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Original contribution

Diagnostic dilemmas in enlarged and diffusely hemorrhagic adrenal glands☆

Mairo L. Diolombi MD[a], Francesca Khani MD[a], Jonathan I. Epstein MD[a,b,c,*]

[a]*The Department of Pathology, The Johns Hopkins Medical Institutions, Baltimore, MD 21231*
[b]*The Department of Urology, The Johns Hopkins Medical Institutions, Baltimore, MD 21231*
[c]*The Department of Oncology, The Johns Hopkins Medical Institutions, Baltimore, MD 21231*

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Summary We have noted an increasing number of cases of enlarged adrenal glands where the underlying diagnosis was masked by a diffusely hemorrhagic process. We identified from our database 59 cases (32 consults, 27 routine) of adrenal glands with diffuse (>25%) hemorrhage received between 2000 and 2014. Fifty-three adrenalectomies and 6 biopsies were identified. The diagnoses after central review were 41 adrenocortical adenomas, 1 nodular adrenocortical hyperplasia with associated myelolipoma, 1 benign adrenocortical cyst, and 10 nonneoplastic adrenal glands with hemorrhage. A definitive diagnosis for the 6 biopsies was precluded by the sample size. The adrenocortical adenomas (size, 1-13 cm; 25%-95% hemorrhage) showed clear cell change in the neoplastic area (10%-80% of the tumor), 19 showed focal calcification (1 with ossification), 11 showed areas of papillary endothelial hyperplasia, 10 showed scattered lymphoplasmacytic inflammation, 6 showed benign cortical tissue extending beyond the adrenal capsule into soft tissue, 1 showed necrosis in the form of ghost cells, 2 showed lipomatous change, and 6 were associated with incidental benign lesions (1 cortical cyst, 1 schwannoma, and 4 myelolipomas). Twenty-four of the adrenocortical adenomas were consults where the referring pathologist had trouble classifying the lesion. Of the 10 nonneoplastic adrenals (4.5-22 cm; 40%-80% hemorrhage), 2 were consults. In summary, pathologists have difficulties recognizing adrenocortical adenomas in the setting of a massively enlarged and hemorrhagic adrenal gland. Although there is a correlation between adrenocortical malignancy and size, hemorrhage into nonmalignant adrenal glands can result in markedly enlarged adrenals.

1. Introduction

A major diagnostic dilemma for radiologists includes distinguishing organizing hemorrhagic lesions from potentially malignant adrenal neoplasms, as both tend to be large and emit heterogeneous signals [1–3]. As a result, these lesions are increasingly being encountered in routine surgical pathology practice. The evaluation and categorization of adrenal cortical neoplasms remain among the most challenging areas in adrenal pathology even for experienced pathologists [4,5]. The Weiss system provides specific guidelines for differentiating adrenocortical adenomas from adrenocortical carcinomas and is considered the standard for determining malignancy in tumors of the adrenal cortex [6–8]. We report our experience with enlarged adrenal glands where the underlying diagnosis was masked or challenging because of extensive organizing hemorrhage.

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* Corresponding author at: 401 N Broadway St, Room 2242, Baltimore, MD 21231.
E-mail address: jepstein@jhmi.edu (J. I. Epstein).

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2. Materials and methods

We searched our electronic database for cases of adrenal glands with diffuse hemorrhage received between 2000 and 2014 and identified 93 cases. Hematoxylin and eosin (H&E)–stained slides in each case were centrally reviewed by all 3 authors, and the original diagnosis was either confirmed or revised. Cases included in the study had a hemorrhagic process centered in the adrenal gland, which represented at least 25% of the submitted sections. Cases with noncortical-based lesions were excluded from the study. A total of 34 cases were excluded from our study: slides were not available for review in 19, 9 cases showed less than 25% hemorrhage in the submitted sections, 5 cases consisted of noncortical-based lesions (3 pheochromocytomas, 1 myelolipoma, 1 angiosarcoma), and the hemorrhagic process was centered in the periadrenal soft tissue in 1 case.

