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Original Research Article

A prospective cross-sectional observational study of acute pelvic pain in gynaecology

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ABSTRACT

Background: The diagnosis of acute pelvic pain is challenging and is based on clinical history, symptoms, physical examination and radiological findings. The various causes of acute pelvic pain may be gynecological, obstetrical, urological or gastrointestinal which can sometimes present with overlapping features and is difficult to diagnose. Objectives were to study the etiology of acute pelvic pain among different age groups and to study the mode of diagnosis of patients. 3)To study the mode of management.
Methods: This is a prospective non-interventional cross-sectional observational study where patients presenting with acute pelvic pain of less than 3 months duration fulfilling the criteria of the study were included and analyzed. The sample size was 210.
Results: 35.7% patients belonged to age group of 23-32 years while 13% patients belonged to age group 43 and above. 47% cases presented with acute pain for less than 10 days. 13.8% of the patients were pregnant when they presented with pain. 24% cases reported vaginal bleeding with acute pelvic pain and only 10 patients presented with fever. The 18 patients were diagnosed with ruptured tubal ectopic pregnancy and 1 patient had scar ectopic pregnancy. 22 patients had ovarian torsion. Seven patients had complex adnexal cyst and 10 had tubo-ovarian mass. 6 cases of hematometra, 2 of pyometra, 1 of bicornuate uterus with hematometra and 2 of uterine horn collection were observed. The 17 patients had no gynaecological cause of pain. The 73.8% patients had undergone surgical management for acute pelvic pain while17.6% were managed medically. In 8.1% cases medical management was followed by surgical management.
Conclusions: Ruptured tubal ectopic, ovarian torsion, ovarian cyst and pelvic inflammatory diseases were the most common causes. Detailed history, examination and radiological studies are equally important in the diagnosis of acute abdominal pain. Early diagnosis is critical to prevent significant morbidity and mortality.

Keywords: Pelvic pain, Ectopic pregnancy, Ovarian cyst, Pelvic inflammatory disease, Vaginal bleeding

INTRODUCTION

Acute pelvic pain is defined as the sudden onset of lower abdominal or pelvic pain lasting less than three months.[1] Women frequently present to the emergency department within few hours of acute pain. Central to correct diagnosis of acute pelvic pain is correct history. The character, onset, duration, radiation and other positive or negative associations with the pain should be recorded. Detailed menstrual history including last menstrual period, amenorrhea, presence of abnormal uterine bleeding should be ascertained. The sexual and contraceptive history along with history of sexually transmitted disorders should be taken into consideration. Gastrointestinal symptoms such as anorexia, nausea, vomiting, constipation, inability to pass flatus; urinary symptoms of dysuria, urgency, increased frequency, hesitancy, hematuria and signs of infection like fever, chills, purulent vaginal discharge

should be a part of history taking. Symptoms attributable to hemoperitoneum like orthostasis, abdominal distension, right upper quadrant pain should be taken into consideration. Medical and surgical history and medications being used by the patient should be considered (example exogenous hormones, blood thinners etc.) Baseline laboratory studies such as complete blood count, liver and renal function test, urine pregnancy test, and imaging studies like transvaginal pelvic ultrasound (TVS), computed tomography (CT) and magnetic resonance imaging (MRI) should be considered where diagnosis is in doubt. Some of the conditions causing acute pelvic pain are life threatening and severe enough to warrant immediate surgical intervention such as ovarian torsion, ectopic pregnancy, ruptured cyst, appendicitis tubo-ovarian abscess and rupture uterus (Table 1). The American College of Radiology appropriateness criteria list pelvic sonography as the first line imaging modality in the evaluation of acute pelvic pain in pregnant and nonpregnant woman of reproductive age when obstetric or gynecological condition is suspected.[2]

