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Intraspinal Extradural Hematopoiesis and Extramedullary Hematopoiesis MRI Findings in a Case of Lung Cancer

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Abstract

Introduction: Extramedullary hematopoiesis is the production of blood outside the bone marrow, which is characterized by increased production of one or more types of blood cells. Intrathoracic extramedullary hematopoiesis usually causes lobulated paravertebral masses with unilateral or bilateral, smooth, sharp edges, and is sometimes accompanied by subpleural and paracostal masses. In this case, we aimed to present the MRI findings of intraspinal extradural hematopoiesis and extramedullar hematopoiesis (EMH) of a patient with lung cancer.

Case: The patient is followed up in the clinic with lung cancer and vertebra metastases. A mass lesion was observed in the prevertebral space extending from the middle thoracic region to the lumbar region, uniformly limited, showing contrast enhancement after intravenous contrast agent (IVCA) injection 2.5 cm in the thickest place, and in the soft tissue intensity that partially surround the azygos vein and thoracic aorta, consistent with extramedullary hematopoiesis. There was an appearance of 6.5 mm in the thickest part of the spinal canal, which was observed in the spinal canal during the C5-T2 vertebrae, posteriorly, extra-dural, compressing from the posterior to the dura, diffusing contrast enhancement in the sequences taken after IVCA injection. Appearance was evaluated in favor of intraspinal, extradural hematopoiesis.

Discussion: Spinal epidural space is a closed anatomic space between the dura mater and the bony spinal canal. Magnetic Resonance Imaging (MRI) is the imaging modality of choice to assess the spine and pathologies of posterior spinal epidural space. The clinical details, laboratory parameters and imaging characteristics help arrive at a specific diagnosis. Extramedullary hematopoiesis appears as well-defined lobulated masses embedded in the epidural space. These show isointense signal to cord on T1W, variable signal on T2W, and none-to minimal post-contrast enhancement.

Conclusion: Recognition of spinal cord EMH requires prompt physical examination and MRI for accurate diagnosis.

Keywords: ***Extramedullar hematopoiesis; Epidural space; Magnetic resonance imaging***

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1. Introduction

Borderline Extramedullary hematopoiesis is the production of blood outside the bone marrow, which is characterized by increased production of one or more types of blood cells. In the fetus, the yolk sac is the primary site of haematopoiesis, followed by the liver, spleen, and bone marrow in the later gestational period. After birth, haematopoiesis should only occur in the bone marrow. Any extramedullary site of haematopoiesis is abnormal. Extramedullary hematopoiesis has occurred in anemias associated with thalassemia, pernicious anemia, hereditary spherocytosis, osteosclerosis where the bone marrow has been replaced with tumor cells (i.e., carcinoma, Hodgkin's disease, lymphoma, and leukemia), hyperparathyroidism, and erythremia. Intrathoracic extramedullary hematopoiesis usually causes lobulated paravertebral masses with unilateral or bilateral, smooth, sharp edges, and is sometimes accompanied by subpleural and paracostal masses [1,2]. In this case, we aimed to present the MRI findings of intraspinal extradural hematopoiesis and extramedullary hematopoiesis (EMH) of a patient with lung cancer.

2. Case

The patient is followed up in the clinic with lung cancer and vertebra metastases. He had a sever backpain. Toracic vertebrae MRI was performed. A soft tissue mass lesion was observed in the prevertebral space extending from the middle thoracic region to the lumbar region, uniformly limited, showing contrast enhancement after intravenouse contrast agent (IVCA) injection. It has 2.5 cm thickness, and soft tissue intensity that partially surround the azygos vein and thoracic aorta, consistent with extramedullary hematopoiesis. There was soft tissue appearance with 6.5 mm thickness in the spinal canal, during the C5-T2 vertebrae segments extra-dural posteriorly, which has diffused contrast enhancement in the sequences taken after IV contrast media injection (FIG. 1). Appearance was evaluated in favor of intraspinal, extradural hematopoiesis. The histopathological evaluation of biopsy taken from the prevertebral mass was reported as hyperplastic hematopoietic tissue.

