greater tumor volume ( $\chi^2=14.621$ ,  $p=0.006$ ) and male sex ( $\chi^2=12.178$ ,  $p<0.001$ ) were associated with worse preoperative endocrine function. All patients underwent TSA without intraoperative complications.

### Baseline characteristics of 50 patients

|  |                           |
|--|---------------------------|
| Number of patients                             | 50                        |
| Age $\pm$ SD, years                            | 57 $\pm$ 13               |
| Sex, no. (%)                                   |                           |
| Male   | 26 (52%)                  |
| Female   | 24 (48%)                  |
| Baseline total tumor volume (mm <sup>3</sup> ) | 4800.9 (18.72 – 26087.82) |
| Visual Impairment                              | 28 (56%)                  |
| No. of impaired pituitary axes per patient     |                           |
| 0  | 17 (34%)                  |
| 1  | 15 (30%)                  |
| 2  | 7 (14%)                   |
| 3  | 7 (14%)                   |
| 4  | 4 (8%)                    |



Tumor volume was significantly smaller in deficit-free patients compared to those with 1-2 and 3-4 pre-op deficits



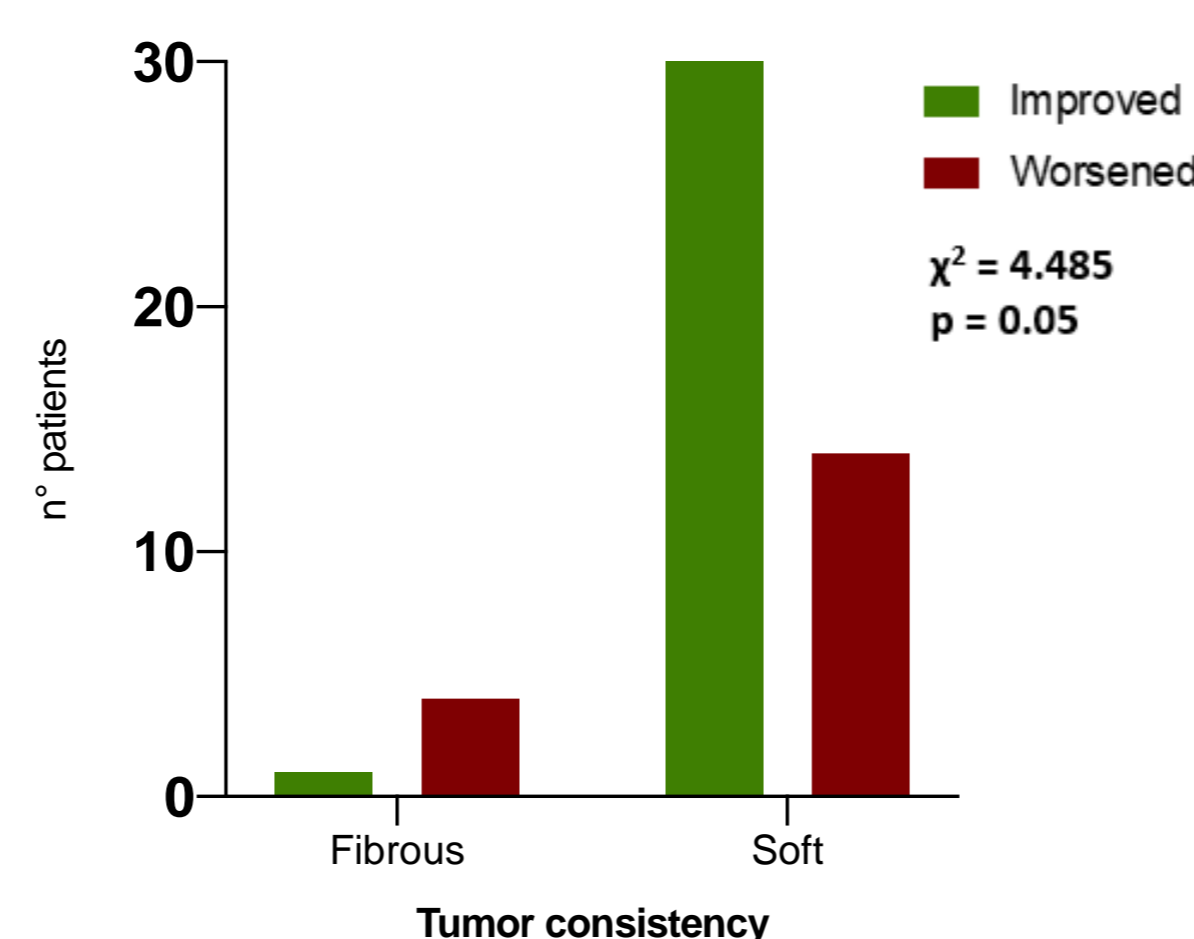
A cut-off of 620 mm<sup>3</sup> predicted the presence/absence of pre-op hormonal deficits (sensitivity 95%, specificity 73%)

