

7. Diploic Space Lesions

The diploic space is the marrow-containing area in the skull vault between the inner and outer layers of compact/dense bone. In adults, in whom yellow marrow has supplanted the red marrow of childhood (or in whom there is simply a greater proportion of yellow marrow), this space is visualized as increased SI on T1WI. The SI pattern of the diploic space may vary on T1WI, ranging from uniform high SI to patchy areas to only a small nidus of high SI. Regardless of the distribution of elevated SI, these areas should be relatively symmetric; any gross asymmetry suggests pathology. Evaluation of the diploic space must be specifically included in the normal search pattern, otherwise subtle lesions will be missed. Metastases to the diploic space may be subtle, particularly if small, on nonenhanced MR but are usually readily evident with contrast administration (Fig. 7.1 A, B). Any diploic space enhancement other than that from adjacent arachnoid granulations and the occasional diploic venous channel is likely pathologic. Arachnoid granulations

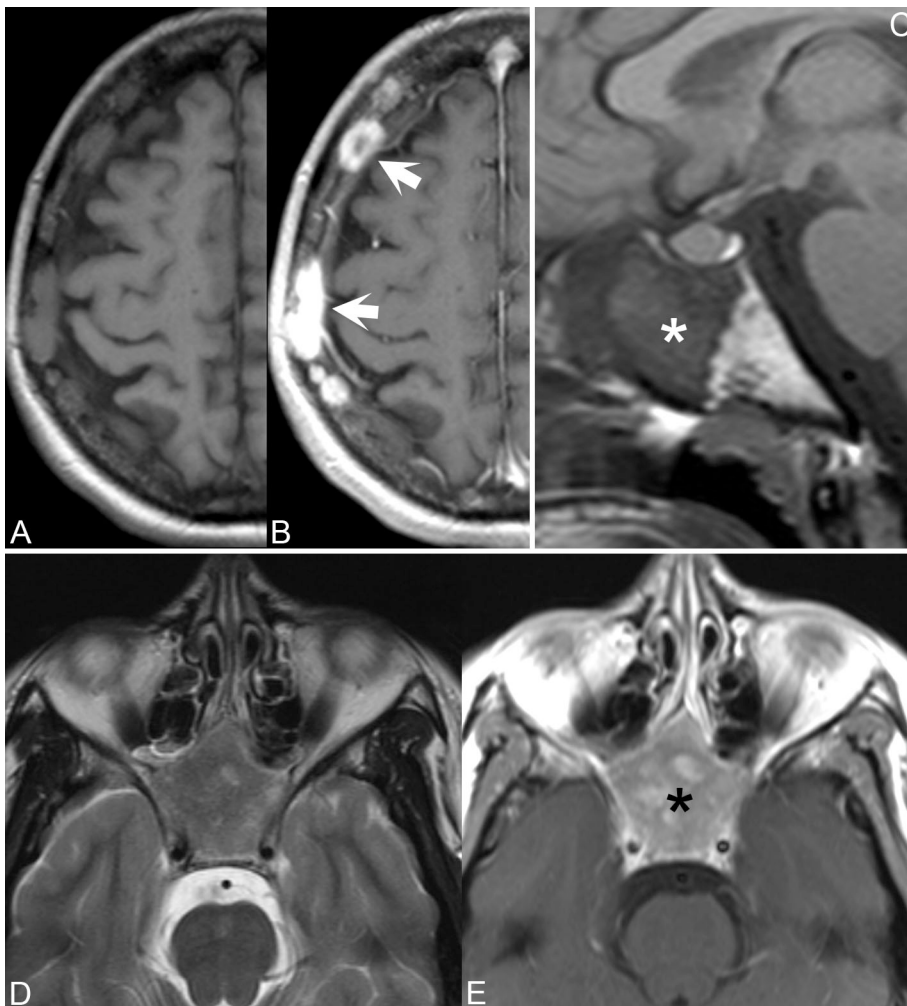


Fig. 7.1

along the midportion of the superior sagittal sinus, for example, are well seen on coronal scans, located adjacent to the sinus along the midline. These are hyperintense on T2WI. Diploic venous channels, which are of low SI on non-enhanced studies, are often seen to enhance, in a recognizable linear pattern. Fat-saturated post-contrast images allow for improved visualization of diploic space metastases, as there is no confusion between enhancing tumor and high SI fatty marrow. However, if these are not obtained, a simple comparison between pre and post-contrast T1WI should suffice to distinguish normal marrow hyperintensity from metastatic enhancement.

Fibrous dysplasia is a classically painless, benign condition most commonly affecting patients under 30 years of age. 70% of all cases are monostotic (with a single osseous site affected), and 30% polyostotic. Craniofacial fibrous dysplasia occurs in approximately half of polyostotic cases and a quarter of monostotic cases. Commonly involved bones include the frontal, temporal, sphenoid (Fig. 7.1 C-E), maxillary, and ethmoid. Bilateral involvement of the jaw—cherubism—may also occur, leading to an “angelic” appearance, although these typically regress by adulthood. The pathologic findings of fibrous dysplasia involve the replacement of medullary bone with expansile fibro-osseous tissue, which gives the bone an enlarged appearance (Fig. 7.1 D, E). Fibrous dysplasia is most often an incidental finding on brain MRI. Lesions demonstrate low to intermediate SI, typically homogeneous, on T1WI (Fig. 7.1 C, asterisk) and low SI on T2WI (Fig. 7.1 D) secondary to fibrous and osseous tissue. Enhancement is variable (Fig. 7.1 E, asterisk), often with areas of more prominent enhancement that correspond to hyperintense parts of the lesion on T2WI (and lucent on CT). In distinction from enhancing metastatic lesions, fibrous dysplasia tends to follow the normal bone contour. Rapid lesion enlargement implies malignant transformation—which, although rare, is most frequently to osteosarcoma. Langerhans cell histiocytosis (LCH) is the preferred term for the clinical entity previously known as histiocytosis X. Unifocal disease (also previously referred to by the misnomer eosinophilic granuloma) is found most often in children, with a 2:1 M:F predominance. The most common locations for a solitary osteolytic lesion include the skull, ribs, pelvis or femur. On brain MR, the typical appearance is that of a solitary skull lesion, centered in the diploic space with destruction of adjacent bone. Lesions tend to demonstrate slight high SI on T2WI and low SI on T1WI. The lesion may also extend into the epidural or subgaleal space. LCH enhances prominently, so again contrast administration is useful. In terms of differential diagnosis, when a solitary lesion of the skull is encountered, a hemangioma should also be included. In Hand-Schüller-Christian disease LCH is multifocal, with associated exophthalmos and diabetes insipidus (from pituitary stalk infiltration).