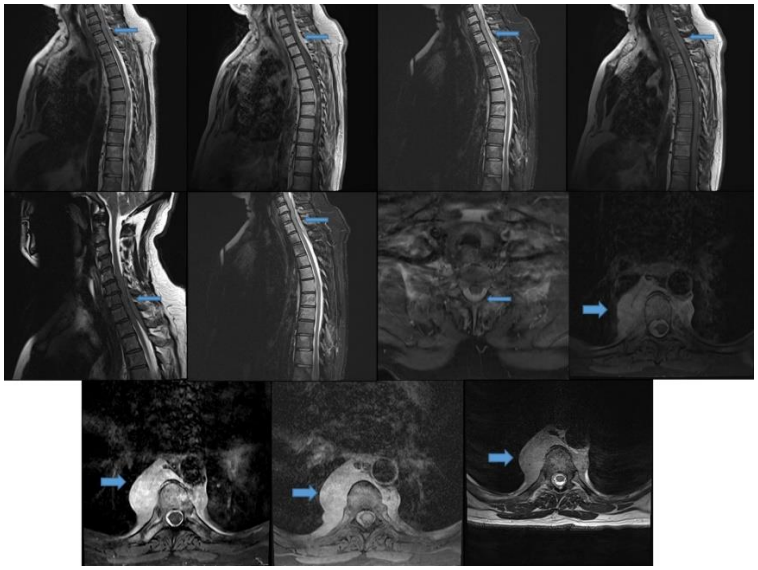

FIG. 1**. A mass lesion was observed in the prevertebral space extending from the middle thoracic region to lumbar region with contrast enhancement. In the spinal canal during the C5-T2 vertebrae, posteriorly, extra-dural, contrast enhancement.**

3. Discussion

Extramedullary hematopoiesis (EH) is the production of blood cells outside the bone marrow and is encountered as a compensatory mechanism in various hematological diseases such as thalassemia, sickle cell anemia, myelofibrosis, and hereditary spherocytosis. EH foci are usually microscopic, and in some cases, they are in the form of mass-like lesions, and are frequently seen in the liver, spleen, lymph nodes, and rarely in the adrenal gland, kidney, breast, peripheral nerves, retroperitoneum, and epididymis. The thorax is a rare site where EH is seen. The pathogenesis of thoracic extramedullary hematopoiesis (TEMH) remains unclear, although one explanation is that TEMH may be derived from the extrusion of bone marrow stem cells through the cortex into a subperiosteal location. An additional hypothesis is that TEMH may be derived from embryonic rests or totipotential cells under the persistent stimulus of anemia [1,2]. In the present case, a few of the necks of the ribs were extremely thin, which may have been responsible for the development of TEMH. Spinal epidural space is a closed anatomic space between the dura mater and the bony spinal canal. Magnetic Resonance Imaging (MRI) is the imaging modality of choice to assess the spine and pathologies of posterior spinal epidural space [3-5]. The clinical details, laboratory parameters and imaging characteristics help arrive at a specific diagnosis. Extramedullary hematopoiesis appears as well-defined lobulated masses embedded in the epidural space. These show isointense signal to cord on T1W, variable signal on T2W, and none-to-minimal post-contrast enhancement [6-9]. Although some publications in the literature suggest that if clinical and radiological appearances are typical, unnecessary surgical procedures should not be performed, our case was applied a needle biopsy which revealed hyperplastic hematopoietic tissue [10].

4. Conclusion

The presence and findings of this entity should be kept in mind in order to evaluate the radiological findings in the paravertebral space and to make a differential diagnosis with other pathologies in this region. Recognition of spinal cord EMH requires prompt physical examination and MRI for accurate diagnosis.

5. Ethical Statements

The approval of the ethics committee was obtained before the initiation of the study.

6. Conflict of Interest

The authors declare that there are no financial or other relations that could lead to a conflict of interest.

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