Most of these conditions can be reliably diagnosed by a trans-abdominal or transvaginal ultrasound often bearing certain pathognomonic signs such as "String of pearls sign" or "Whirlpool sign" in a case of ovarian torsion or the "Fishnet weave" pattern seen in a haemorrhagic cyst.[7,8] Conditions like ectopic pregnancy can be diagnosed with 95% sensitivity using history, physical examination, TVS and serum β-Human chorionic gonadotrophin (β-HCG). The gold standard for diagnosing endometriosis remains laparoscopy but endometriomas can be diagnosed with up to 74% sensitivity using TVS.[9] Occasionally, MRI is also helpful to make the diagnosis of endometriosis. PIDs is diagnosed using the extensive guidelines given by the CDC.[10] The symptoms and signs associated with ovarian neoplasms are often nonspecific pelvic pain and discomfort. Serum CA 125 assay is a useful tool to distinguish between benign and malignant ovarian masses.[11] Imaging modalities for diagnosis include pelvic ultrasonography, computed and magnetic resonance imaging. The features which distinguish benign and malignant include features like unilocularity of cyst, Minimal septations, thin walls absence of papillary projections, absence of ascites, etc,.[12]

METHODS

This was a prospective non-interventional cross-sectional observational study conducted in the department of obstetrics and gynecology in a tertiary care referral hospital in Mumbai, India. The study commenced after the approval of the institutional ethics committee. The duration of the study was one year (January 2023-January 2024).

Inclusion criteria

Patients who were admitted with pain of acute onset of gynecological original (less than 3 months), ectopic pregnancy and its complications and intrauterine contraceptive devices (IUCD) associated infections were included.

Exclusion criteria

Patients with acute pelvic pain related to pregnancy (abortions) and its complications (postpartum endometritis), patient presenting with acute exacerbation of chronic pelvic pain and patients not willing to give consent for the study were excluded.

Sample size

Based on the data collected for the three months (January, February and March 2024) from a tertiary care referral hospital there were 91 number of patients admitted to the gynecological ward with complaint of acute pelvic pain. Hence, the estimated population size in 2 years was around 600 cases. The prevalence of acute pelvic pain associated with gynecological cause varies between 20-40 percent (mean 30%). Taking 95% confidence limits the sample size to be studied was calculated to be 208, using the app Epiinfo.exe, which is an open-source statistical calculator software freely downloadable from CDC, USA website. For statistical convenience, we recruited 210 patients for our study.

Methodology

Patients fulfilling the inclusion criteria were provided information regarding the study and consent for participation taken. Consent was taken from the guardian if the patient was a minor. Detailed history was taken with special reference to age, duration of onset and nature of pain, menstrual history, sexual activity, contraceptive history and previous history of sexually transmitted diseases. A detailed clinical examination including general, systemic and pelvic examinations was done. For women who were not sexually active but presented with complaint of acute pelvic pain, only per rectal examination was done after taking consent. Laboratory and imaging studies used in each case were recorded. The modality of diagnosis used and the mode of management (medical or surgical) was included in the study.

Statistical analysis

Patients' information was recorded in the case record form. The outcome of the study was tabulated, analyzed and presented in terms of percentage, mean, median, and mode. Association between qualitative variables was assessed by chi-square test, with continuity correction for all 2×2 tables and by Fisher's exact test for all 2×2 tables where chi-square test was not valid due to small counts. In presence of small counts in tables with more than two rows and/or columns, adjacent row and/or column data was pooled and chi-square test reapplied. An alpha value $p \leq 0.05$ was used as the cut-off for statistical significance. Appropriate statistical software, including but not

restricted to MS excel, PSPP version1.0.1 was used for statistical analysis. Graphical representation was done in MS excel package included in Microsoft office 365.

RESULTS

The 67% of patients who presented with acute abdomen were in 23-42 years of age group. The 11% patients were in the postmenopausal age group. 86.2% of the patients were sexually active. 47% cases reported duration of pain less than 10 days. The 13% patients had duration between 30-40 days and 5.7% patients presented within 10-20 days interval. 13.8 % of the patients were pregnant. The prevalence of fever, vaginal discharge, vaginal bleeding and menstrual complaints are shown in Figure 1.