### Post-operative assessments

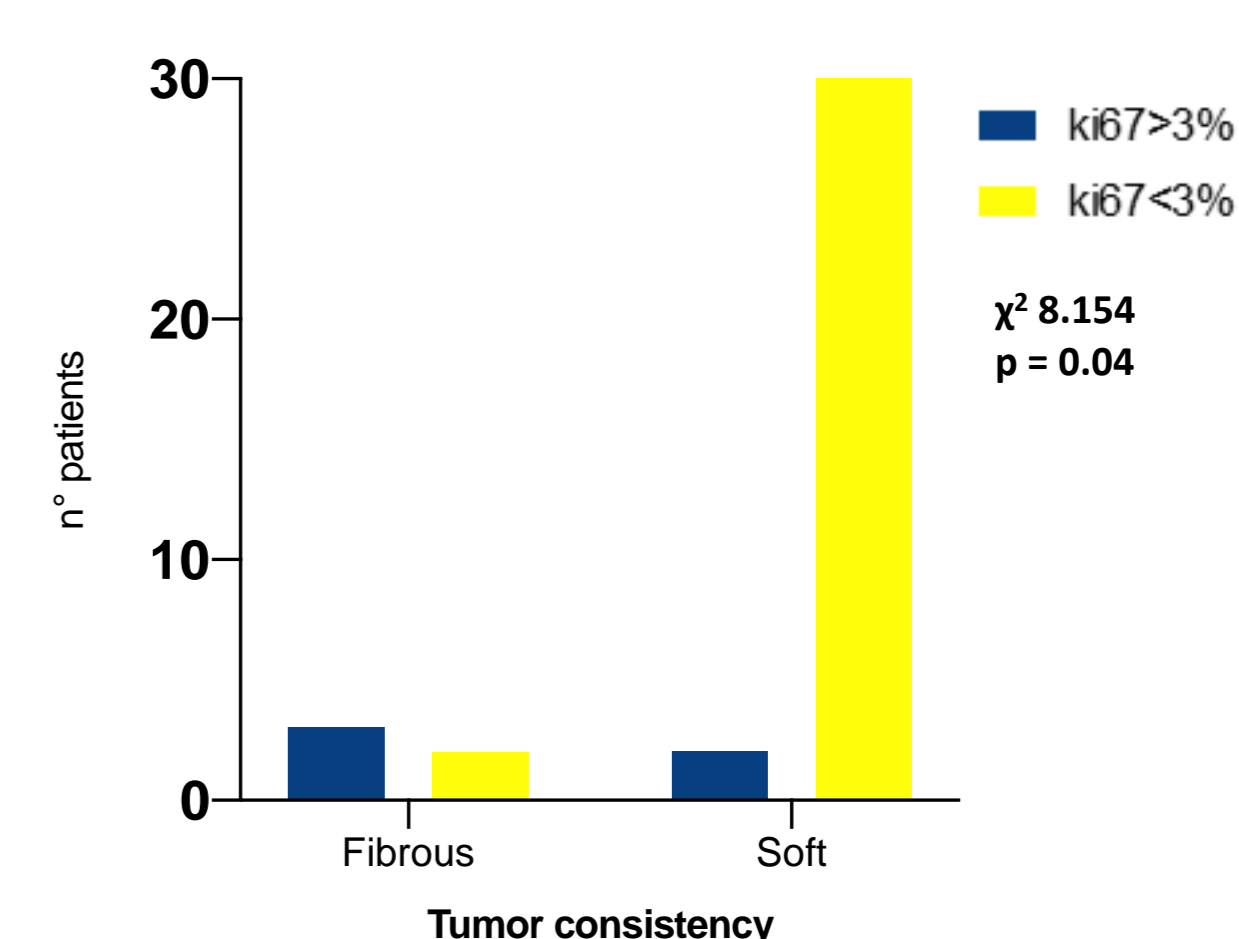
|                            |          |
|----------------------------|----------|
| Tumor consistency, no. (%) |          |
| Soft                       | 45 (90%) |
| Fibrous                    | 5 (10%)  |
| Tumor histology, no (%)    |          |
| Null cell                  | 9 (18%)  |
| PRL+                       | 6 (12%)  |
| ACTH+                      | 10 (20%) |
| GH+                        | 14 (28%) |
| FSH/LH+                    | 15 (30%) |
| p53 expression, no. (%)    | 9 (18%)  |
| Ki67>3%, no. (%)           | 4 (8%)   |

