Letter to the Editor

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Intervertebral Disc Vacuum Phenomenon With H-Shaped Vertebrae in an Adolescent With Sickle Cell Anemia

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Sickle cell anemia is rare in East Asia [1] and has seldom been addressed in the *Korean Journal of Radiology*. Semionov et al. [2] described an H-shaped vertebra caused by central endplate depression, a distinctive pattern of vertebral body collapse, as a characteristic radiological sign of sickle cell anemia in their published article. In this letter, we present a unique case of an intervertebral disc vacuum in a patient with sickle cell anemia, likely resulting from vertebral collapse associated with the disease. This case report may contribute to a more comprehensive understanding of the radiological manifestations of the spine in sickle cell anemia.

Vertebral collapse is the most common non-degenerative cause of the vacuum phenomenon in the intervertebral discs [3,4]. Various causes of vertebral collapse have been reported to cause vacuum in the intervertebral discs [4,5].

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Sickle cell anemia is also one of the diseases that causes vertebral collapse, and characteristically, the vertebral body appears to be H-shaped. However, to date, there have been no reports that endplate collapse in sickle cell anemia can cause the vacuum phenomenon in intervertebral discs. In addition, the vacuum phenomenon in the intervertebral discs in adolescents is exceedingly rare, making this case unique.

A 17-year-old boy was referred for chest computed tomography (CT) due to intermittent cough. The patient had a known history of sickle cell anemia. The CT scan revealed no significant abnormalities in the lungs. Multiplanar reformatted images in the bone window showed depression of the central endplates of multiple thoracic vertebrae, giving an H-shaped appearance to the vertebrae (Fig. 1). The vacuum phenomenon was observed in multiple intervertebral discs adjacent to the collapsed endplates (Fig. 1). Splenic calcification was also observed.

The hypercellular bone marrow in sickle cell anemia impedes blood flow, resulting in stasis and hypoxia [6]. Hypoxia triggers microvascular sickling that causes infarction. Infarction of the central portion of the vertebral endplates results in a square-shaped depression or step-off deformity of the endplates, resulting in the characteristic H-shaped vertebrae [6]. The H-shaped vertebral deformity, also known as the Lincoln log deformity, is pathognomonic of sickle cell anemia [6]; however, it can sometimes be seen in Gaucher's disease, although its pathogenesis is different [7]. H-shaped vertebrae are differentiated from the "fish mouth" vertebrae of osteopenia, where the depression of the endplates is smooth, concave, extending from corner to corner in the latter condition, while it is abrupt and step-like in the former [7].

Vertebral collapse due to osteoporosis, neoplasms (multiple myeloma, metastases), trauma, and infection has been reported to cause the vacuum phenomenon in intervertebral discs [4,5]. To the best of our knowledge, the collapse of endplates due to the osteonecrosis in sickle cell anemia as an etiology of vacuum discs, as seen in our case, has not yet been reported in the literature. In addition, this is probably one of the earliest cases of intervertebral disc vacuum.

In conclusion, a new etiology of the vacuum phenomenon in intervertebral discs is reported here. Vertebral endplate collapse in patients with sickle cell anemia can cause

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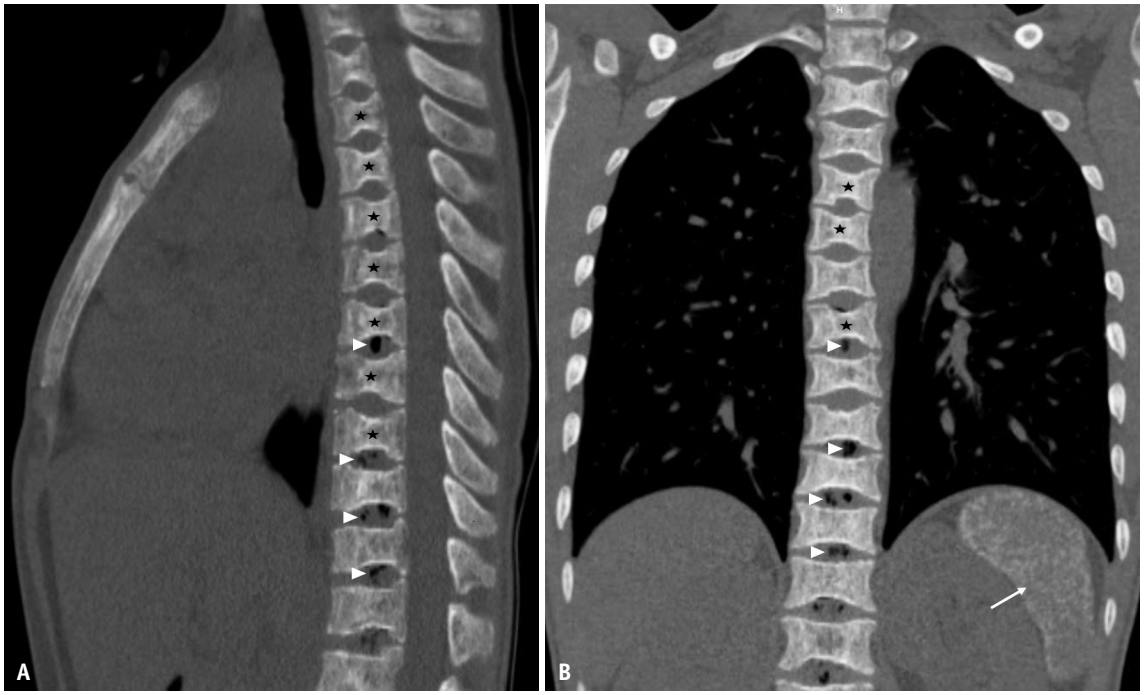

Fig. 1. Sagittal **(A)** and coronal **(B)** reformatted CT scan images (bone window) of the thorax in a 17-year-old male with sickle cell anemia: The square-shaped depression of the central endplates is noted in multiple thoracic vertebrae (asterisks), giving them an H-shaped appearance. The vacuum phenomenon is noted in multiple intervertebral discs adjacent to the collapsed endplates (arrowheads). Note splenic calcifications (arrow).

intervertebral disc vacuum.

Conflicts of Interest

The author has no potential conflicts of interest to disclose.

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