IMAGE

Incidental findings and normal variants on hybrid imaging: falx cerebri ossification

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ABSTRACT

The images presented in this paper are part of a series which aims to highlight anatomical variants and incidental findings which may be placed on hybrid imaging. The current images show the incidental finding of falx cerebri ossification which has been evident on ^{18}F-sodium fluoride positron emission tomography/computed tomography (CT) scans of a 45-year-old female with breast cancer and a 61-year-old male with known prostate cancer. The falx cerebri is a midline fold of the dura mater which may become ossified in some patients. This finding can have varying appearances on CT scans due to location, size, extent, and pattern of ossification. Physicians must be able to identify this as an incidental finding rather than a pathological lesion in order to avoid misinterpretation.

Keywords: Incidental findings, dura mater, positron emission tomography/computed tomography, radionuclide imaging.

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The falx cerebri is a midline structure which separates the two cerebral hemispheres in the brain. It is formed by a fold of the dura mater which attaches anteriorly to the internal frontal crest and crista galli and posteriorly to the tentorium cerebelli. The upper border of the falx cerebri contains the superior sagittal sinus [1]. Ossification of the falx cerebri is a rare occurrence; it is present in approximately 7% of radiographs [2]. Physiological calcifications of the dura mater, including the falx cerebri, increase with age and are more common in men than in women [3,4]. In most cases, this finding has no clinical significance [1,2].

The falx cerebri is formed by multipotent mesenchymal cells which can be stimulated to become osteogenic. Stimuli may include trauma, hemorrhage, irritation, or degeneration. Histologically, ossified falxes have hyperplastic meningo-epithelial cells and have the structure of bone marrow. This is consistent with the magnetic resonance imaging (MRI) findings which show ossified falxes as regions of fatty marrow surrounded by cortical bone. The membranous bone that is formed can be the site of metastatic or leukemic infiltration, falcine osteosarcoma, or myelometaplasia [1].

CT is the most sensitive method for detecting physiological intracranial calcifications [3]. On CT scans, falx cerebri ossifications appear as areas of focal marginal cortical bone-like density with occasional central lower density areas representative of bone marrow [1,2]. The lesion may appear round, oval, wedge-shaped, or elongated as shown in Figures 1 and 2 [1]. Although ossification can occur along any part of the falx cerebri, it most commonly occurs anteriorly as seen in Figure 1 [1,5]. Some individuals may have more than one site of ossification of the falx cerebri [1,5].

Falx cerebri ossification is typically an incidental finding on CT or MRI scans of the brain [1]. Although it usually has no clinical significance by itself, it may be associated with certain conditions such as hyperparathyroidism, hypertelorism, and chronic renal failure or it may occur following a chronic epidural or subdural hematoma [2,4,5]. Falx cerebri ossification may especially be associated with nevoid basal cell carcinoma where this finding can be present in approximately 65%-79% of patient radiographs [5] compared to only 7% of normal patient radiographs [2]. Furthermore, falx cerebri ossification can obstruct the superior sagittal sinus, thereby impeding cerebrospinal fluid flow and increasing intracranial pressure which can have fatal consequences for the individual [1,5]. It is important that physicians are able to distinguish benign falx ossifications from pathologic lesions such as hemorrhage, calcified meningiomas, dural metastasis, and leukemic infiltration of an ossified falx [1,5].