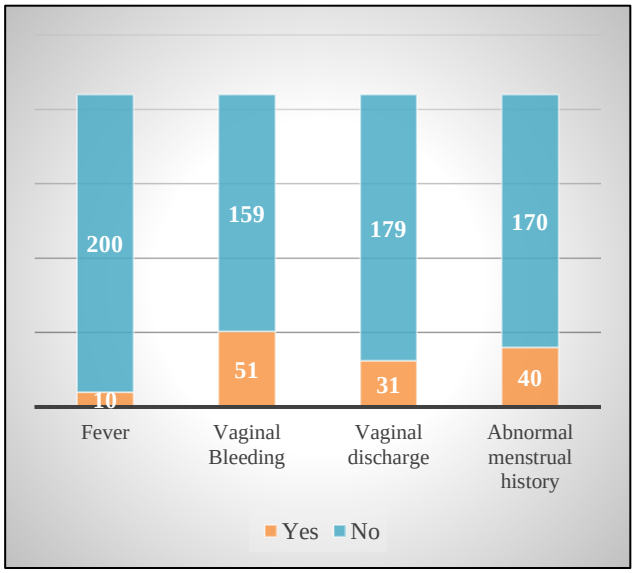

Figure 1: Prevalence of fever, vaginal discharge, vaginal bleeding and abnormal menstrual history in patients.

The 10% patients had acute pain which was cyclical in nature and associated with menstruation. Only 4.3% patients with acute pelvic pain had prior history of sexually transmitted diseases. The 7.6% patients who presented with acute pelvic pain gave history of contraceptive use which was mainly intrauterine contraceptive device (IUCD). A few patients also had history of using barrier method of contraception. The 71% patients had no major medical illness in the past. Among the remaining 6.7% were hypothyroid, 4.3% had bronchial asthma, 2.9% patients had hypertension.1.4% patients had diabetes mellitus. 2.86% had heart disease. 1 patient had history of pulmonary Koch's while 1 patient was a known case of multi-drug-resistant tuberculosis (MDR-TB). Out of total number of cases of 210 patients,10% patients had undergone previous lower segment caesarean section, 2.9% patients had undergone appendicectomy, 2.4% had undergone total abdominal hysterectomy. Only 1% were operated for ectopic pregnancy and 2% had undergone exploratory laparotomy for other causes. The 73% patients had not undergone any surgery Table 2 shows the distribution of patients based on their examination findings. Out of 184 patients whose pelvic examination was done, 31% had a retroverted uterus while 1% had undergone hysterectomy.

Table 3 shows the distribution of patients as per their USG findings while Table 4 and 5 show the distribution based on CT and MRI findings respectively. 88.6% cases were diagnosed on ultrasonography and rest 5.7% cases were diagnosed each on CT scan and MRI. Table 6 shows the final diagnosis made from history, physical examination and radiological studies. The 37 patients had undergone medical traeatment,155 patients had undergone surgical intervention. The 17 patients were initially managed conservatively followed by surgical intervention. Transvaginal ultrasound guided aspiration of pyosalpinx was done in 1 patient. Figure 2 represents the treatment given to the patients.

