



## Chronic Pelvic Pain in Adolescents

### Transvaginal ultrasound Versus Laparoscopy

### A Prospective Cross Sectional Observational Study

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#### Abstract

**Background:** Chronic pelvic pain (CPP) is cyclic or noncyclic, intermittent or constant discomfort in the pelvic region for at least 6 months. It is a common complaint in female adolescents that may be overlooked.

**Objective:** To evaluate CPP in adolescents using transvaginal ultrasound (TVS) and laparoscopy.

**Study design:** This is a prospective cross sectional observational study conducted at gynecology clinic of Al Azhar University Hospital of Assiut- Egypt. A total of 100 adolescents with CPP were evaluated by TVS and laparoscopy and findings were analyzed.

**Results:** The mean age of adolescents was  $17 \pm 3.5$  the majority were parous (51%), rural (69%) and low social class (65 %). Diffuse pelvic pain was present in (62%), Dysmenorrhea in (61%), deep abdominal and pelvic tenderness in (55% and 80% respectively).

TVS was normal in (40%) and abnormal in (60%). Laparoscopic evaluation was normal in (29%) and abnormal in (71%) in the form of tubo- ovarian masses (19%), endometriosis (18%) ovarian cysts (9%), adenomyosis (8%), Adhesions (6%), PID and RVF uterus (4% for each), subserous fibroid and pelvic congestion (1% for each). sensitivity and specificity of TVS were (81.7% and 93.1% respectively). Positive and negative predictive values were 96.7% and 67.5% respectively. Kappa test between TVS and laparoscopy showed good agreement ( $kappa = 0.67$ ).

**Conclusions:** Good agreement was found between TVS and laparoscopy, however, laparoscopy is considered as a gold standard tool in evaluating adolescent CPP because of distinct advantages in terms of sensitivity and negative predictive value.

**Key words:** Chronic Pelvic Pain, TVS, Laparoscopy, adolescents.

## **Introduction:**

Chronic pelvic pain (CPP) is defined as pain localized to pelvis or lower abdomen below the line joining the two anterior superior iliac spines, and of at least six months duration which is severe enough to cause functional disability and requires medical or surgical treatment.<sup>1</sup>

CPP accounts for 10% of office visits to gynecologists and general clinics<sup>2</sup>. Causes of CPP are both gynecological and non-gynecological visceral and somatic disorders and in around 35% of cases no cause is detected. Potential visceral sources of chronic pelvic pain include the reproductive, genitourinary and gastrointestinal tracts, and potential somatic sources include the pelvic bones, ligaments, muscles and fascia. It may also be due to psychological disorders and neurological diseases. