Case 13381

Eurorad

Cat-scratch disease encephalitis

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ISSN: 1563-4086
Section: Paediatric radiology
Area of Interest: Head and neck Liver Abdomen Spleen
Procedure: Imaging sequences
Procedure: Education
Procedure: Localisation
Imaging Technique: MR-Diffusion/Perfusion
Imaging Technique: Ultrasound
Imaging Technique: CT
Imaging Technique: Ultrasound-Colour Doppler
Special Focus: Acute Abscess Infection Case Type:
Clinical Cases
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Patient: 8 years, male

Clinical History:

An 8-year-old boy presented to the ER with a tonic-clonic convulsive status which started while playing videogames. Previous relevant medical history included a chronic suppurative otitis and a clinically suspected muscular fibrillar rupture in the right inguinal area.
Imaging Findings:

An unenhanced brain CT was obtained and considered normal (Fig. 1)

After careful physical evaluation, an erythematous lump in the right inguinal area was found which was not consistent with a fibrillar rupture. Sonography revealed a hypoechoic rounded lesion with vascular hilum closely related to a subcutaneous collection (with fluid drainage to the skin), compatible with suppurative inflammatory lymphadenopathy (Fig. 2).

Additionally, abdominal US revealed multiple hypoechoic and rounded small lesions (<1cm) affecting liver and spleen (Fig. 3, 4, 7).

Due to persistent encephalopathic behaviour, a brain and liver MRI was performed. Brain MRI showed signal abnormality on DWI in multiple cortical areas without restricted diffusion on the ADC. This would be in keeping with focal areas of cerebral oedema. (Fig. 5). Liver MRI confirmed the presence of multiple T2-hyperintense lesions showing restricted diffusion, compatible with granulomas/micro-abscesses (Fig. 6).
Discussion:

BACKGROUND
Cat-scratch disease (CSD) is an infection caused by Bartonella henselae. It usually affects children and young adults, and 87% of cases occur in those younger than 18 years of age. Cats are the principal reservoir. Infection is transmitted by a cat scratch or bite, and spreads through the lymphatic system [1].

CLINICAL PERSPECTIVE
After inoculation, cutaneous lesions may appear 3-10 days later and progress from erythematous to papular, and

finally crusted stages. Single regional lymphadenopathy could typically appear (axillary, epitrochlear, head/neck, groin). Suppurative nodes require drainage in 10% of cases. A low-grade fever might be present. Rarely, dissemination to various organs may occur, most often liver, spleen, and bone marrow (hepatosplenic dissemination, vertebral osteomyelitis). Spread occurs less frequently to the CNS (Parinaud syndrome, neuroretinitis, encephalitis/encephalopathy). Encephalitis is characterised by headaches, nuchal rigidity, and mental status changes [1, 2, 5].

IMAGING PERSPECTIVE

Lymphadenopathy: US may show enlarged, sometimes hyperaemic lymph nodes with or without central necrosis, and approximately 10% will suppurate and require drainage.

Hepatosplenic lesions: Multiple lesions of variable size/shape throughout the liver or spleen, compatible with granulomas/microabscesses. On US and CT, lesions are usually hypoechoic and hypoattenuating. After contrast administration, hepatosplenic granulomas may show variable peripheral enhancement. Healed lesions may show calcifications [3, 4, 5, 6].

Encephalitis: Cat-scratch-related encephalitis/meningitis show T2 and FLAIR hyperintensity in various regions of the brain. Post contrast-enhanced T1-weighted images may reveal focal or diffuse leptomeningeal enhancement. In our case, signal abnormality on the DWI in multiple cortical areas without restricted diffusion on the ADC was observed, in keeping with focal areas of cerebral oedema (Fig.5) [7, 8, 9, 10, 11].

OUTCOME

Detection of B. henselae is accomplished by serology studies which have replaced biopsy. If biopsy is performed, it shows granulomata with central necrosis and microabscesses. In our case, a serologic test and a biopsy were performed, confirming the presence of Bartonella henselae in both.