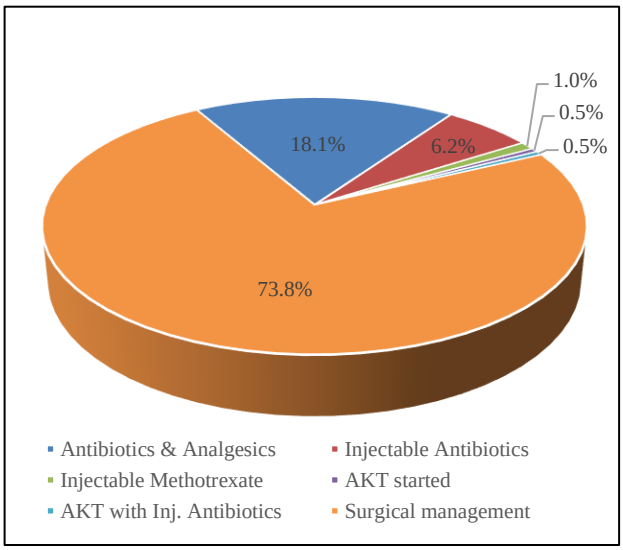

Figure 2: Distribution of the cases as per treatment.

Out of the 74% patients who received surgical management, salpingectomy was done in 21% cases, 19% cases had undergone salpingoophorectomy, 11% cases had undergone ovarian cystectomy, 5.2% cases had undergone total abdominal hysterectomy. The 36.7% patients had undergone other surgical interventions like drainage of hematometra/pyometra, fractional curettage, excision of uterine horn, myomectomy, drainage of pelvic abscess etc.

In Table 7 shown below, the chi square test was conducted to determine how well the obtained sample proportions of medical and surgical management and final diagnosis fit the population proportions. The Pearson chi-square turned out to be significant for the three compared groups. The results indicate the application of two different modes of treatment have produced significant different results for the final diagnosis.

Table 1: History and physical examination clues to the diagnosis of acute pelvic pain.[3-6]

Clinical clues	Suggested diagnosis
History	
Bilateral pelvic pain	PID
Dysmenorrhea	Endometriosis, uterine fibroid
Dyspareunia	Endometriosis, ovarian cyst
Gross-hematuria	Kidney stone, UTI
Left-sided pelvic pain	Diverticulitis, kidney stone, ruptured ovarian cyst
Midcycle pain	Mittelschmerz
Nausea and vomiting	Appendicitis, ovarian torsion
Pain migration from periumbilical area to right lower quadrant of abdomen	Appendicitis
Radiation of pain to groin	kidney stone, ovarian torsion
Right sided pelvic pain	Appendicitis, kidney stone, ovarian torsion, ruptured ovarian cyst
Urinary frequency	UTI
Vaginal Bleeding	Ectopic pregnancy, uterine fibroid
Vaginal discharge	PID
Physical examination	
Adnexal mass	Corpus luteum, cyst, diverticula of colon, ectopic pregnancy, endometriosis, follicular cyst, PID, uterine fibroids.
Bilateral abdominal tenderness	PID
Cervical motion, uterine, or adnexal tenderness	PID
Fever	Appendicitis, PID, pyelonephritis
Hypotension	Ectopic pregnancy, ruptured hemorrhagic ovarian cyst
Left lower quadrant abdominal tenderness	Diverticulitis
Right lower quadrant abdominal tenderness	Appendicitis
Vaginal mucopurulent	PID

Table 2: Distribution of patients based on their examination findings.

Variables	Abnormal vital signs (tachycardia, hypotension, tachypnea, pallor)	Cervical motion tenderness on vaginal examination *	Fornicial tenderness on vaginal examination*	Adnexal mass felt on vaginal examination*
Present	9%	35.7%	82.6%	49.5%
Absent	91%	64.2%	17.4%	50.5%

*Out of 210 patients, vaginal examination was done in 184 patients only.

Table 3: Distribution of cases of acute pelvic pain on basis of ultrasound findings.

USG findings	N	Percentage (%)
Ruptured tubal ectopic pregnancy	38	18.1
Ovarian cyst	28	13.3
Ovarian torsion	22	10.5
Fibroid uterus	16	7.6
Tubo-ovarian mass	10	4.8
Ovarian cystadenoma	9	4.3
Unruptured ectopic pregnancy	8	3.8
Adnexal complex cyst	7	3.3
Pyosalpinx	7	3.3
Hematometra	6	2.9
Ovarian chocolate cyst	6	2.9
Dermoid cyst	5	2.4
Hemmorhagic cyst	5	2.4
Adenomyosis of uterus	4	1.9
Endometrioma	4	1.9
Pelvic abscess	3	1.4
PID	3	1.4

Continued.

