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Case Report

Beaver tail liver on pediatric chest X-ray ☆☆☆

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ABSTRACT

Beaver tail liver is an anatomical liver variant presenting as elongated left lobe of liver which extends laterally to the spleen. It can present with symptoms or be detected accidentally. We present a case of a 2-year-old asymptomatic patient who was had an X-ray of the chest describing a shadow of unknown origin located left paracardial and the diagnosis of “beaver tail liver” was confirmed after a multi-slice computed tomography of thorax and abdomen was done. We give an overview of very sparse available literature on this anatomical variant while emphasizing the rarity of diagnosis in pediatric population and clinical importance of this variant.

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Introduction

Beaver tail liver is a very rare anatomical variant of liver which is presented by elongated left lobe of the liver that extends laterally to touch the spleen, in some cases it also encircles it [1,2]. It can be detected incidentally or it can present with symptoms, usually as a consequence of an injury of the upper left abdominal quadrant [1,2]. Due to similar structure of the spleen and liver seen on CT and ultrasound it can be mistaken for splenic subcapsular hematoma or perisplenic fluid collection [3,4].

Case presentation

A 2-year-old male patient, who was previously healthy, had been hospitalized due to high fever and cough, under the diagnosis of pneumonia at our Pediatric Clinic. During diagnostic evaluation laboratory results showed elevated markers of inflammation. X-ray of the chest described inhomogeneous shading approximately 3 cm in diameter located left paracardial and partly in summation with cardiac shadow. Described shading may correspond to congenital pulmonary sequestration, but inflammatory infiltration couldn't be ruled out. Due clinical symptoms correlating with pneumonia he was treated with antibiotics to which he responded excellently and was discharged from the hospital. He came for an outpatient control when X-ray of the lungs was done again to re-evaluate the original finding. The X-ray showed triangular shading left paracardial whose differential diagnosis could be

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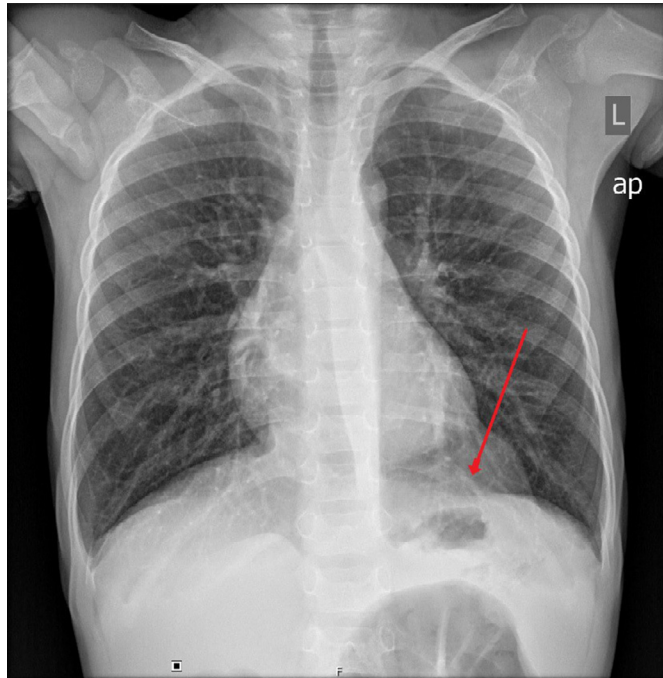


Fig. 1 – The image is showing chest X-ray done at first patient evaluation, with the red arrow pointing to the shadow left paracardial.

