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Case Report

Acute Pyelonephritis of an Ectopic Kidney Mimicking Acute Appendicitis: Two Unusual Cases in an Emergency Department

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Abstract

Ectopic kidney is relatively uncommon, but it is not an emergency illness, and emergency surgery is rarely indicated. However, acute pyelonephritis of an ectopic kidney may mimic acute appendicitis. Here, we report our experience with two cases of acute pyelonephritis of ectopic right kidneys. Appendicitis was suspected initially. The patients underwent sonography and computed tomographic scanning because of an ambiguous diagnosis. Ectopic right kidney was identified with pyelonephritis. The appendix was found to be normal in both cases and unnecessary surgical procedures were avoided. Proper utilization of sonography and computed tomography in patients with abdominal pain helps to clarify ambiguous diagnoses in an emergency department and avoid unnecessary surgical procedures. [*Tzu Chi Med J* 2009;21(1):70–72]

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1. Introduction

Acute appendicitis is a common emergency surgical illness in any emergency department. Diagnosis should be straightforward if the presentations are typical, but there are many conditions that may mimic acute appendicitis including related diseases such as diverticulitis, omental torsion, an intestine mass and various gynecological conditions.

Acute pyelonephritis in an ectopic kidney is rarely encountered and may mimic acute appendicitis. Over the past 11 years, two such cases have arrived in our emergency department presenting as acute appendicitis; in both cases, the diagnosis later became right ectopic kidney with acute pyelonephritis. This disease could result in a missed diagnosis and inappropriate treatment unless this potential diagnosis is kept in mind and the patient undergoes imaging studies.

2. Case reports

2.1. Case 1

A female patient aged 19 years presented at our emergency department with fever and abdominal pain of the right lower quadrant for the previous 2 days. The pain radiated to the right flank region. Anorexia, nausea and dry retching were present. She was also experiencing a burning sensation towards the end of urination.

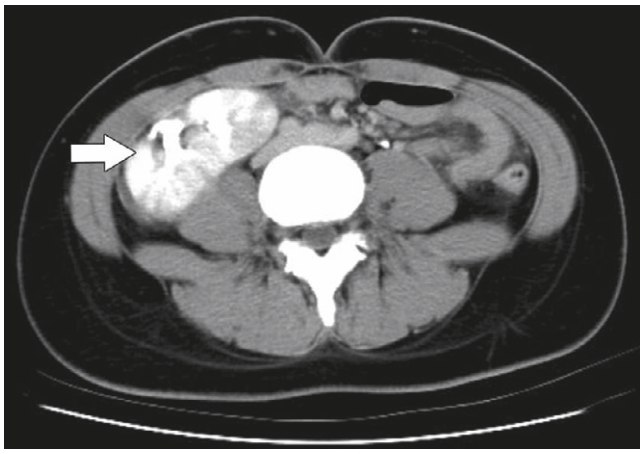

Fig. 1 — Computed tomography of the abdomen demonstrates an ectopic right kidney (arrow).

On physical examination, right low quadrant rebounding tenderness was noted. Knocking tenderness at right costovertebral angle was also detected. Laboratory examination revealed her peripheral white blood cell count to be 17,600/mm^3 and the segmented neutrophil level was 85%. Her serum C-reactive protein level was 123.1 mg/dL and serum creatinine was 0.8 mg/dL. Urine analysis revealed 30–40 white blood cells per high-power field. A subsequent urine aerobic culture revealed an *Escherichia coli* count exceeding 10,000/mm^3. Acute pyelonephritis and appendicitis were considered first. Transabdominal sonography revealed a low-positioned right kidney that was large in size. To differentiate between appendicitis with pyuria and pyelonephritis of an ectopic right kidney, the patient underwent computed tomography of the abdomen to clarify the diagnosis. The computed tomography revealed a right ectopic kidney with acute pyelonephritis and a normal appendix (Fig. 1). The patient was hospitalized and treated with antibiotics. Surgical intervention was avoided.