USG findings	N	Percentage (%)
Hydrosalpinx	2	1.0
Pyometra	2	1.0
Uterine horn collection	2	1.0
Pyosalpinx	1	0.5
Abdominogenital Koch's	1	0.5
Bicornuate uterus with hematometra	1	0.5
Cystic degeneration of fibroid	1	0.5
Fundal sessile polyp with PID	1	0.5
Scar ectopic	1	0.5
Normal	17	8.1
Total	210	100

Table 4: Distribution of cases of acute pelvic pain as per CT scan findings.

CT scan	N	Percentage (%)
Serous cystadenoma of rt ovary	3	1.4
18×14 cm rt ovarian cyst with torsion	1	0.5
7×5 cm mass in rt ovary	1	0.5
Cervicitis vaginitis and pyometra	1	0.5
Genital Kochs	1	0.5
Left adnexal complex cyst	1	0.5
Left adnexal cyst	1	0.5
Rt pyosalpinx	1	0.5
Rt serous cystadenoma	1	0.5
Rt tubo ovarian mass	1	0.5
Ct not done	198	94
Total	210	100

Table 5: Distribution of the cases of acute pelvic pain as per findings of MRI.

MRI	N	Percentage (%)
Broad ligament fibroid of 11×15 cm	1	0.5
Complex cystic lesion of 7×5 cm	1	0.5
Hematometra	1	0.5
Hematometra, hematosalpinx with hematocolpos with cervical atresia	1	0.5
Hypoplastic bicornuate uterus with hematometra	1	0.5
Large ant wall complete thickness defect	1	0.5
Left functioning uterine horn	1	0.5
Left ovarian teratoma of 5×4 cm	1	0.5
Normal uterus with 4 cm Fibroid	1	0.5
Scar ectopic pregnancy	1	0.5
ut didelphys with 2 chocolate endometrioma with septum in vaginal wall	1	0.5
Uterine didelphys with hematometra	1	0.5
MRI not done	198	94
Total	210	100

Table 6: Final diagnosis of patients with acute pelvic pain.*

Final diagnosis	N	Percentage (%)
Ruptured tubal ectopic pregnancy	38	18.1
Ovarian cyst	27	12.9
Ovarian torsion	22	10.5
Fibroid uterus	16	7.6
Tubo- ovarian Mass	10	4.8
Ovarian cystadenoma	9	4.3

Continued.

Final diagnosis	N	Percentage (%)
Pyosalpinx	8	3.8
Unruptured ectopic pregnancy	8	3.8
Adnexal complex cyst	7	3.3
Hematometra	6	2.9
Ovarian chocolate cyst	6	2.9
Hemorrhagic cyst	5	2.4
Dermoid cyst	5	2.4
Adenomyosis of uterus	4	1.9
Endometrioma	4	1.9
Pelvic abscess	3	1.4
Pid	3	1.4
Pyometra	3	1.4
Hydrosalpinx	2	1.0
Uterine horn collection	2	1.0
Abdominogenital kochs	1	0.5
Bicornuate uterus with hematometra	1	0.5
Cystic degeneration of fibroid	1	0.5
Fundal sessile polyp with PID	1	0.5
Scar ectopic	1	0.5

*17 patients out of 210 were not diagnosed with any gynaecological cause of pain and were referred to surgery, medicine and urosurgery departments for further evaluation.

Table 7: Association among the cases between final diagnosis and medical and surgical management.