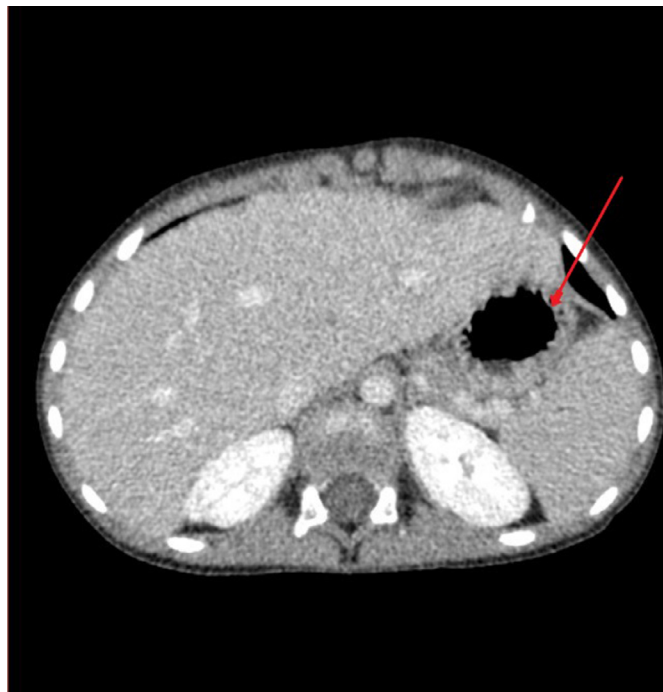


Fig. 2 – The image is showing multi-slice computed tomography (MSCT) of the thorax and abdomen with the red arrow demonstrating hypertrophic left liver lobe called “beaver tail.”

a fat pad (Fig. 1). Due to the need to further clarify the etiology of the shadow, a multi-slice computed tomography (MSCT) and MSCT angiography of the thorax and abdomen were performed. MSCT showed normal pulmonary parenchyma but it described hypertrophic left hepatic lobe, which takes on the

appearance of a "beaver tail" and is slightly imprinted cranially pushing up the diaphragm creating the shadow seen on chest X-ray (Figs. 2 and 3).

The patient is in great general condition and he is without any symptoms.



Fig. 3 – The image is showing multi-slice computed tomography (MSCT) of the thorax and abdomen with the red arrow pointing out the hypertrophic part of the left hepatic lobe that is imprinted cranially pushing up the diaphragm creating the shadow seen on chest X-ray.

This case occurred just before the onset of the COVID-19 pandemic and during the follow-up patient has not had a COVID-19 infection.

Discussion

Anatomic variants of the liver are very rare. They can present in a form of ectopic or accessory lobes which are more commonly found in the right lobe of the liver, although the left lobe also varies in size and shape [5,6]. They can present as an incidental finding or with symptoms if the torsion of the pedunculus which connects the accessory lobe develops. Hepatocellular tumors were reported in these accessory lobes as well [5]. Very rare incidental finding is an anatomical variant called “beaver tail liver.” It consists of normal hepatic parenchyma in which the lateral part of the left lobe of the liver extends laterally to the spleen and sometimes even encircles it [1,6]. According to very limited literature, it is more commonly found in females [6]. Another possible presentation of this variant is fibrous connective-tissue which extends from left lateral edge of the liver to the diaphragm and it may contain liver parenchyma [7].

This variant has some important clinical implications. In the case of trauma of the left upper quadrant of the abdomen, this extended lobe can be injured and be misdiagnosed as splenic subcapsular hematoma or perisplenic fluid collection [3,4,8]. This variation can also be dangerous if invasive surgical procedures are done without knowledge of its existence [1,7]. Focal lesions in the distal region of this elongated left lobe have been reported, they are difficult to detect by an ultrasound because of the anatomical localization, especially if the examiner doesn't think about the possibility of such variant, while they are usually detected on MSCT [9].

Interestingly, living liver donors with the beaver tail feature may have a safer recovery and better outcome because of bigger residual liver volume [10].

The available literature on this variant is very limited. To the best of our knowledge and after extensive review of literature, there are no reports of this variant in children and also no reports of this variant being seen on a chest X-ray. Only a few case reports available describe it as an incidental finding in middle - aged patients [11,12].

Conclusions

We presented, after extensive review of literature and to best of our knowledge, the youngest patient with beaver tail liver variant, also the only patient who was diagnosed due to a shadow seen on chest X-ray. Beaver tail liver is a very rare anatomical variant where the left lobe of the liver extends laterally to the spleen. It can have some serious clinical implications. It can be involved in blunt trauma of the abdomen and misdiagnosed as splenic trauma. Some focal lesions of this elongated part of the liver can be missed if the examiner doesn't know about the possibility of its existence and therefore doesn't actively search for it. Although it is a normal variant of liver development, it is very important that the clinician considers it during patient evaluation.

Author contributions

Conceptualization: M.R.; Investigation: M.R, K.B., M.I., A.R.; Writing—original draft preparation: K.B., M.I., A.R.; Writing—

review and editing: M.R.; Supervision: M.R. All authors have read and agreed to the published version of the manuscript.

Institutional review board statement

The study was conducted according to the guidelines of the Declaration of Helsinki. Ethical review and approval were waived for this study because it is case report.

Data availability

The data presented in this study are available on request from the corresponding author.

Patient consent

A written informed consent has been obtained from the patient's guardian for publication of this article.

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