Chances of Misdiagnosis between Acute Appendicitis & Ureteric Colic

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Hamdan A. Abbas*, Mohammed H. Al-Alwan**

*C.A.B.S., Surgeon, Al-Yarmouk Teaching Hospital, Baghdad-Iraq
**F.R.C.S., Senior Lecturer in General Surgery, Dept. of Surgery, Al-Mustansiriya College of Medicine.

Abstract:
Background: The symptoms of acute appendicitis (A.A.) mimic sometimes the symptoms of ureteric colic (U.C.) due to stone leading to mistake in the diagnosis and delay in the management hence increased mortality and morbidity.

Aim: to compare the features of differential diagnosis between the two groups and to see how frequent cases of U.C managed and treated as A.A.

Method: prospective study of 100 patients who were proved A.A and 100 patients proved U.C were taken to compare the features of differential diagnosis while 50 patients of histologically proved negative appendicectomies were followed up for ureteric stone.

Result: no urinary stones in the 50 cases of negative appendicectomies have been found when followed up. A.A cause more often fever, localized pain in the right iliac fossa, nausea with or without vomiting, C - reactive protein (C.R.P) and white blood cell (W.B.C) count elevation more than U.C while general urine examination (G.U.E.) revealed more red blood cells (R.B.C) and pus cells in cases of U.C as compare with A.A.

Conclusion: misdiagnosis between A.A and U.C is a rare clinical event in our hospital. U.C causes pain and tenderness in the flanks and revealed more R.B.C in the urine while A.A causes more fever, leucocytosis and elevated C.R.P.

Key words: appendicitis, ureteric colic, stone, diagnosis.

Introduction:
The diagnosis of A.A can be easy and unmistakable and this is in most cases especially when the clinical sign and symptoms are classical. Less commonly the diagnosis can be misleading with other right iliac fossa conditions (R.I.F) especially those related to urinary tract failure to make early diagnosis is a primary reason for mortality and morbidity. The relative difficulty in diagnosis of A.A may be related to the stage of inflammation at which the patient consults his doctor and the variable anatomical sites of the veriform appendix, in addition to absence of single diagnostic test to depend on. Instead we depend on a collection of data obtained from the history, clinical examination and laboratory findings collectively. Depending on these bases there will be a significant percentage of negative appendicectomies reaching in some series up to 33 % (1, 2). The most common causes of negative appendicectomies are non specific abdominal pain, pelvic inflammatory disease and acute gastroenteritis (1, 9). Non surgical urinary tract diseases found in few percentage of patients operated on for A.A (2,4). on the other hand an unusual presentation of A.A mimic sometimes urological disorders may cause delay in the operative management (11,12). In this study we compared different diagnostic tools between A.A and U.C due to stone by means of history taking, physical examination, laboratory and radiological findings. In addition we did follow up cases of negative appendicectomies to see how much frequent cases of U.C managed as A.A.

Patients and Methods:
Patients and method: this is prospective study done in Alyarmook teaching hospital designed to differentiate between cases of A.A and U.C with abdominal pain form the period April 2009 and December 2009 to compare the diagnostic characteristics of both diseases. Two groups were selected from different age group: group one; 100 patients with U.C (90 male, 10 female), the history and physical findings were recorded. The blood was sampled for WBC count and CRP. The urine sample was taken for microscopical examination, Intravenous urography (I.V.U) and plain x-
ray of abdomen was done for 56 patients while ultrasound done for the rest. Group 2; 100 patients (38 female, 62 male) with histologically verified A.A, blood sampled for W.B.C count and C.R.P, G.U.E was done for all patients. Group 3; 50 patients with histologically negative appendix (25 male, 25 female) were followed up by ultrasonography to look for any urological abnormalities. Data were presented in simple measure of frequency, percentage, mean standard deviation with statistical significance of various parameters was tested by Fischer’s exact test and student-t test for unpaired data.

**Result:**

From the 100 cases of U.C (group1) no cases misdiagnosed as A.A. On the other hand no ureteric stone was found in the 50 cases of negative appendicectomies (group3) when followed up later on.

1. **History taking:**
   - **Sex distribution:** ureteric stone was significantly higher in males than females (p<0.0001) in comparison to A.A as shown in table1a.
   - **Duration of symptoms:** it is significantly longer in A.A than UC (p<0.0001) as shown in figure1b.
   - **Age distribution:** significantly higher in U.C than AA (p<0.0001) as shown in figure 1c.
   - **Nausea and vomiting:** higher in A.A than U.C (figure 1d).
   - **Pain distribution:** pain in the flanks is a feature of U.C in contradistinction to A.A in which the pain localized in R.I.F (figure 1e).

2. **Physical examination:**
   - **Body temperature:** it is significantly higher in A.A than U.C (figure 2a).
   - **Abdominal tenderness:** in A.A tenderness located in the R.I.F while in U.C located in the flanks (figure 2b).

3. **Laboratory analysis:**
   - **C.R.P and W.B.C count:** they were significantly higher in A.A than U.C (figure3a & 3b) respectively.
   - **Urine analysis:** R.B.C in urine is significantly higher in U.C (p>0.05) as in figure 3c.
   - I.V.U done for 56 patients with U.C and all of them revealed stones, delayed contrast excretion and dilatation of pelvicalyseal system. In the rest diagnosis established by ultrasonography, plain x-ray and passage stone in the urinary stream.