Final diagnosis		Medical	Surgical	Medical followed by surgical
Ruptured tubal ectopic pregnancy	No.	0	38	0
	%	0.0%	100.0%	0.0%
Ovarian torsion	No.	0	22	0
	%	0.0%	100.0%	0.0%
Fibroid uterus	No.	1	8	7
	%	6.3%	50.0%	43.8%
Tubo-ovarian mass	No.	2	6	2
	%	20.0%	60.0%	20.0%
Ovarian cystadenoma	No.	0	9	0
	%	0.0%	100.0%	0.0%
Pyosalpinx	No.	2	4	2
	%	25.0%	50.0%	25.0%
Unruptured ectopic pregnancy	No.	2	5	1
	%	25.0%	62.5%	12.5%
Adnexal complex cyst	No.	0	7	0
	%	0.0%	100.0%	0.0%
Hematometra	No.	0	6	0
	%	0.0%	100.0%	0.0%
Adenomyosis of uterus	No.	1	2	1
	%	25.0%	50.0%	25.0%
Endometrioma	No.	0	3	1
	%	0.0%	75.0%	25.0%
Dermoid cyst	No.	0	5	0
	%	0.0%	100.0%	0.0%
Pelvic abscess	No.	0	2	1
	%	0.0%	66.7%	33.3%
PID	No.	3	0	0
	%	100.0%	0.0%	0.0%
Pyometra	No.	0	2	1
	%	0.0%	66.7%	33.3%
Hydrosalpinx	No.	1	1	0
	%	50.0%	50.0%	0.0%

Continued.

Final diagnosis		Medical	Surgical	Medical followed by surgical
Uterine horn collection	No.	1	1	0
	%	50.0%	50.0%	0.0%
Abdominogenital Kochs	No.	1	0	0
	%	100.0%	0.0%	0.0%
Bicornuate uterus with hematometra	No.	0	1	0
	%	0.0%	100.0%	0.0%
Cystic degeneration of fibroid	No.	1	0	0
	%	100.0%	0.0%	0.0%
Fundal sessile polyp with PID	No.	1	0	0
	%	100.0%	0.0%	0.0%
Haemorrhagic cyst	No.	4	1	0
	%	80.0%	20.0%	0.0%
Ovarian chocolate cyst	No.	0	4	2
	%	0.0%	66.7%	33.3%
Ovarian cyst	No.	1	26	0
	%	3.7%	96.3%	0.0%
Scar ectopic	No.	0	1	0
	%	0.0%	100.0%	0.0%
Normal	No.	16	1	0
	%	94.1%	5.9%	0.0%
Total	No.	37	155	18
	%	17.6%	73.8%	8.6%
Chi-square test	**Value**	**Df**	**P value**	**Association is**
Pearson chi-square $	197.444	50	2.08E-19	Significant
Pearson chi-square^, #	68.953	1	1.01E-16	Significant
Fisher's exact test^, #			5.17E-13	Significant

$67 cells (85.9%) have expected count less than 5. ^, # row and column data pooled and chi-square test reapplied with continuity correction.

DISCUSSION

In the present study,183 patients belonged to age group of 13-42 years which signifies that acute pelvic pain of gynaecological origin is mainly seen in the reproductive age group. In 45.7% patients, acute pelvic pain was less than 10 days in duration which makes this pain sudden onset and short in duration. About 86.2% patients were sexually active which signifies that acute pelvic pain is one of the presenting features of sexually transmitted diseases and ectopic pregnancies. Among the causes of pelvic pain, ruptured tubal ectopic, ovarian torsion, ovarian cyst and pelvic inflammatory diseases were the most common. 73.8% patients had undergone surgical management for acute pelvic pain. Only 17.6% had undergone medical management. In 8.1% patients, medical management was followed by surgical management. Among those patients who were given medical management, 18.1% patients were treated with antibiotics and analgesics. In 1% patients each, anti-tubercular drugs and methotrexate was started. Among the patients who were surgically managed, 21% patients underwent salpingectomy, 19% had salpingo-oophorectomy, 11% had ovarian cystectomy and 5.2% underwent total abdominal hysterectomy.

