



# What is Your Radiologic Diagnosis?

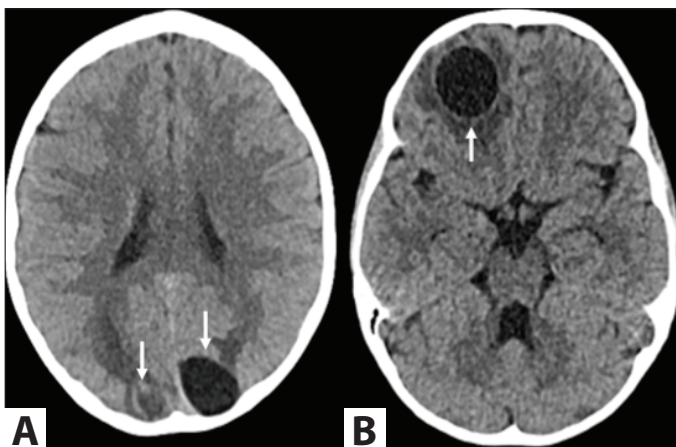
## Radyolojik Tanınız Nedir?

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A seven-year-old girl without any previous complaints or chronic disease is admitted to the emergency service with complaints of sudden weakness in the right arm and leg, a shift in the mouth to the right and inability to speak. It is learned from her history that the family is engaged in animal husbandry and the girl has a dog with whom she has been in close contact since birth. On physical examination, the body temperature of the patient was 36.8°C, while the muscle strength of the left upper and lower extremities was 5/5, while the right side was 4/5. Thereupon, non-contrast brain computed tomography (CT) examination is performed in emergency conditions. On brain CT examination, cystic lesions are detected in both cerebral parenchyma, the largest in the right frontal lobe (Figure 1).



**Figure 1.** Brain CT. (A) Both occipital and (B) right frontal subcortical white matter cystic lesions (white arrows) are present.

Considering the clinical and physical examination findings of the patient, the brain and diffusion magnetic resonance (MR) imaging is performed due to the suspicion of stroke, and acute ischemia-related diffusion restriction in the left corpus striatum (Figure 2) and occlusion in the left middle cerebral artery in the brain MR angiography examination (Figure 3) are seen. Embolectomy is performed urgently. In the brain MRI performed six weeks later for the detailed evaluation and follow-up of the cerebral parenchymal cysts of the patient for whom antiaggregant therapy was initiated after embolectomy, the presence of thick contrast enhancement and peripheral edema in the wall of the parenchymal cysts indicate that the cysts are complicated (Figure 4). In simultaneous brain MR angiography imaging, a signal showing the presence of normal calibration and patent luminal flow in the left middle cerebral artery is seen (Figure 5).

Upon the detection of a 25 x 17 mm hypoechoic myocardial cystic lesion on the lateral wall of the left ventricle in echocardiography examination performed for the diagnosis of childhood stroke, CT of the thorax and the entire abdomen is performed. While the parenchyma of both lungs is normal on thorax CT, a myocardial hypodense, non-enhancing, cystic lesion is seen on the lateral wall of the left ventricle of the heart (Figure 6A). On CT examination of the abdomen, an 8 x 6 mm cyst located in the upper pole anterior of the spleen is detected (Figure 6B).