Most patients have self-limited lymphadenopathy and do not require antibiotics. CSD disseminated to the liver, spleen, eye, or central nervous system may require antibiotics, as was the case with our patient. Use of oral azithromycin for mild to moderate disease or a combination of erythromycin or doxycycline plus rifampin for encephalitis/meningitis may be effective. [1]

Most patients recover fully although a small percentage may develop complications [7].

TAKE HOME MESSAGE

- Infection starts after a scratch or bite from a cat/kitten.

- After inoculation, cutaneous lesions may appear in association with regional lymphadenopathy (axillary, epitrochlear, head/neck, groin).

- Rarely, dissemination to various organs occurs, most often liver, spleen, bone marrow.

- Encephalitis is a rare complication (2-4%).

- Most patients make a full recovery.

Differential Diagnosis List: Cat-scratch disease encephalitis, Granulomatous diseases (Tuberculosis), Lymphoma, Sexually transmitted diseases, Infections of the leg and foot (Cat-Scratch disease), Tularemia, Lyme disease, Hepato-splenic metastases

Final Diagnosis: Cat-scratch disease encephalitis

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Figure 1

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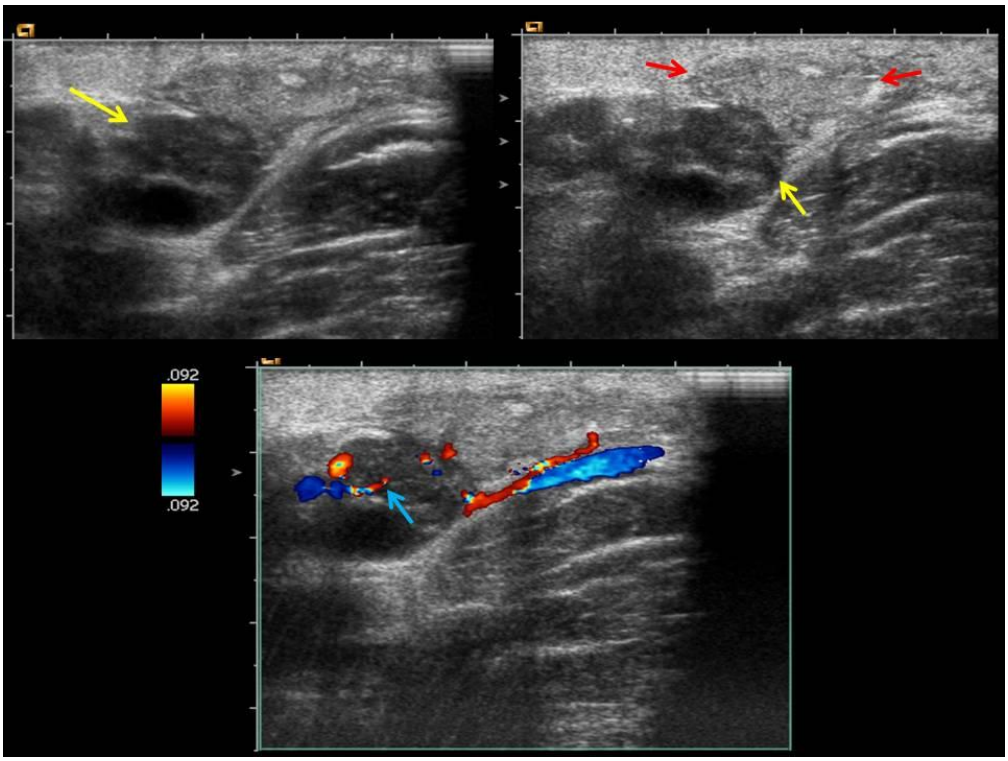
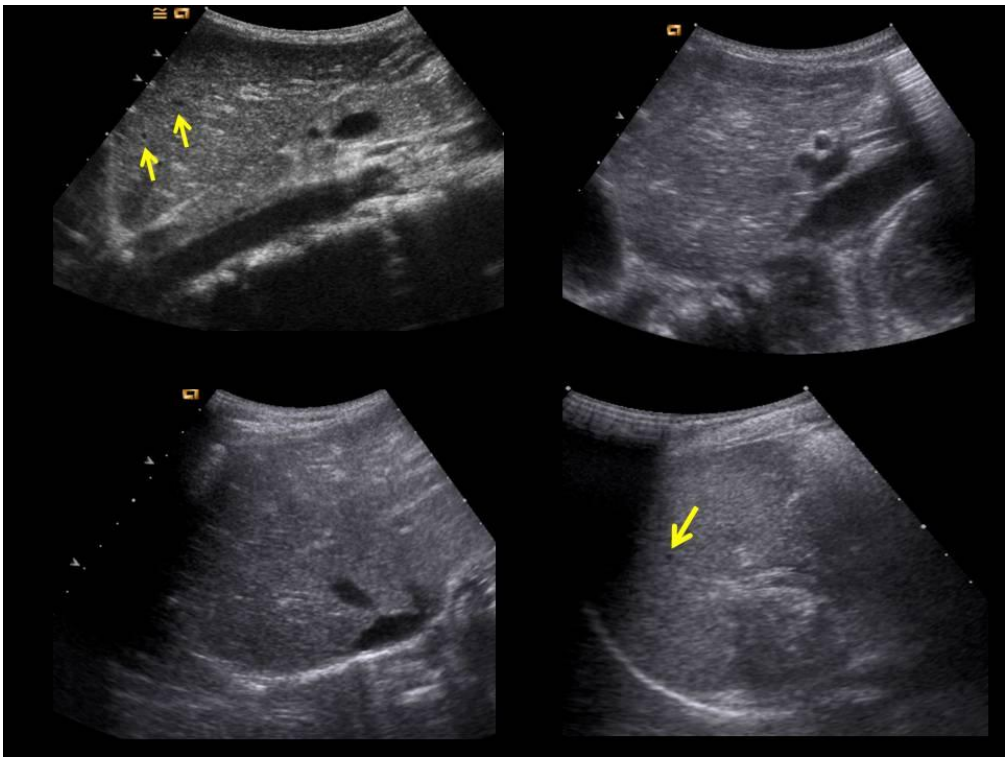