|                    | Baseline    | 6-months follow-up |
|--------------------|-------------|--------------------|
| ACTH deficiency    | 12/50 (24%) | 27/50 (54%)        |
| TSH deficiency     | 23/50 (46%) | 20/50 (40%)        |
| FSH/LH deficiency  | 26/50 (52%) | 20/50 (40%)        |
| GH deficiency      | 5/50 (10%)  | 7/50 (14%)         |
| Diabetes Insipidus | 0/50 (0%)   | 6/50 (12%)         |

Fibrous adenoma consistency was observed in 10% of patients and was associated with a Ki-67 greater than 3% ( $\chi^2=8.154$ ,  $p=0.04$ ) and with a greater risk of developing postoperative hormone deficiencies ( $\chi^2=4.485$ ,  $p=0.05$ , OR=8.571; 95% CI; 0.876-83.908) along with a lower resection rate ( $\chi^2=8.148$ ,  $p=0.004$ ; OR 1.385, 95% CI; 1.040-1.844). Similarly, worse resection rates were observed in tumors with suprasellar extension ( $\chi^2=5.048$ ,  $p=0.02$ ) and CSI ( $\chi^2=4.000$ ,  $p=0.04$ ), resulting in a 6-fold (OR=6.000, 95% CI; 1.129-31.880) and 3-fold (OR=3.857, 95% CI; 0.997-14.916) increase in the risk of lower surgical radicality, respectively.



A comparison of postoperative pituitary function between fibrous (left) and soft pituitary tumors (right).



A comparison of Ki-67 (MIB-1) expression between patients with fibrous (left) and soft pituitary tumors (right).

## Discussion

Predictors of endocrine outcomes following pituitary surgery are still lacking. We demonstrated that tumor consistency might provide useful information about postoperative pituitary function, likely due to its impact on surgical procedures. Further prospective studies with larger cohorts are needed to confirm our preliminary findings.

### References:

- Pofi R, Gunatilake S, Macgregor V, et al. J Clin Endocrinol Metab. 2019;104(11):5316-5324.
- Cappelletti M, Ruggeri AG, Spizzichino L, D'Amico A, Avella E, Delfini R. World Neurosurg. 2019;121:e449-e457.