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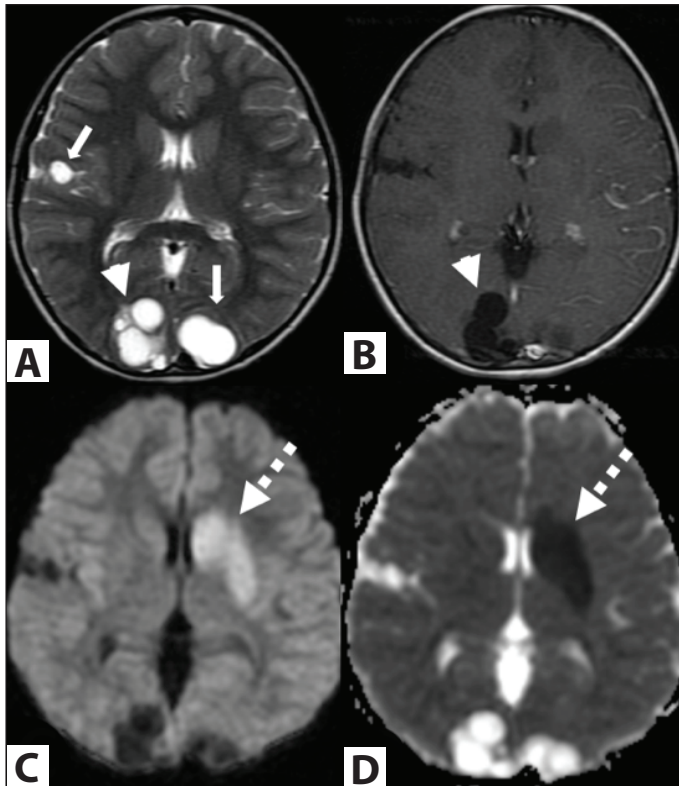
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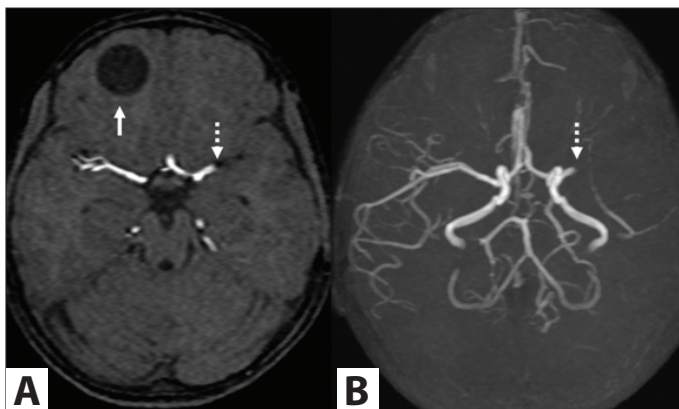
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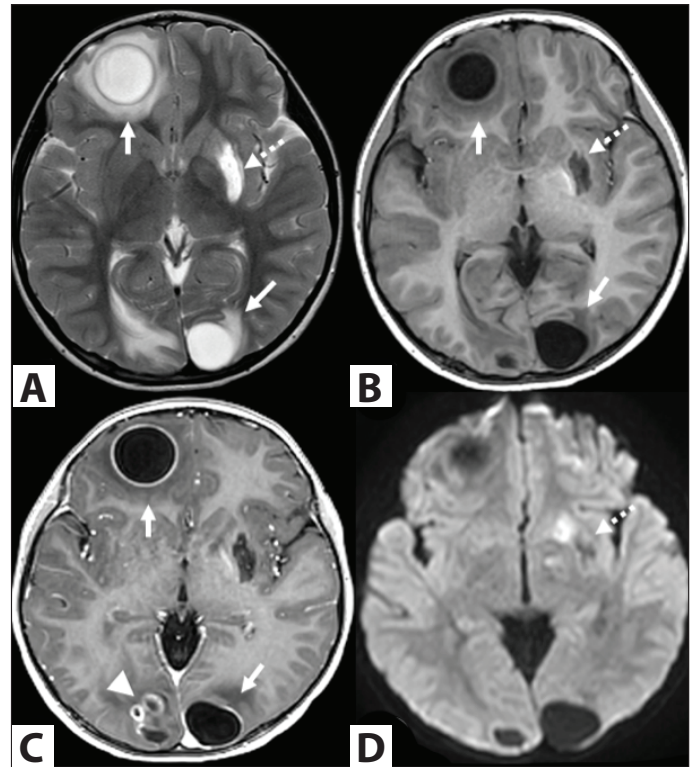
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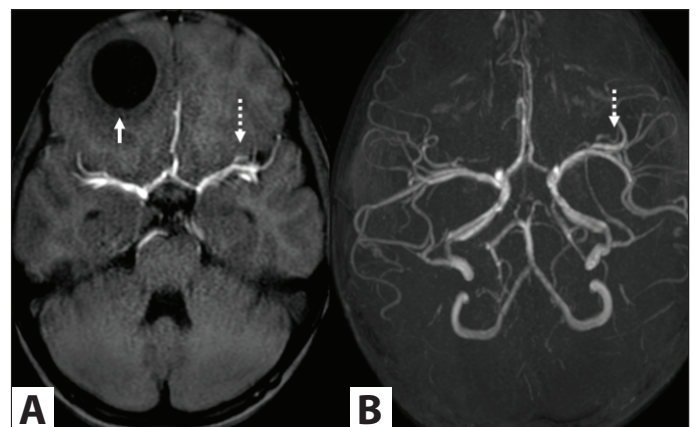
**Figure 2.** Brain and diffusion MRI. **(A)** Axial T2 weighted imaging shows multilobule and thinly septated (arrowhead) right opercular and left occipital high-pressure cysts (white arrows) in the right occipital. **(B)** There is no peripheral and septal contrast enhancement in the multilobular and septal cyst (arrowhead) located in the right occipital on T1 weighted imaging after contrast medium. **(C, D)** Diffusion MR imaging shows diffusion restriction associated with acute ischemia (dashed arrows) in the left corpus striatum.