2.2. Case 2

Another female patient, aged 22 years, presented at our emergency department with fever and right lower quadrant abdominal pain for the previous 12 hours. She had initially felt vague abdominal pain, which was later localized to the right low quadrant abdomen and was accompanied by nausea and urinary frequency. On physical examination, her body temperature was 38.1°C. Right lower quadrant and rebounding tenderness without costovertebral tenderness were noted on physical examination. Laboratory examination revealed her peripheral white blood cell count to be 10,700/mm^3 and her serum creatinine was 0.77 mg/dL. Urine analysis revealed 15–20 white blood cells per high-power field. Urine aerobic culture for bacteria revealed no growth for up to 72 hours. A ruptured appendicitis with abscess formation was considered first. She then underwent computed tomography of the abdomen in order to plan drainage procedures. However, computed tomography revealed an ectopic right kidney. Acute pyelonephritis was diagnosed based on the clinical findings (Fig. 2). The patient was hospitalized and treated with antibiotics. The abdominal pain improved and she recovered uneventfully.

Fig. 2 — Horizontal reconstruction image of an abdominal computed tomographic scan in the oblique plane demonstrates the right ectopic kidney (arrow).

3. Discussion

Ectopic kidney is relatively uncommon and the incidence rate is between about 1/2200 and 1/3000. Renal ectopia may be associated with other congenital anomalies, particularly genitourinary abnormalities. Vesicoureteral reflux, hydronephrosis and lithiasis are frequently found and ectopic kidneys seem to be more susceptible to urinary tract infection. An ectopic kidney may be symptomless and may function normally for the whole life of the individual until it is serendipitously found during an imaging study. In general, if urinary function is normal, an ectopic kidney should be left untreated unless there is frequent urinary infection (1–5).

Nephroptosis (floating kidney) is defined as an abnormal caudal movement of the kidney when the patient changes from the supine to erect position (6). It is an acquired disorder and differs from congenital

ectopia in which the kidney has not ascended to its normal position. In nephroptosis, the ureter is normal in length, whereas the ureter is short in congenital ectopia. In our cases, the ureter length was short and there was no ureteral kink, as is normally found with nephroptosis.

Based on our examination of the reviewed articles, there have only been a few reports of ectopic kidney with chronic pyelonephritis. Butler described a male aged 29 years who was treated for an acute appendix abscess when, in reality, he was suffering from infection of an ectopic right pelvic kidney (7). Mokoena et al reported a patient with ectopic kidney who presented with an appendiceal mass or abscess (8). They concluded that the associated pyelonephritis could simulate an appendiceal mass/abscess or colonic tumor and that this may result in needless surgical exploration. Shen et al reported a female aged 42 years who was misdiagnosed and underwent laparotomy for an infected right pelvic kidney (9).

Appendicitis can also cause pyuria. Arnbjornsson suggested that there might be a direct spread of bacteria from the inflamed appendix to the urinary tract because of their close anatomic relationship and the severity of the inflammatory changes (10). Puskar et al concluded that inflammation is the major cause of abnormal urinalysis and transitory pyelocaliceal dilation in some patients with acute appendicitis and pyuria should not mislead the surgeon when diagnosing acute appendicitis (11).

In our cases, unnecessary surgical intervention was avoided because ruptured appendicitis was ruled out by computed tomography of the abdomen. Sonography and computed tomography are important tools in the differential diagnosis of abdominal pain in emergency departments. Ultrasonography is useful as a means of confirming the presence of an ectopic kidney. However, ultrasonography is not effective enough to exclude the possibility of acute appendicitis. Doria et al performed a meta-analysis and concluded that computed tomography had a significantly higher sensitivity than ultrasonography in studies of children and adults (12). For ultrasonographic studies, the pooled sensitivity and specificity for diagnosis in adults were 83% and 93%, respectively. Using computed tomography, the pooled sensitivity and specificity for diagnosis in adults were 94% and 94%, respectively. If there is an ectopic kidney in the right lower abdomen and if pyuria is present, diagnosis is difficult unless appendicitis can be excluded. Therefore, the proper utilization of computed tomography in patients with abdominal pain will help to clarify ambiguous diagnoses in emergency departments and avoid unnecessary surgical procedures (13,14).

4. Conclusion

Acute pyelonephritis of an ectopic kidney mimicking acute appendicitis is a rare but possible differential diagnosis, and these two cases were unforgettable in our emergency department. In both cases they presented with the same clinical feature, a tender mass that could be palpated in the right lower quadrant of the abdomen. This is associated with a vague clinical history leading to a suspicion of acute appendicitis with acute pyelonephritis. An ectopic kidney with acute pyelonephritis should also be considered in the list of differential diagnoses and, in such circumstances, further imaging studies are warranted.

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