RIGHT LOWER ABDOMINAL PAIN IN FEMALES OF REPRODUCTIVE AGE: COMPARISON OF CLINICAL, LABORATORY AND SONOGHRAPHIC PARAMETERS

Sajjad Ahmad Ansari, Saima Kanwal*, Zaib Un Nisa

Combined Military Hospital, Sargodha/National University of Medical Sciences (NUMS) Pakistan, *Khawaja Fareed Social Security Hospital, Multan Pakistan

ABSTRACT

Objective: To determine the causes of right lower abdominal pain in females of child bearing age and compare the diagnostic value of clinical, laboratory and sonographic parameters in these patients.
Study Design: Prospective comparative study.
Place and Duration of Study: Department of Surgery, Combined Military Hospital Sargodha, from Nov 2018 to Oct 2019.
Methodology: The study included 92 female patients between the age of 13 to 45 years who presented in Surgical Department with pain right lower abdomen and underwent surgery with a pre-operative diagnosis of appendicitis. Intra-operative findings were recorded and final diagnosis was made by peroperative macroscopic examination. Data consisting of symptoms, signs, investigation and final diagnosis was analyzed.
Results: Mean age of the patients was 21.3 ± 3.7 years. Out of 92 study subjects, 78 (84.68%) had appendicitis while 14 (15.21%) were having gynaecological disorders. The rate of negative appendectomy was 15.21%. The most common gynaecological disorder was ruptured ovarian cyst seen in seven patients (7.6%). Most of the symptoms and signs were common in acute appendicitis and gynaecological disorders except migration of pain to the right iliac fossa which was seen in appendicitis only. Rise in leukocytes and neutrophil counts and a positive ultrasound for appendix were seen only in about 50% of the appendicitis patients.
Conclusion: A considerable number of females of child bearing age with gynaecological disorders presented with symptoms and signs simulating as acute appendicitis. Out of the three parameters, not a single parameter was 100% efficient in diagnosing the cause of pain.

Keywords: Acute appendicitis, Females of child bearing age, Pain right lower abdomen.

INTRODUCTION

Abdominal pain is one of the most common presenting complaints of Emergency Department (ED) patients and constitutes about 5% to 10% of all ED visits[1,2]. The most common diagnosis in patients admitted with pain right lower abdomen is acute appendicitis[3]. However, it is more difficult to diagnose acute appendicitis in females of reproductive age than in males due to overlapping symptoms of obstetrics and gynecological conditions[4,5]. Literature record suggest that the diagnosis of acute appendicitis is less correct in young adult women than in men[4]. The accuracies of diagnosing acute appendicitis in women of child bearing age are 71.7% to 75.3%, while the accuracies in men are 88.6% to 90.0%[4]. These diagnostic failures are commonly seen due to missed diagnoses of obstetrics and gynecological conditions[4]. Various parameters such as clinical, laboratory and radiological have been used to improve the diagnostic accuracies in this group of population but with variable results[7,13,22]. Therefore, the diagnosis and management of pain right lower abdomen in females of child bearing age can pose a difficult challenge for general surgeons as well as gynecologists[5].

The rationale of our study was to determine the frequency of diseases which can present with right lower abdominal pain in females of child bearing age and to compare the clinical, laboratory and sonographic parameters data with the operative diagnosis of the patients in order to know how much help these parameters can

Correspondence: Dr Sajjad Ahmad Ansari, Classified Surgical Specialist, CMH Sargodha, Pakistan
Received: 26 Nov 2019; revised received: 14 Jan 2020; accepted: 21 Jan 2020

provide in reaching the correct diagnosis in these patients at a secondary care hospital of Sargodha.