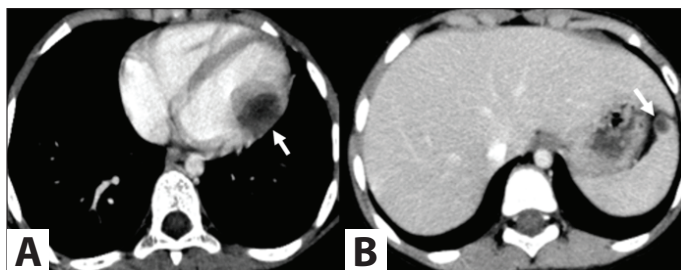
**Figure 3.** Brain MRI angiography examination. **(A, B)** TOF MRA imaging shows occlusion in the proximal left middle cerebral artery (dashed arrows) and **(A)** cystic lesion located in the right frontal lobe (white arrow).



**Figure 4.** Follow-up MRI of the brain and diffusion. **(A)** T2 weighted imaging shows an area of increased parenchymal edema around the cysts (white arrows). **(B)** Compared with unenhanced T1 weighted imaging, **(C)** contrast-enhanced T1 weighted imaging shows a very thick wall and complicated septal enhancement especially in the right occipital region, a complicated cyst that has lost pressure (arrowhead) and other complicated cysts with thin peripheral enhancement (white arrows). **(D)** Diffusion MR imaging shows chronic lacunar ischemia in the left putamen (dashed arrows-also marked in pictures **A** and **B**).



**Figure 5.** Follow-up brain MRI angiography examination. **(A, B)** TOF MRA imaging shows a patent luminal flow signal (dashed arrows) after embolectomy in the left middle cerebral artery. **(A)** In addition to the increase in size and pressure of the cyst located in the right frontal lobe, peripheral edema area and capsular thickening-related findings (white arrow) are observed.



**Figure 6.** (A) Unenhanced hypodense cystic lesion (white arrow) located in the myocardium on the lateral wall of the left ventricle in thorax CT examination. (B) Abdominal CT examination reveals a hypodense cyst (white arrow) located anterior to the upper pole of the spleen.

What is your diagnosis with the patient's history, examination and radiological examination findings?

### **Diagnosis: Hydatid Cyst Embolism to the Left Middle Cerebral Artery with Brain, Spleen and Cardiac Involvement**

#### **Short Discussion**

Hydatid cyst, also known as echinococcosis, is a parasitic infectious disease caused by *Echinococcus granulosus*. Embryo entering through the gastrointestinal tract pierces the intestinal mucosa and reaches the liver via the portal route. Once the embryos manage to pass the hepatic and pulmonary 'filters', they reach the brain via systemic circulation.