![Figure1a: the distribution of cases according to sex.](image1a)

![Figure 1b: distribution of cases according to duration of symptoms](image1b)
Discussion:
A.A is most common surgical emergency faced in the surgical department which need surgical intervention in contradistinction to U.C which is mostly managed conservatively\(^\text{(11)}\). In spite of long experience in dealing with these two surgical emergencies, still there are much debates about the criteria in distinguishing between these misleading conditions\(^\text{(6)}\). As expected, average duration of symptoms in A.A is 25 hours while in U.C it is 7 hours which is similar to that found by Paajanen. et. al\(^\text{(7)}\). It may be attributed to the fact that the pain in U.C is due to stone impaction and hence obstruction of urinary stream in contrary to that in A.A which is due to bacterial infection which needs time to elapse\(^\text{(7)}\). Acute appendicitis occur more in males than females (62% vs. 38%) while in ureteric colic was 90% males versus 10% females and that similar to other studies conducted by Buchman et. al.\(^\text{(11)}\) and Higgins\(^\text{(16)}\), as they found that A.A occurs in males 55% and in females 45% while in U.C 76% and 24% respectively. A.A commonly affects age group of youth i.e. second and third decades of life while U.C affects fifth decade of life and this is also seen by Hughes et. al\(^\text{(15)}\), John et. al\(^\text{(12)}\). Much attention was paid to nausea and vomiting as part of diagnostic index of A.A\(^\text{(7,12)}\) especially Alvarado in his score system\(^\text{(2)}\). Nausea and or vomiting found in 78% of cases of U.C. This is attributed to the reflex splanchnic stimulation of gastrointestinal tract as part of local peritonitis leading to pyloric stenosis\(^\text{(21)}\). Most cases of A.A have pain in the R.I.F (98%) which is the usual anatomic site of the base of the vermiform appendix, rarely in the flanks\(^\text{(2)}\), and this is usually due high maldescended appendix\(^\text{(6)}\). U.C o n the other hand induce pain in the flanks (82%) sometimes localized and more frequently radiating to the lower abdomen and scrotum. this has been seen by Hughes et. al\(^\text{(15)}\). A history of relatively fixed pain associated with suprapubic or lower abdominal tenderness may be associated with ureteric stone in up to 24-44% of cases as reported by Higgins\(^\text{(16)}\) and John et. al\(^\text{(12)}\). A rise in body temperature in acute appendicitis (73.6\(^\circ\)c) in comparison to U.C (36.8\(^\circ\)c) attributed to the more sever inflammation associated with A.A than that in U.C\(^\text{(20)}\). Body temperature is one of the diagnostic score used in the diagnosis of A.A in modified Alvarado score system\(^\text{(2)}\). Tenderness in the R.I.F associated with A.A in up to 97%. Tenderness in the same area presents in up to 22% of cases of U.C and this is attributed to the local inflammatory reaction around impacted stone in the upper and middle ureter, as it is reported by Nordback\(^\text{(17)}\). Characteristically tenderness in the flanks associated with U.C in 78% of cases while in A.A it reaches only to 3%. Other studies in the world have the same result like Paajanenet. al\(^\text{(7)}\).C.R.P is a sensitive marker of tissue injury rises up to 46mg/l in A.A. This explained by the fact that A.A is a more sever type of tissue injury. This rise in the C.R.P value had been seen also by Paajanenet. al\(^\text{(7)}\) who found an increase up to 41mg/l C.R.P value in A.A, while in U.C up to 14mg/l\(^\text{(7,20)}\). W.B.C is another indicator of inflammation rises in A.A up to 11.6×10\(^{9}\)/l in comparison to 6.8×10\(^{9}\)/l in U.C. This was also taken by modified Alvarado score system\(^\text{(2)}\) and Paajanenet. al\(^\text{(7)}\) who had seen an average rise in W.B.C count up to 14×10\(^{9}\)/l in A.A. The most common urological manifestations of A.A was hematuria (15%) and pyuria(25%) in comparison to patients with ureteric colic in whom characteristic high percentage of hematuria (95%) with non significantpyuria (32%). This is similarly reported by other studies like Hughes et. al\(^\text{(15)}\), Paajanenet. al\(^\text{(7)}\) who discovered that hematuria may be absent in about 8-14% of cases of U.C. Abnormal urine analysis has been found in about 30% of cases of A.A by Scott et. al\(^\text{(14)}\) and Paajanenet et.al\(^\text{(7)}\). Pyuria presents in up to 2-19% of cases with A.A and microscopical hematuria in 5-14% of cases as found by Bennionet. al\(^\text{(19)}\) and Kretchendor et. al\(^\text{(13)}\). The anatomical position of the appendix with in the abdomen and its proximity to the urinary tract organs is a crucial determinant in this respect\(^\text{(7,13)}\). Since 90% of urinary calculi are radio-opaque, plain radiograph is sensitive but not specific in diagnosis of ureteric stones\(^\text{(7,18)}\). Urological reasons for negative appendicectomies are practically rare. In previous studies 1-4% of such patients had urinary tract infections, Lau et. al\(^\text{(1)}\) and Lewis et. al\(^\text{(10)}\) or ureteric stone, Buchman et. al\(^\text{(11)}\) and John et. al\(^\text{(12)}\). The chances of misdiagnosis of A.A for U.C due to stone was estimated to be one or two in 700 or
800 cases managed as appendicectomy performed annually in one of the hospitals in Finland according to Paajanen et. al[7]. In this study such misdiagnosis was not present in our hospital, probably due to the fact that our patient’s management done by a welltrained staff. Introduction of computerized tomography and laparoscopy in the management of A.A contributed much in lowering both mortality and morbidity and decreased the incidence of negative appendicectomy[22,23]

Conclusions:
Misdiagnosis between A.A and U.C is rare in our center. Pain and tenderness in the flanks are important characteristic features of U.C. Fever, leucocytosis and elevated C.R.P occur in most cases of A.A in contrary to U.C. Hematuria but not pyuria is reliable finding in patients with U.C.

References