METHODOLOGY

This prospective comparative study was conducted between November 2018 and October 2019 at Surgical Department of Combined Military Hospital (CMH) Sargodha. The study was approved by hospital Ethics Committee (1627/adm). Inclusion criteria was females between 11 and 45 years of age with acute right lower abdominal pain who presented in accident and emergency department or surgical outpatients departemnt of CMH Sargodha. Exclusion criteria was patients who had a past history of abdominal or gynecological surgery, pregnant patients, patients with irregular menstrual cycle, patients with urinary tract symptoms and patients whose pain settled with conservative treatment. Patients were recruited after universal sampling method. A detailed history and physical examination was performed to look for signs and symptoms of acute appendicitis. Investigations like blood complete picture, urine routine examination, urine for pregnancy test and abdominal ultrasound scan were done in all the patients to improve the diagnostic accuracy. Ultrasound results were categorized as positive or negative for acute appendicitis. A positive ultrasound was defined as visualization of non-compressible, thick-walled, blind-ended, aperistaltic tubular structure in right lower quadrant arising from the base of cecum with a diameter >6 mm. A negative ultrasound was defined as visualization of a normal appendix or as a non-visualized appendix without secondary signs of appendicitis. Patients whose ultrasound revealed gynaecological disease were excluded from the study and were referred to gynaecologist for further treatment. Computerize tomography scan was not done in any patient due to concerns related to the hazards of ionizing radiation in young females. Diagnostic laparoscopy was also not performed in any patient as this facility was not available in this hospital. Preoperative diagnosis of acute appendicitis was made on clinical, laboratory and sonographic parameters. All diagnosed patients with acute appendicitis received intravenous fluids, pre and postoperative antibiotics cover and underwent an open approach appendectomy via a McBurney incision under general or spinal anesthesia. Intra-operative findings were recorded. Last two feet of terminal ileum was examined in all patients with normal appendix to exclude possible Meckel's diverticulum. Peroperative gynecological advice was obtained for patients with gynecological pathology. Final diagnosis of appendicitis and gynecological disease was made by peroperative macroscopic examination. Data was analyzed using the SPSS-21. Quantitative variable like age was presented in Mean ± SD. Qualitative variables like operative diagnosis, symptoms, signs and investigations were presented as frequencies and percentages. Chi square test was used for association. A p-value ≤0.05 was considered significant.

RESULTS

The mean age of the patients was 20.4 ± 3.6 years and age ranged from 13 to 45 years. A total of 92 patients were operated for pain right lower abdomen. Out of 92 study subjects, 78 (84.68%) had acutely inflamed appendix while 14 (15.21%) were having gynaecological disorders. Majority of the patients in both the groups (appendicitis and gynaecological disorders) belonged to age group between 13 to 30 years (table-III). In the gynaecological disorders, ruptured hemorrhagic ovarian cyst and pelvic inflammatory disease accounted for 7 (7.6%) and 4 (4.34%) patients respectively whereas ruptured ectopic pregnancy, right ova-

Table-I: Operative diagnosis of pain right lower abdomen in reproductive age female subjects in our study.

Per-operative Diagnosis	Number	Percentage (%)
Acute appendicitis	78	84.68
Ruptured hemorrhagic ovarian cyst	7	7.6
pelvic inflammatory disease	4	4.34
Ruptured ectopic pregnancy	1	1.08
Rt ovarian torsion	1	1.08
Mittelschmerz	1	1.08

rian torsion and Mittelschmerz accounted for 1 (1.08%) patient each only (table-I). The rate of negative appendectomy in our study was 15.21%. Duration of pain ranged from 4 hours to 3 days. Pain and tenderness in right iliac fossa was found in all patients (100%) whereas migration of pain to right iliac fossa was seen in 47% of appendicitis patients only. Anorexia, nausea and vomiting had similar percentages in appendicitis and gynaecological disorders patients whereas a statistically significant difference was observed between acute appendicitis and gynecological disorders patients regarding shift of pain to the right iliac fossa and rebound tenderness in right iliac fossa (table-II).

Table-II: Comparison of clinical, laboratory and sonograghic parameters.