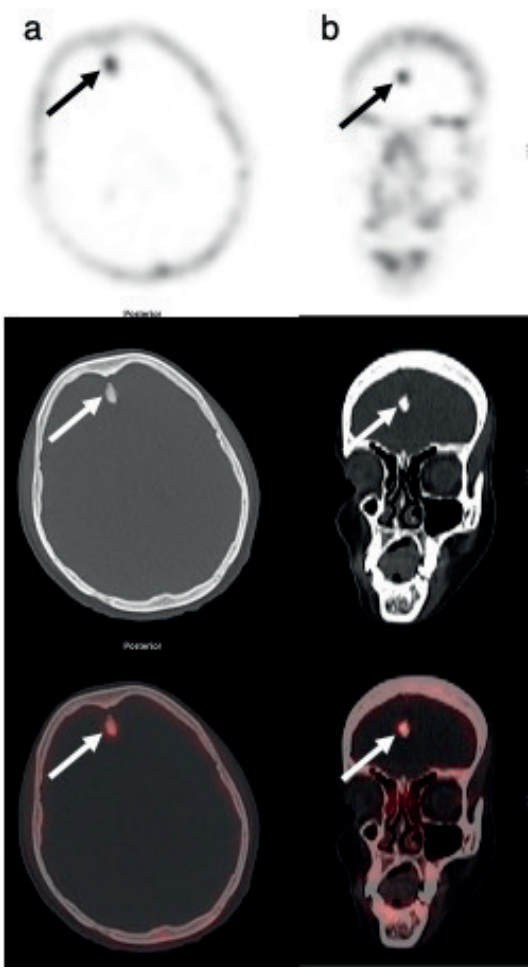

Figure 1. *^{18}F-sodium fluoride (^{18}F-NaF) positron emission tomography/computed tomography (PET/CT) scan of a 45-year-old female with right-sided breast cancer. Axial (a) and coronal (b) images of her scan are shown. There is a focus of uptake of ^{18}F-NaF in the midline calvarium on the PET scan (upper row). This corresponds to the ossification seen in the midline on the CT scan (middle row) and on co-registered PET/CT images (lower row), which suggests that this is an incidental ossification of the falx cerebri rather than a pathological lesion.*

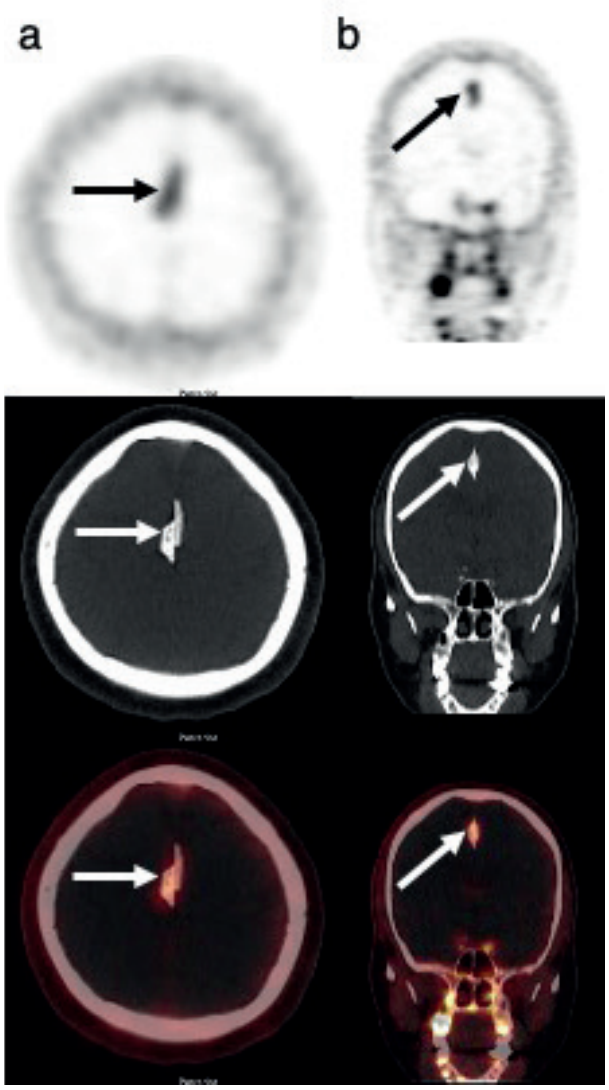

Figure 2. *Axial (a) and coronal (b) images of an ^{18}F-NaF PET/CT scan of a 61-year-old male with known prostate cancer. The ossification of the falx cerebri is evident on axial and coronal images. Note that falx cerebri ossification can vary in shape and location.*

List of Abbreviations

CT	Computed tomography
^{18}F-NaF	^{18}F-Sodium fluoride
MRI	Magnetic resonance imaging
PET	Positron emission tomography

Conflicts of interest

The authors declare that they have no conflicts of interest.

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Ethical Consent

This article does not contain any studies with human participants or animals performed by any of the authors.

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