Neurosarcoidosis with pituitary stalk involvement as a first manifestation of a systemic disease
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Section: Neuroradiology
Area of Interest: Neuroradiology brain
Procedure: Diagnostic procedure
Imaging Technique: MR
Imaging Technique: CT
Special Focus: Pathology Case Type: Clinical Cases
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Patient: 57 years, female

Clinical History:
A 57-year-old female patient presented with intractable headache and vertigo at the emergency department. There was no history of any disorder known at that time and investigation started with a brain MRI.

Imaging Findings:
Brain-MRI revealed multiple enhancing nodules of the leptomeninges (Fig. 1). Additionally, T1-weighted images showed a pituitary stalk thickening, normal anterior lobe and absence of posterior lobe’s bright signal (Fig. 2). Although the combination of these findings raised the suspicion of neurosarcoidosis, due to the lack of history of a pulmonary disease, metastases were the first diagnosis to be taken under consideration. CT of the thorax and abdomen followed and revealed the presence of calcified paratracheal and para-aortic lymph nodes as well as lymph nodes at both pulmonary hilums (Fig. 3). Disease of pulmonary parenchyma was not evident. Lymph node biopsy disclosed sarcoidosis.

Discussion:
Sarcoidosis is a chronic multisystemic disorder of unknown aetiology characterized by accumulation of epithelioid granulomas without caseation necrosis in affected organs. This disease is common among young adults between 20 and 40 years with a female predilection. Its prevalence is estimated between 8 and 10 per 100 000. Pulmonary involvement is the most frequent manifestation but the disease can actually affect any organ [1, 2]. The prevalence of clinical involvement of the nervous system is estimated to be about 5–15% [3, 4]. However, autopsy results suggest that a subclinical involvement may be present in up to 25% of patients [1]. The prognosis of neurosarcoidosis is poor with mortality rates among 10% to 18% [5]. Any part of the nervous system can be affected, but the most commonly involved structures are the cranial nerves, the hypothalamus and the pituitary gland. Sarcoid granulomas can also affect the meninges, the parenchyma of the brain, the brainstem, the subependymal layer of the ventricular system, the choroids plexuses, the peripheral nerves and the blood vessels supplying the nervous structures [6]. Hypothalamo-pituitary (HP) manifestations are rare, occurring in <1% of all intrasellar lesions [7]. Only a few studies have specifically described HP involvement. Diabetes insipidus (17–90%) has been considered the most frequently reported endocrine disorder [8]. Due to the potential of pachymeningeal, leptomeningeal and parenchymal involvement there is a wide spectrum of
imaging characteristics. Neurosarcoidosis can manifest as focal dural masses or diffuse dural thickening, with low signal intensity on T2-weighted sequences and homogeneous enhancement on contrast enhanced T1-weighted sequences. Leptomeningeal involvement is the most typical manifestation of central nervous system disease, accounting for 40% of the cases. It is recognised as diffuse or nodular enhancement of the leptomeninges, spreading along the perivascular spaces and with a predilection for the basilar meninges. Hypothalamus and pituitary involvement pertains to the last category and shows as leptomeningeal thickening and enhancement around the hypothalamus and pituitary infundibulum. Hydrocephalus, cranial nerve involvement and enhancing parenchymal mass lesions are part of the spectrum of imaging of neurosarcoidosis. Generally, the features of the lesions are so atypical that without a known history of the systemic disease the differential diagnosis can be quite broad [9].

**Differential Diagnosis List:** Neurosarcoidosis with pituitary stalk involvement., Metastases, TB, Histiocytosis

**Final Diagnosis:** Neurosarcoidosis with pituitary stalk involvement.

**References:**


Description: T1w axial images, after contrast material administration: arrows indicate areas of nodular leptomeningeal enhancement. Origin: Department of Clinical Radiology, Medical School of Ioannina, Greece.
Figure 2

Description: T1w sagittal midline images, before (a) and after (b) contrast media administration. Loss of the bright signal of the posterior lobe of the pituitary gland is seen and the pituitary stalk is thickened (arrow). Origin: Department of Clinical Radiology, Medical School of Ioannina, Greece.
**Figure 3**

*Description:* CT of the thorax, axial planes, non-enhanced: Numerous calcified lymph nodes can be visualized in the mediastinum (paratracheal, paraaortic space) and at the pulmonary hilums (arrows).

*Origin:* Department of Clinical Radiology, Medical School of Ioannina, Greece.