Symptoms, Signs & Investigations	Acute Appendicitis n (%)	Gynaecological disorders n (%)	*p*-value
Pain right iliac fossa	78 (100%)	14 (100%)	1.00
Migration of pain to right iliac fossa	37 (47%)	-	<0.001
Anorexia	58 (74%)	10 (71%)	0.818
Nausea and Vomiting	51 (65%)	9 (64%)	0.936
Fever	35 (45%)	5 (35%)	0.524
Right iliac fossa tenderness	78 (100%)	14 (100%)	1.00
Rebound tenderness	78 (100%)	12 (85%)	0.021
WBC count (>11000/mm^3)	42 (54%)	5 (36%)	0.211
Neutrophils (%) >75%	41 (53%)	6 (43%)	0.503
Positive signs of appendicitis on ultrasound	38 (49%)	-	<0.001

Table-III: Comparison of age distribution.

Age (Years)	Acute appendicitis n=78(%)	Gynaecological disorders n=14(%)	*p*-value
13-20	40 (51%)	7 (50%)	0.998
21-30	23 (29%)	4 (29%)	
31-40	10 (13%)	2 (14%)	
41-45	5 (7%)	1 (7%)	

A rise in WBCs and neutrophil counts was seen in more than half of the patients with acute appendicitis while these counts rose only in two fifth of the gynaecological disorders patients. A positive ultrasound for appendicitis was observed in about half of the patients of appendicitis while no patient from gynaecological disorder group had positive signs of appendicitis on ultrasound (table-II). No postoperative death or morbidity was noticed in these patients.

DISCUSSION

The mean age of the patients in our study was 20.4 ± 3.6 years and majority of the patients belonged to age group between 13 to 30 years, thus supporting this view that acute appendicitis and gynaecological disorders are commonly seen in young age group[20]. All of our patients had abdominal pain and tenderness in right lower abdomen suggesting that both acute appendicitis and gynaecological disorders have some common symptoms and signs and can sometime result in misdiagnosis of acute appendicitis with some gynaecological disorder[21]. A study by Shahid *et al* also reported high frequencies of gynaecological disorders simulating acute appendicitis in young age females due to these common symptoms and signs[22]. Migration of pain to right iliac fossa and nausea and vomiting were seen in 53% and 54% of appendicitis patients respectively in our study. Humes *et al*[20] also reported that these classical symptoms of appendicitis are present in only 50% of the appendicitis patients. On the other hand, not a single patient from gynaecological disorder group had migration of pain to right iliac fossa.

Laboratory and ultrasound findings can help in diagnosing the cause of pain but their efficiency is not 100%[12,13]. For example, Al-Gaithy observed that acute inflammatory markers like WBCs and neutrophil counts are less reliable in confirming the presence of acute appendicitis because of their low sensitivity and specificity and do not always indicate disease severity[14]. A study by Soomro

reported elevation of WBCs and neutophil counts in only 53.33% of acute appendicitis patients[15]. The sensitivity and specificity for leukocyte count in appendicitis determined in various international studies ranges from 80.0- 88.7% and from 61.5-87% respectively[14]. So, WBCs count by itself is not completely preventive against negative appendectomy rate[14]. Similar is the case with ultrasound. It has the sensitivity and specificity of 51.8% and 81.4% respectively for the diagnosis of appendicitis[16]. A study by D'Souza *et al* observed that appendix was not visualized on ultrasound in 45% of the patients with suspected acute appendicitis[16]. Soldo *et al* observed that diagnostic accuracy can be improved by combined clinical and laboratory parameters in the diagnosis of pain right iliac fossa in adult emergency population as compared to clinical or laboratory parameters alone[17]. However, no combinations of these parameters is 100% reliable in the diagnosis of acute appendicitis[17]. In our study, out of 78 appendicitis patients only 54% of patients were having raised WBC count and 49% of the patients had positive signs of appendicitis on ultrasound which is in consistent with the results of other studies in literature[15,16]. Due to poor rates of appendix visualization on ultrasound, surgeons instead use ultrasonography to exclude gynaecological causes of right lower abdominal pain in females[16]. However, if the patients' ultrasound reports are inconclusive, these patients frequently progress to surgery.

