Spinal subdural hematoma diagnosis

Spinal hematomas are a frequent indication for radiologic evaluation and can be a diagnostic dilemma for many radiologists and surgeons. There are four types of spinal hematomas: epidural, subdural, subarachnoid, and intramedullary (spinal cord) hematomas. Because they differ by their location in relationship to the meningeal membranes and spinal cord, unique radiologic appearances can be recognized to distinguish these types of spinal hemorrhage. Anatomic knowledge of the spinal compartments is essential to the radiologist for confident imaging diagnosis of spinal hematomas and to specify correct locations. MRI is the modality of choice to diagnose the location of the hematoma, characterize important features such as age of the hemorrhage, and detect associated injury or disease. Each type of spinal hematoma has imaging patterns and characteristics that distinguish it from the others, as these specific spinal compartments displace and affect the adjacent anatomic structures. Early detection and accurate localization of spinal hematomas is critical for the surgeon to address the proper treatment and surgical decompression, when necessary, as neurologic deficits may otherwise become permanent [1].

Radiographic features

Subdural hematomas occur within the dural sac; therefore, in contradistinction to epidural hematomas, the epidural fat is preserved and the dura is not displaced inward. The hematoma is bounded by the paired lateral denticulate ligaments and the dorsal septum, forming the inverted Mercedes-Benz sign on axial images 1. As such, it compresses the nerve roots but does not extend into the neural foramina or make direct contact with bone. Naturally, smaller collections will not expand the potential subdural space and will, therefore, not create the inverted Mercedes-Benz sign.

Imaging findings include:

(a) hyperdense lesions on plain CT within the dural sac, distinct from the adjacent low-density epidural fat and silhouetted against the lower-density spinal cord and cauda equina, which it compressed;

(b) lack of direct continuity with the adjacent osseous structures;

C.- Clumping, loculation, and streaking of blood within the dural sac on both MR and CT

(d) an inhomogeneous and variable signal intensity to the ASSH on all MR pulse sequences, but, nevertheless, a striking low signal intensity on T2-weighted spin-echo or T2-weighted gradient-echo to a major part of the ASSH because of deoxyhemoglobin. Plain CT was most helpful in compartmentalizing the hematoma [2].

Classical imaging findings in spinal subdural hematoma - “Mercedes-Benz” and “Cap” signs [3].

Hyperintense on T1W imaging and hypointense to cord on T2W image. The STIR sequence shows hyperintensity to cord.

Spinal subdural hematoma may present with rapidly progressive neurological symptoms. MRI is the

investigation of choice. The knowledge of MRI appearance with respect to the chronological stage of the bleed is essential to avoid diagnostic and hence surgical dilemma [4].

MRI

MRI is the imaging modality of choice for identifying and characterizing subdural hematomas.

Signal characteristics will vary, depending on the age of the blood.

After having confirmed the location of the collection as subdural on axial images, sagittal images can be utilized for measuring its extent.

CT

CT is the workhorse of emergency medicine and is usually utilized before MRI for emergencies. However, spinal hematomas can easily be missed in the acute setting, especially if it is small. After having identified a subdural hematoma on MRI, it is good practice to revisit the CT study and use a narrow window in an attempt to identify the hematoma. Moreover, revisiting the CT study can sometimes help clarify the diagnosis 1.

A crescentic hyperdense collection may be seen adhering to the inner margin of the dura, separated from the hypodense epidural fat.

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