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MR Is the Best Way to Diagnose Pyelonephritis

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MR, CT, Kidney; Acute Kidney Injury; Nephrytis.

1. Abstract

A young man, entered the Emergency Department because an episode of fever in bilateral lumbar ache. The lab tests were suggestive for Acute Kidney Injury (AKI), according to K-DIGO, of unknown etiology as the negative immunological and inflammatory lab tests. As imaging patient underwent Computed tomography scan (CT scan) and Ultrasound (US) that were negative. After the discharge Magnetic Resonance (MR) was done showing multiple triangular zones of impaired diffusion compatible with nephritis not evident at the lab tests. In this case only the MR was able to detect the kidney morphological alteration related to the inflammation determining AKI.

2. Introduction

A young man, 20, entered the Emergency Department because a bilateral lumbar ache for two days with fever till 39°C, with cough. He assumed orally once cefixime 400 mg and then twice ciprofloxacin 500 mg. His story was negative, normal blood pressure, vaccinated with 3 doses with Comirnaty. In the family 3 relatives of his father were in dialysis for unknow disease (2 uncles and the mother). The physical examination was substantially negative, in particular the abdomen was negative, the temperature at the admission was 37.2°. The lab tests demonstrated normal BCC, creatinine of 174 umol/L, C reactive protein of 45.6 mg/dL (normal range <5 mg/dL); urinalysis with blood +/4, protein 0.30 g/L, negative sediment. As the patient had a previous normal renal function, according to K-DIGO criteria he presented an episode of Acute Kidney injury (AKI). The abdomen CT scan and the kidneys US were both normal. The patient was admitted in observation to the Emergency Medicine Department. In the following 2 days no antibiotics were done, he was hydrated, the fever disappeared spontaneously, the creatinine decreased to 102 umol/L, and the urinalysis cleared. A nephritic panel lab tests was done: complement C3-C4, ANA, ENA, ANCA were negative. After the discharge Magnetic Resonance (MR) was done showing multiple triangular zones of impaired diffusion compatible with nephritis without alteration of kidneys morphology (Figure 1).

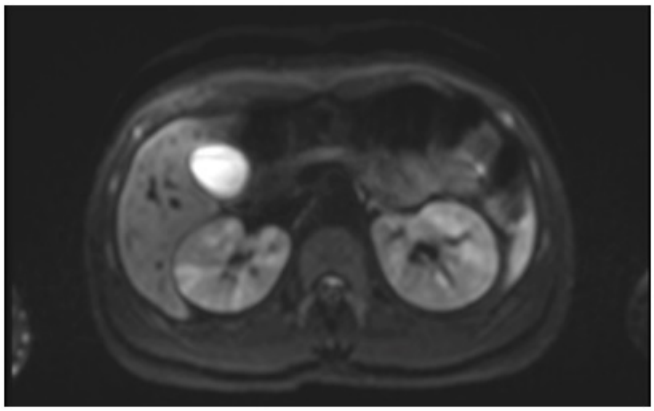

Figure 1: diffusion sequences at MR.

3. Discussion

Abdomen and pelvis computed tomography scan (CT scan) with contrast media is the study of choice to detect alterations in the renal parenchyma associated with acute complicated Urinary Tract Infection (UTI). This technique is more sensitive than excretory urography or renal ultrasound for detecting renal abnormalities related to UTI. CT without contrast has become the standard radiographic study for demonstrating calculi, gas-forming infections, haemorrhage, urinary obstruction, and abscesses. Contrast is needed to demonstrate alterations in renal perfusion enhancing the CT findings in pyelonephritis including localized hypodense lesions due to ischemia induced by cell infiltration and oedema. The CT can also be normal in patients with mild infection requiring a closer patient's follow up. Renal ultrasound is appropriate in patients for whom exposure to contrast or radiation is contraindicated. MR is not advantageous over CT except when avoidance of contrast

medium or ionizing radiation is warranted [1,2,3].

4. Conclusion

In this clinical case MR was useful in providing clinical data to interpret renal pathology. Although the previous imaging (CT and US) was negative, the execution of the MR allowed to identify by only specific sequences for diffusion an alteration of the renal parenchyma signal compatible with an inflammatory state. This inflammatory state had not previously been identified by the immunological examinations and conventional imaging.

5. Lesson Learned

The use of MR with specific sequences for the study of diffusion can be of valid help in doubtful cases of AKI with negative traditional imaging and lab tests. The follow up of these specific sequences can help clinicians to monitor the renal recovery when the AKI etiology is not clear or unknown.

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