In a study conducted on ectopic pregnancy by Sindhura et al revealed that 40.5% patients reporting with acute pelvic pain were in the age group 20-35 years age group.[13] In the study conducted by Sudha et al 67% belonged to the age group 20-30 years which is close to the study done by Panchal et al with 71% people were in the same age group 20-30 years.[14,15] In the study conducted by Sindhura et al, where 89.3% patients had amenorrhoea, 68.3% had abdominal pain and 43.30% had vaginal bleeding. Cervical motion tenderness was reported in 21.51% cases and adnexal tenderness in 16.4% cases.[13] In the study conducted by Pal et al, pain was the most common symptom in 91% cases followed by bleeding per vaginum in 71% and amenorrhea 41%.[15] In our study other symptoms reported were bleeding per vaginum in 24.3% patients. The 14.8% had vaginal discharge and 4.8% patients had fever along with pain. The 19% had abnormal menstrual complaints like amenorrhea, menorrhagia, dysmenorrhoea and 81% patient had normal menstrual history or not achieved menarche. In the study conducted on PID by Shinde et al the presenting complaints were pain in abdomen in 93.5%, per vaginal discharge in 66%, fever in 51% cases.[16] These findings are somewhat comparable with the study by Nkwabong et al where pain in abdomen, per vaginal discharge and fever were seen in 75.7% ,73.27% and 70.85% cases respectively.[17] In the same study of Shinde et al fornicial and cervical motion tenderness were the commonest per vaginal examination findings seen in 89% and 84% cases respectively. In our study, fornicial and cervical motion tenderness were seen in 82.6% and 35.7% cases respectively.

Considering ovarian tumours, in a study conducted by Shirish et al the common age group for malignant age group was 51-60 years followed by 21-30 years.[18] Okugawa et al studied showed that age of malignant tumour was 51.9 years and pain and lump in abdomen were the most common presenting symptoms.[19] The 67.5% of the patients presented with pain abdomen, which was vague and associated with a feeling of heaviness in the lower abdomen. However, a study by Neelgud et al reported that 2.43% patients had presented with severe pain abdomen and there were signs of acute abdomen. These patients were clinically suspected to have twisted ovarian cysts.[20] A diagnosis was confirmed by ultrasonography and doppler study.

In the reproductive age group, 9.75% cases had presented with menorrhagia and dysmenorrhea.[21] In our study, ovarian cystadenoma was seen in 4.3% patients and adnexal complex cyst was seen in 3.3% patients. These patients presented with abdominal pain and postmenopausal bleeding.

Andreotti et al showed that clinical diagnosis of acute pelvic pain in female patient can be challenging because of nonspecific signs and symptoms and imaging is found to be valuable in narrowing the differential diagnosis.[22] In our study, ultrasound was the most commonly used diagnostic modality in 210 patients. The clinical findings were confirmed on ultrasound in 198 patients.

In a study by Allison et al gynaecological disorders in women with negative pregnancy test who presented with acute pelvic pain included acute PID, functional ovarian cyst, ovarian endometriomas and adnexal torsion.[23] Our study reported 12.9% patients with ovarian cyst and 10.5% cases ovarian torsion. Tubo-ovarian mass was found in 4.8% patients. Chocolate cyst was found in 2.9% patients. Uterine fibroid was seen in 7.6% cases. Few cases presented as hydrosalpinx, uterine horn collection, bicornuate uterus with hematometra. Around 4 patients had pelvic inflammatory disease. These findings were consistent with that of Allison et al.[23]

CONCLUSION

Our study confirms that pelvic pain has multiple etiologies, sometimes of rare nature, which needs multimodal approach to diagnosis. Detailed history, physical examination, laboratory results and imaging studies contribute equally in the final diagnosis and management. We also conclude that prompt diagnosis is essential to reduce morbidity and mortality. However, we acknowledge that more studies with a larger sample size are needed to formulate the best approaches and diagnostic algorithms for acute pelvic pain.

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