Pain right lower abdomen in females of reproductive age is a common problem seen in surgical department of a hospital[7]. Hatipoglu *et al* observed that the commonest cause of this pain in these females is acute appendicitis (77.2%)[7] and we have seen a similar result in our study as well. However, the correct diagnosis of acute appendicitis can only be made in 76%-92% of the patients[7,8]. Diagnostic precision falls in women of reproductive age, children and the elderly[7,8]. In this study we have found a diagnostic failure of 15.21% for acute appendicitis in women of child bearing age, which corresponds with the national and international data for negative appendectomy rate of 15-42% in these patients[9,22]. The reason of this diagnostic failure is overlapping of the signs and symptoms of acute appendicitis with those of gynaecological disorders in females of reproductive age[10]. Ovarian cyst rupture was the most common gynaecological problem seen in our study with half of the gynaecological disorder patients presented with this disease. The patients were in the age group 13-30 years and in their active reproductive life, which is in accordance with the literature[23]. Pelvic inflammatory disease (PID) was the second most common gynaecological disorder observed in this study, accounting for 28.57% of the gynaecological problems. Ateeq *et al* also noticed in their study that PID was the second common cause of gynaecological acute abdomen in females of child bearing age[6]. Ovarian torsion, ruptured ectopic pregnancy and Mittelschmerz were the least commonly observed gynaecological emergencies seen in our study with only 1.4% of the patients suffering from each of these diseases. Ateeq *et al* also observed lower frequencies of these diseases in female patients with acute surgical abdomen[6].

The current regime, in majority of the hospitals, for patients with right lower abdominal pain whose diagnosis is not clear at the start of symptoms and are also not toxic, is active observation with regular re-examination and serial monitoring of pulse and temperature recordings, WBC count and abdominal ultrasound[11]. However, if the diagnosis still remains unclear then the best approach is to perform diagnostic laparoscopy and proceed, rather than going for open appendicectomy because it gives not only rapid, safe and accurate diagnosis but also a therapeutic option for most of the intra-abdominal conditions with minimal trauma to the body[18,19].

LIMITATION OF STUDY

The main limitation of this study was small sample size. Therefore, its results cannot be generalized. Another prospective study with large sample size having all patients with abdominal pain with suspicion of appendicitis should be conducted.

ACKNOWLEDGEMENT

Authors would like to thank, Dr Usman Shakil, Radiologist CMH Sargodha and Dr Maria Altaf, Pathologist CMH Sargodha for their help in the preparation of this article.

RECOMMNENDATIONS

General surgeons should have the training to solve basic gynecological and obstetric disorders found during an appendicectomy operation when no gynaecologist is available. Equivocal cases should be closely observed. Diagnostic laparoscopy and proceed, where available, should be the preferred treatment over open approach. Close collaboration between surgeon and gynaecologist can help these patients because sometime the cause is gynaecological.

CONCLUSION

A considerable number of young females with gynaecological disorders presented with symptoms and signs simulating as acute appendicitis. Out of the three parameters, not a single parameter was 100% efficient in diagnosing the cause of the pain. However, this study revealed that while making the diagnosis of appendicitis in young females, one should also keep in mind the possibility of gynaecological diseases as well so that we can reduce the negative appendictomy rate.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