Compared to hepatic and pulmonary forms, intracranial involvement is rare and constitutes 0.5-3% of all hydatid cyst cases (1-2). 75-80% of the affected patients are in the pediatric age group (3). Progressive intracranial hypertension and focal neurologic deficit are encountered in most of the cases with intracranial involvement (1-3). 30-75% of the cases may present with sensory-motor defects, approximately 44% with clinical findings such as visual impairment and seizures (2-4).

The majority of intracerebral hydatid cysts are located supratentorially. It is usually located in the middle cerebral artery irrigation area in 45-85% of cases and often in the subcortical location and the parietal lobe. Imaging findings are mainly related to cyst integrity and cyst type. CT and MRI examinations may show juvenile cysts or floating membranes in the arterial lumen. Clinical findings of the patient are primarily related to the size and location of the cysts (2-4). Because of its rapid and easy accessibility in the diagnosis of intracranial hydatid cyst, the first preferred imaging method is brain CT. Uncomplicated

hydatid cyst lesions are seen as high-pressure, homogeneous low-density fluid-density, well-circumscribed lesions without contrast enhancement and parenchymal edema (4). In complicated hydatid cyst lesions, the findings are variable, and there are wall thickening, contrast enhancement, and/or parenchymal edema, which indicate an inflammatory response associated with cyst rupture or infection (3,5). Intracranial hydatid cyst is usually single, although it is quite rare, spontaneous intra-arterial rupture may occur more than once in cases of hydatid embolism or trauma (6).

Arterial involvement is extremely rare and most commonly occurs due to rupture of cardiac hydatid cysts in the right ventricle or atrium. Intravascular growth of parenchymal hydatid cyst into adjacent vascular structures is also a rare cause of the disease and usually causes chronic arterial occlusion. Acute massive embolism can result in sudden death. Patients are also at risk of anaphylaxis due to acute rupture of cysts (6). Arachnoid, pencephalic and epidermoid cysts, pyogenic abscess, cystic tumor of the brain and neurocysticercosis are the differential diagnoses of cerebral hydatid cyst.

Although surgery is the preferred treatment method, antelmintic drugs are preferred in cases of cyst rupture, systemic involvement or recurrence.

#### **References**

1. Turgut M. Intracranial hydatidosis in Turkey: Its clinical presentation, diagnostic studies, surgical management, and outcome. A review of 276 cases. *Neurosurg Rev* 2001;24:200-8. <https://doi.org/10.1007/s101430100168>
2. Duishanbai S, Jiayu D, Guo H, Liu C, Liu B, Aishalong M, et al. Intracranial hydatid cyst in children: Report of 30 cases. *Childs Nerv Syst* 2010;26:821-7. <https://doi.org/10.1007/s00381-009-1008-2>
3. Tanki H, Singh H, Raswan US, Bhat AR, Kirmani AR, Ramzan AU. Pediatric intracranial hydatid cyst: A case series with literature review. *Pediatr Neurosurg* 2018;53:299-304. <https://doi.org/10.1159/000488714>
4. Assamadi M, Benantar L, Hamadi H, Ksiks O, El Hadwe S, Aniba K. Cerebral hydatid cyst in children: A case series of 21 patients and review of literature. *Neurochirurgie* 2022;68:618-26. <https://doi.org/10.1016/j.neuchi.2022.07.005>
5. Gana R, Skhissi M, Maaqili R, Bellakhdar F. Multiple infected cerebral hydatid cysts. *J Clin Neurosci* 2008;15:591-3. <https://doi.org/10.1016/j.jocn.2006.11.019>
6. Unal E, Balci S, Atceken Z, Akpınar E, Ariyurek OM. Nonthrombotic pulmonary artery embolism: Imaging findings and review of the literature. *AJR Am J Roentgenol* 2017;208:505-16. <https://doi.org/10.2214/AJR.16.17326>