Description: Sonography revealed a hypoechoic rounded lesion (yellow arrows) with a vascular hilum (blue arrow), with an adjacent subcutaneous collection (red arrows), consistent with supurative inflamatory lymphadenopathy. **Origin:** Prat-Matifoll J.A, Department of Radiology, Vall Hebron Hospital

Figure 2

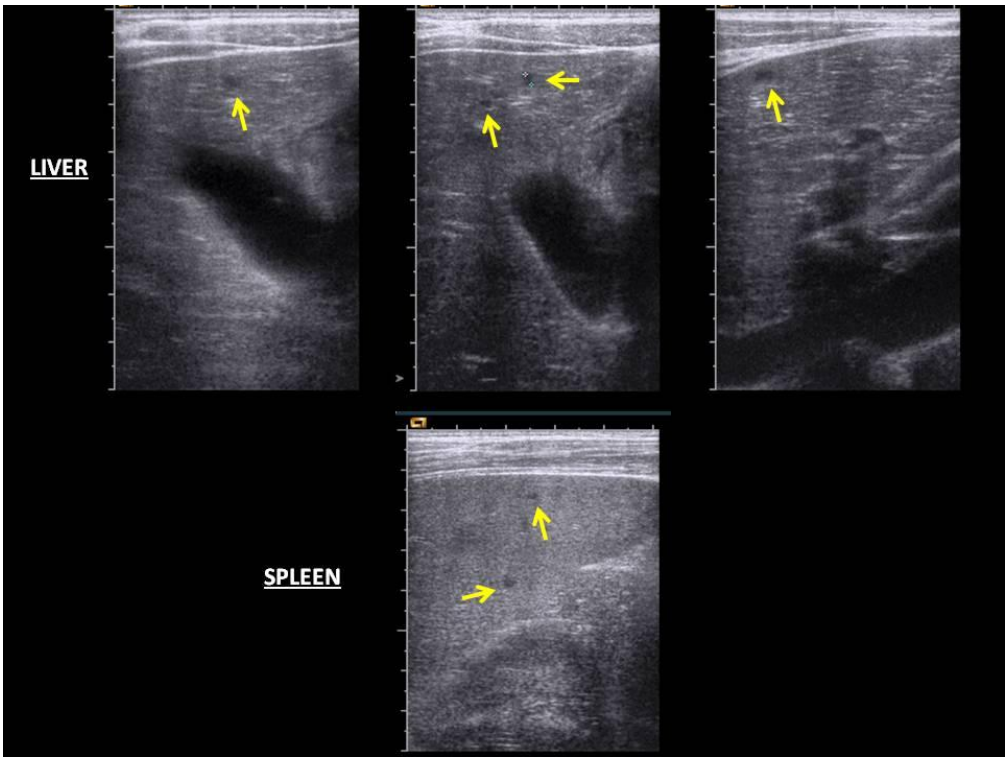
a



Description: Using the convex transducer probe subtle small hypoecoic lesions were identified (yellow arrows). **Origin:** Prat-Matifoll J.A, Department of Radiology, Vall Hebron Hospital

Figure 3

a