REFERENCES

1. Chanana L, Jegaraj MA, Kalyaniwala K, Yadav B, Abilash K. Clinical profile of non-traumatic acute abdominal pain presenting to an adult emergency department. J Family Med Prim Care 2015; 4(3): 422-25.
2. Velissaris D, Karanikolas M, Pantzaris N, Kipourgos G, Bampalis V, Karanikola K, et al. Acute abdominal pain assessment in the emergency department: the experience of a greek university hospital. J Clin Med Res 2017; 9(12): 987-93.
3. Karagülle E, Türk E, Yıldırım E. A rare cause of left lower quadrant abdominal pain: acute appendicitis with situsinver sustotalis. Ulus Travma Acil Cerrahi Derg 2010; 16(3): 268-270.
4. Jearwattanakanok K, Yamada S, Suntornlimsiri W, Smuthtai W, Patumanond J. Validation of the diagnostic score for acute lower abdominal pain in women of reproductive age. Emerg Med Int 2014; 2014: 320926.
5. Abdelhadi MS. Acute abdominal pain in women of child-bearing age remains a diagnostic dilemma. J Family Community Med 2001; 8(2): 45–50.
6. Ateeq M, Jehan S. Gynaecological acute abdomen. J Rawalpindi Med Coll 2012; 16(1): 48-50.
7. Hatipoglu S, Hatipoglu F, Abdullayev R. Acute right lower abdominal pain in women of reproductive age: clinical clues. World J Gastroenterol 2014; 20(14): 4043-49.
8. Arredondo GP. Acute abdomen in fertile women with pain located in the right iliac fossa. Appendicitis? Observational Study. Arch Clin Med Case Rep 2017; 1(1): 4-10.
9. Alhamdani YF, Rizk HA, Algethami MR, Algarawi AM, Albadawi RH, Faqih SN, et al. Negative appendectomy rate and risk factors that influence improper diagnosis at king abdulaziz university hospital. Mater Sociomed 2018; 30(3): 215–20.
10. Boyd CA, Riall TS. Unexpected gynecologic findings during abdominal surgery. Curr Probl Surg 2012; 49(4): 195–251.
11. Rennie AT, Tytherleigh MG, Theodoroupolou K, Farouk R. A prospective audit of 300 consecutive young women with an acute presentation of right iliac fossa pain. Ann R Coll Surg Engl 2006; 88(2): 140-43.
12. Burai M, Gameraddin MB, Suliman A, Gareeballah A, Alagab F, Elzaki M. Pelvic ultrasonographic findings in patients with acute right iliac fossa pain. Int J Health Allied Sci 2019; 8(1): 33-7.
13. Arooj S, Haq A. The specificity and sensitivity of ultrasonography in the diagnosis of acute right lower quadrant pain in women of child bearing age. J Pak Med Assoc 2015; 65(9): 933-36.
14. Al-Gaithy ZK. Clinical value of total white blood cells and neutrophil counts in patients with suspected appendicitis: retrospective study. World J Emerg Surg 2012; 7(1): 32-37.
15. Soomro BA. Acute appendicitis in children. J Surg Pak (Int) 2008; 13(4): 151-54.
16. D'Souza N, D'Souza C, Grant D, Royston E, Farouk M. The value of ultrasonography in the diagnosis of appendicitis. Int J Surg 2015; 13(1): 165-69.
17. Soldo I, RadisicBiljak V, Bakula B, Bakula M, Simundic AM. The diagnostic accuracy of clinical and laboratory parameters in the diagnosis of acute appendicitis in the adult emergency department population - a case control pilot study. Biochem Med (Zagreb) 2018; 28(3): 030712.
18. Ravichandran KS, Sivachandran K. Diagnostic laparoscopy in right iliac fossa pain. Surgical Update: Int J Surg Orthopedics 2018; 4(4): 139-43.
19. Ruffolo C, Fiorot A, Pagura G, Antoniutti M, Massani M. Acute appendicitis: What is the gold standard of treatment? World J Gastroenterol 2013; 19(47): 8799-807.
20. Humes DJ, Simpson J. Acute appendicitis. Bio Med J 2006; 333(7567): 530-34.
21. Javed MA, Shaukat A, Khan H, Ahmed A. Gynaecological encounters in surgical emergency. J Fatima Jinnah Med Coll 2014; 8(3): 41-44.
22. Shahid G, Dar HM, Majid HJ, Siddique Z, Mehmood S, Tufail M. A study of gynaecological emergencies presenting as Acute Appendicitis. Proceeding Shaikh Zayed Postgrad Med Inst 2005; 19(1): 13-37.
23. Emeksiz HC, Derinöz O, Akkoyun EB, GüçlüPınarlı F, Bideci A. Age-specific frequencies and characteristics of ovarian cysts in children and adolescents. J Clin Res Pediatr Endocrinol 2017; 9(1): 58-62.