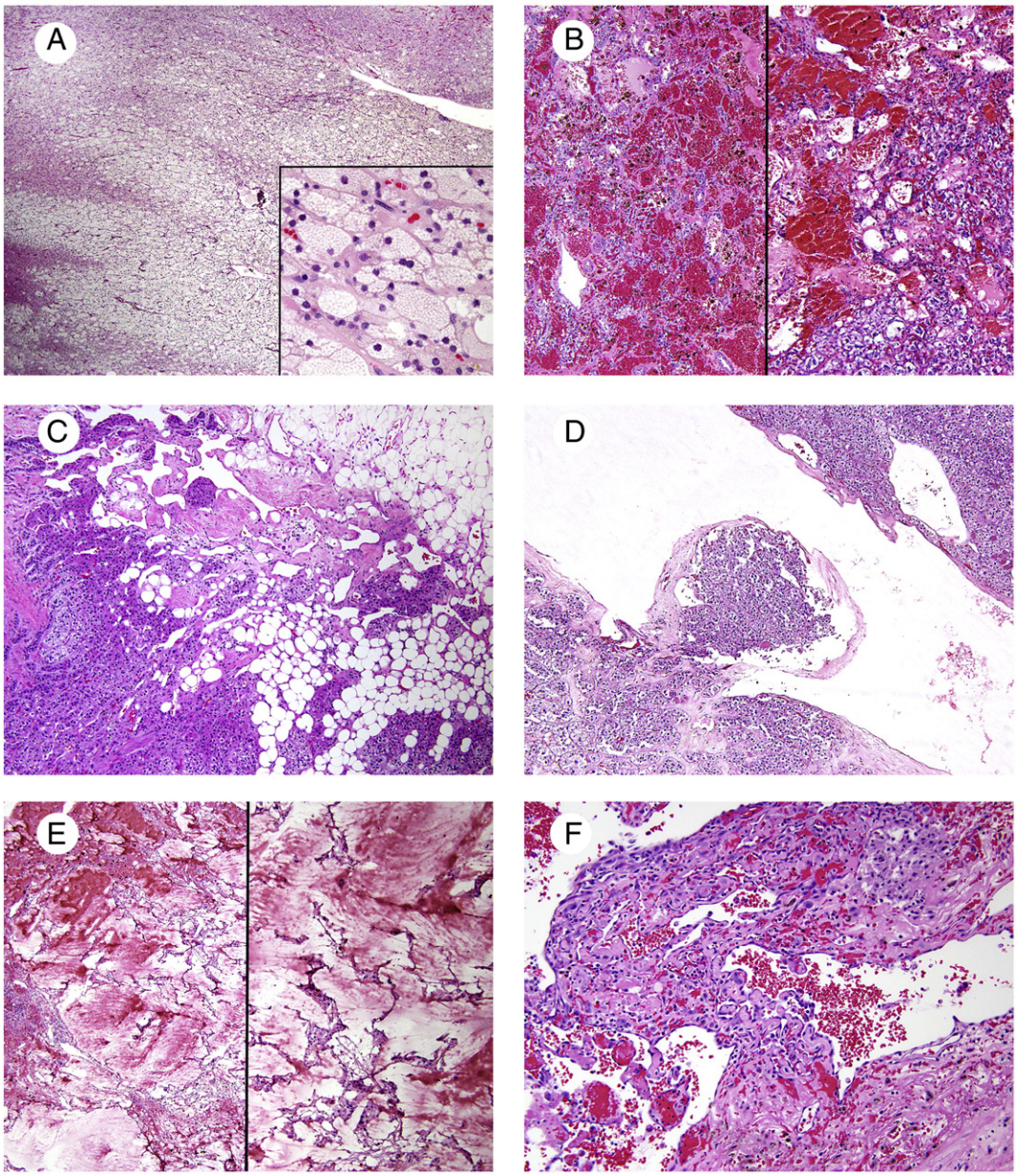

Fig. 1 A, Adenoma with expanded sheets of fasciculata-type cells with loss of normal cortical architecture; the inset shows the lipid-rich "clear" cells (original magnification, H&E ×4; inset, ×40). B, Blood dissecting the adrenal cortex (right) in an adenoma, mimicking a benign vascular lesion (left) (H&E × 10). C, Nonneoplastic adrenocortical tissue in a case with adenoma elsewhere extending into periadrenal soft tissue, mimicking capsular invasion (H&E ×4). D, Adenoma with protrusion into a vessel, mimicking vascular invasion (H&E ×4). E, Difficult frozen section of an adenoma read as a benign adrenal gland with hemorrhage. Low magnification (left, ×10) with higher magnification (right, ×20) showing scant adrenocortical tissue (H&E). F, Extensive recanalization and papillary endothelial hyperplasia in an adenoma, mimicking an angiosarcoma (H&E × 10).