Description: After changing to a high-frequency linear probe, multiple hypoechoic liver and splenic lesions became more conspicuous (yellow arrows), consistent with hepato-splenic granulomata or micro-abscesses. **Origin:** Prat-Matifoll J.A, Department of Radiology, Vall Hebron Hospital

Figure 4

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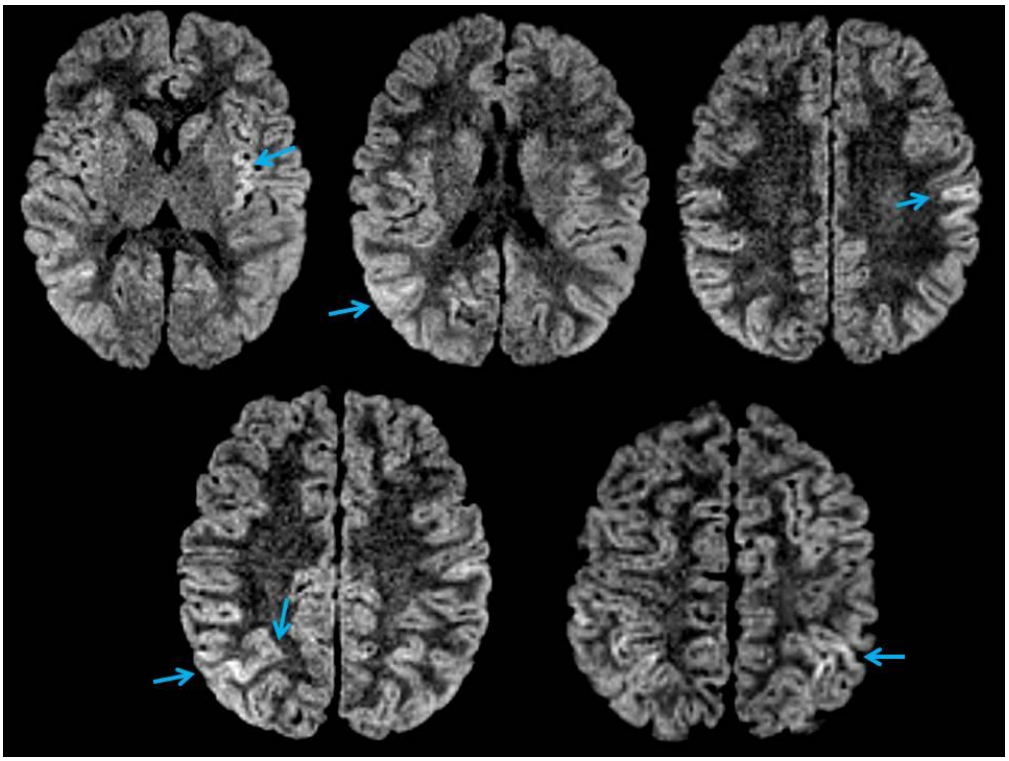

Description: Axial DWI images of the brain showing scattered cortical altered diffusion (blue arrows), probably related to cerebral vasogenic oedema. **Origin:** Prat-Matifoll J.A, Department of Radiology, Vall Hebron Hospital

