Sellar Contour: Anatomic-Polytomographic Correlation

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Sellar Contour: Anatomic-Polytomographic Correlation

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In the polytomographic evaluation of the sella, the spectrum of normal sellar contour is broad. Minimal sellar contour changes may be insignificant. Therefore, the polytomographic diagnosis of pituitary microadenomas should be limited to those patients with definite focal, usually asymmetric, expansion of the sellar floor.

Focal contour changes of the sella have been interpreted by several authors to represent underlying pituitary microadenomas [1-4]. These changes are often only recognized by thin section tomography. However, normal variations in the sellar contour may simulate pathologic alterations [5]. Due to the high incidence of incidental pituitary microadenomas in the general population [6], clear guidelines for the evaluation of minimal sellar contour changes have not been established. To alleviate this, an anatomic study was performed to correlate the histologic appearance of the pituitary gland with the tomographic contour of the sella.

Materials and Methods

A total of 100 sphenoid specimens were removed by block dissection at autopsy so that the pituitary contents remained undisturbed. Specimens were then fixed in formalin. Frontal and lateral hypocycloidal tomograms were obtained at 2 mm intervals.

After tomography, the specimens were decalcified and sectioned in the sagittal plane. Four sections through the pituitary fossa separated by about 2 mm were stained with routine H and E stain. These specimens were then reviewed by a neuropathologist (B. H. H.). The presence of a pituitary microadenoma, its approximate size, and other abnormalities of the pituitary gland or adjacent bone were recorded.

The tomograms were reviewed by five neuroradiologists who were unaware of the pathologic diagnosis. Tomograms were scored as being normal, indeterminate, or definitely indicative of a microadenoma based on the criteria of localized expansion or erosion. Alterations in contour related to sphenoid sinus septae were considered normal variations. The final score for each case was determined by a simple majority of the examiners’ interpretations.

Results

Autopsy records were available on 80 patients. There was no clinical suspicion of pituitary disease in any of these patients. Ages were 9-82 years, with 38 females and 42 males. Neoplastic processes caused death in 39 patients.

The histologic evaluation of the specimens revealed 79 normal pituitary glands, three gland infarcts, four metastases to the pituitary, and 14 glands containing microadenomas. Three of the specimens contained microadenomas 5-8 mm in diameter, eight were 3-5 mm, and three were 1-3 mm. Of the 14 specimens in which a microadenoma was found, the radiologic evaluation suggested the presence of a tumor in three instances (true-positive). In three cases, the
Fig. 1.—Microadenomas. All anatomic specimens are midline sections and correspond to tomographic section directly above. A, 8 mm pituitary microadenoma (arrows) with partially empty sella and normal sellar contour. B, Anteroposterior section of pituitary gland with 7 mm microadenoma on right (arrows). No sharpening of lateral sellar margin and sellar floor slopes to opposite side. Anatomic specimen is slightly tilted (arrows). C, Anterior bulge unrelated to underlying 1.5 mm microadenoma. D, Inferior microadenoma (arrows) with no evidence of localized expansion or erosion.

diagnosis was indeterminate and in eight instances the sella was considered to be normal (false-negative) (fig. 1). Of the 86 specimens that did not contain microadenomas, 52 were considered to be normal on radiologic evaluation (true-negative), 26 were considered as indeterminate, and in eight cases the sella was considered abnormal (false-positive) (fig. 2, table 1).

"Abnormal" anterior inferior focal expansion of the sella was seen in three (21%) of the 14 microadenomas. It was also noted in eight (9%) sellae without microadenomas. Focal thinning was present in one microadenoma and two normals. Sloping of the sellar floor greater than 2 mm was seen in one adenoma and three normal pituitary fossae. In one specimen with a microadenoma and sloping floor, the floor sloped away from the adenoma (fig. 1B). Sharpening of the lateral margins of the sella was present in two microadenomas and two normals (table 2).

Discussion

This investigation underscores the high incidence of incidental pituitary adenomas in the general population. As with other endocrine glands, the number of pituitary adenomas increases with age. In the series reported by Costello [6], the peak age for pituitary microadenomas found incidentally at autopsy occurred in the sixth decade. In our experience (unpublished data), pituitary microadenomas were found in 22.5% of pituitary glands in 1,000 consecutive autopsies. This is consistent with other similar studies [7–11].

Minimal focal contour changes in the sella were found in a significant number of sellae with an underlying histologically normal pituitary gland. Therefore, very minimal focal expansions or erosions are not reliable signs of pituitary microadenomas. Swanson and DuBoulay [5] noted that 31% of patients who had no known pituitary disease had minor
Fig. 2.—No microadenomas. All anatomic specimens are midline sections and correspond to tomographic section directly above. A–C, Anterior bulge contour changes of the sella incidentally noted at pneumencephalography. The high percentage of indeterminate diagnoses also underscores the broad spectrum of minor changes that are difficult to interpret with confidence. Sloping of the floor or sharpening of the lateral sellar margins may also occur in sellae with a normal pituitary gland.

**REFERENCES**


**TABLE 1: Interpretation of Tomograms**

<table>
<thead>
<tr>
<th>Interpretations</th>
<th>No. Specimens</th>
<th>Microadenomas</th>
<th>Normals</th>
</tr>
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<tbody>
<tr>
<td>Normal</td>
<td>8*</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>Questionable</td>
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<td>26</td>
<td></td>
</tr>
<tr>
<td>Definitely abnormal</td>
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<td>8</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>14</td>
<td>86</td>
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</table>

* Three microadenomas were greater than 5 mm.

**TABLE 2: Frequency of Individual Criteria**

<table>
<thead>
<tr>
<th>Findings</th>
<th>No. Specimens</th>
<th>Microadenomas (n = 14)</th>
<th>Normals (n = 79)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior-inferior bulge</td>
<td></td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Focal thinning</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Sloping of floor &gt; 2 mm</td>
<td></td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Sharpening of angles</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
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10. Sommers SC. Pituitary cell relations to body states. *Lab Invest* 1959;8:588–621