

The Pool sign in Metastatic Adenocarcinoma of Brain

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CASE DETAILS

Majority of intracranial lesions may present as a solitary mass, with two main differentials – a primary intracranial neoplasm and metastasis. These lesions offer a greater diagnostic challenge to both the clinician and radiologist, and often these patients undergo biopsy. Prompt diagnosis is required due to differences in the management and clinical outcomes of primary tumor and metastasis. In case of a metastatic lesion, further workup is necessary to find the primary malignancy.

We present the case of a 60-year-old female, with no comorbidities, presented with a history of left-sided weakness and new onset seizures. Her cerebrospinal fluid study was normal, Mantoux, tuberculosis polymerase chain reaction and tumor markers were negative. Her brain magnetic resonance imaging (MRI) showed a ring-enhancing lesion in the right parietal lobe with perilesional edema. Also, there was a perilesional T2 hyperintense rim “the pool sign” immediately adjacent to the solid mass, deep to the peritumoral vasogenic edema. Her computed tomography scan of the chest showed a right lung mass, biopsy of which confirmed an adenocarcinoma (Figure 1). “The pool sign” is typically higher in

signal intensity relative to the surrounding vasogenic edema and may be secondary to leakage of secretions from the metastatic adenocarcinoma. This sign is more conspicuous and reliable on T2-weighted imaging. Signal characteristics of the rim of high T2 signal are variable on T1-weighted imaging, but typically isointense to hypointense relative to the gray matter. Fluid-attenuated inversion recovery (FLAIR) sequence tends to blend the rim with the surrounding vasogenic edema. Presence of the pool sign favors that a solitary intracranial lesion is a metastatic adenocarcinoma rather than a primary brain neoplasm. In the workup of an unknown primary tumor, this sign may be helpful in focusing the locations where adenocarcinomas are the most common like lung and gastrointestinal tract.^{1,2}

Advanced MRI techniques used to differentiate metastasis from a primary tumor are perfusion imaging, spectroscopy, and molecular imaging. These techniques are not always readily available and can be time-consuming for post-processing of images and data. Therefore, this unique conventional T2-weighted imaging finding to distinguish metastasis from a primary brain tumor is more practical and beneficial in

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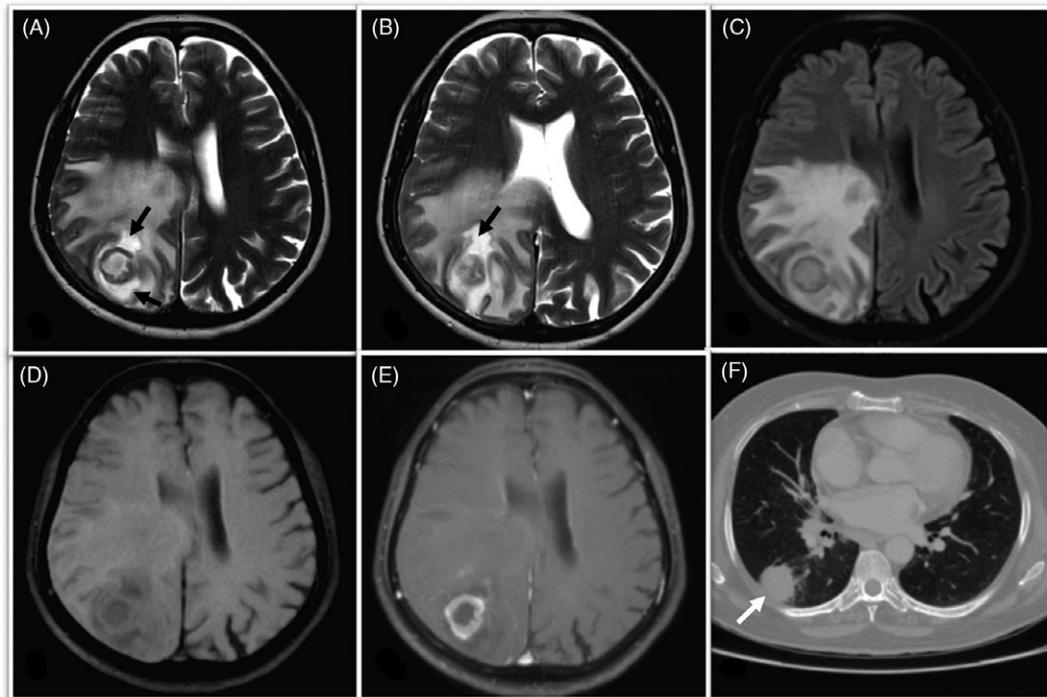


Figure 1: Axial T2-weighted MRI (A, B) shows right parietal lobe lesion with the pool sign (black arrows). The pool of high T2 signal is brighter than the surrounding perilesional vasogenic edema. In FLAIR (C) sequence, the perilesional pooling is not conspicuous and blends with the surrounding edema. The corresponding perilesional rim appears hypointense relative to the gray matter on T1-weighted (D) sequence. Postcontrast T1-weighted MRI (E) shows peripheral enhancement of the lesion. CT scan of the chest (F) shows a right lung mass (white arrow) which was pathology proven adenocarcinoma.

the routine clinical practice where advanced imaging techniques are not possible.

STATEMENT OF AUTHORSHIP

SK: study design, acquisition of data, and drafting of manuscript. JS: acquisition and critical revision of imaging data. BR: critical revision of imaging data. RP: study concept and design. SS: critically reviewed the manuscript for intellectual content.

CONFLICT OF INTEREST

The authors report no conflict of interest.

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