Figure 5

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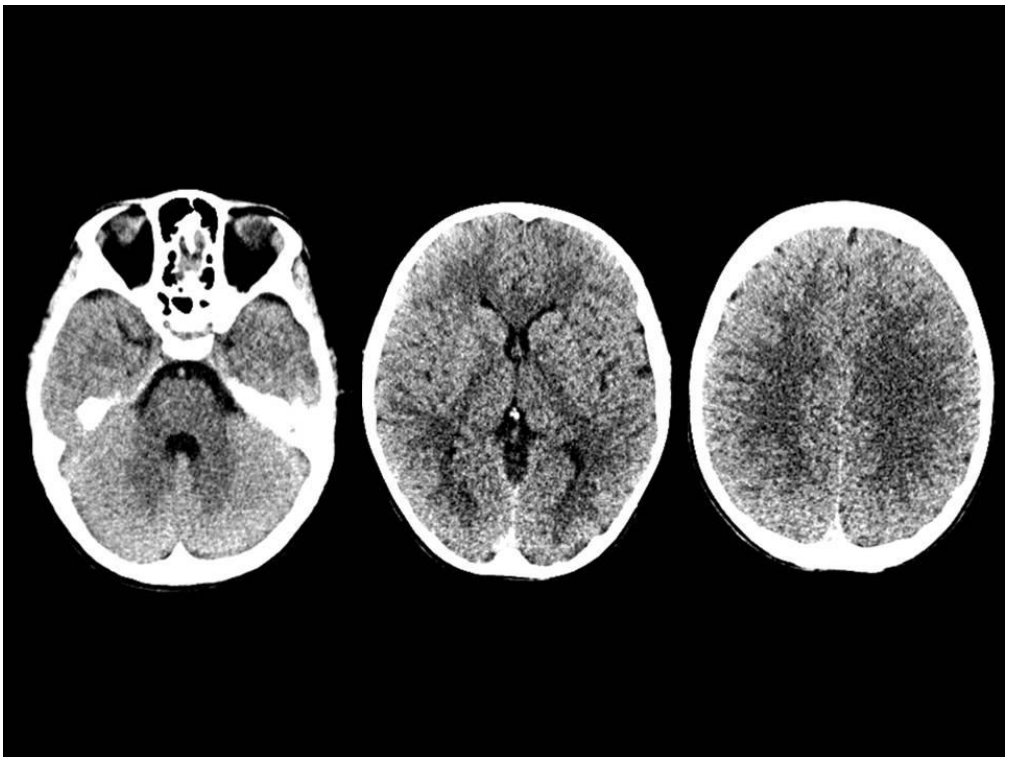
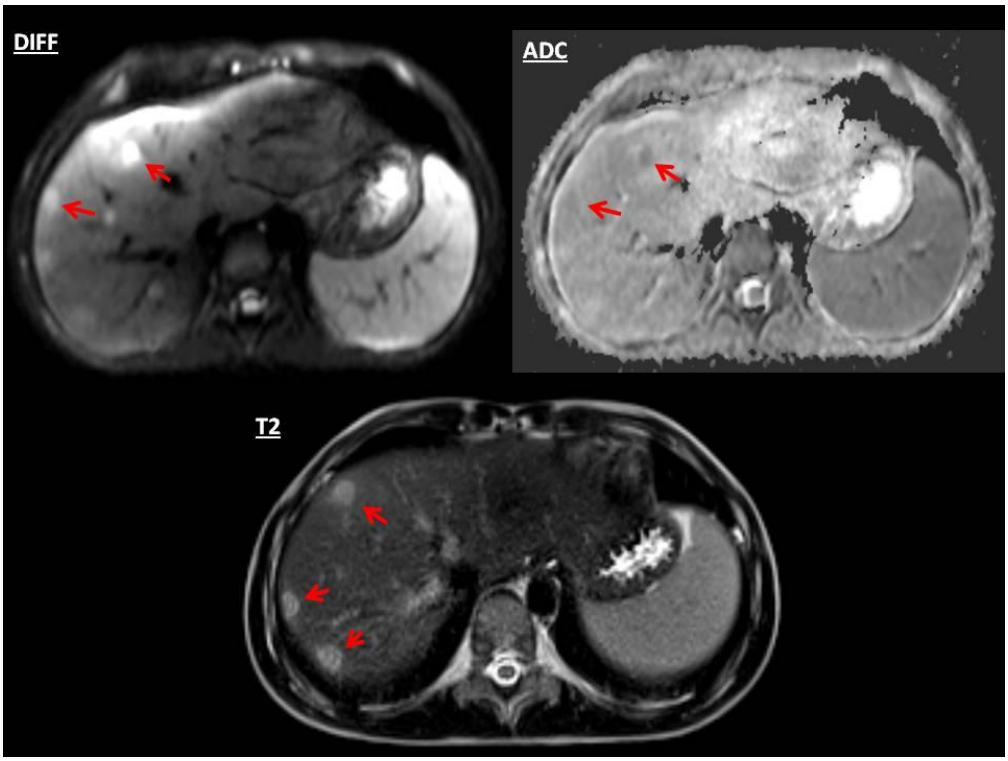


Description: Unenhanced brain CT showed no relevant abnormality. **Origin:** Prat-Matifoll J.A, Department of Radiology, Vall Hebron Hospital

Figure 6

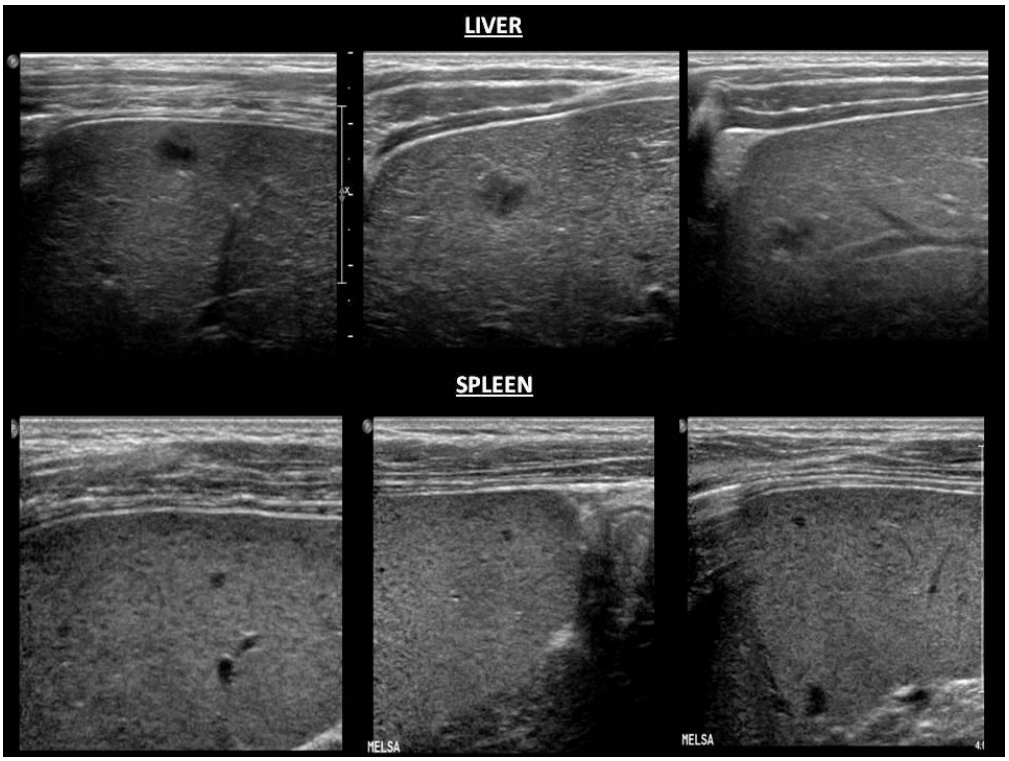
a



Description: Liver MRI confirmed the presence of multiple T2-hyperintense lesions showing restricted diffusion (red arrows) compatible with granulomata or micro-abscesses. **Origin:** Prat-Matifoll J.A, Department of Radiology, Vall Hebron Hospital

Figure 7

a



Description: One week after the acute onset of CSD encephalitis, abdominal sonography was performed.

The hypoechoic lesions have increased in size, possibly related to post-treatment changes. **Origin:** Prat-Matifoll J.A, Department of Radiology, Vall Hebron Hospital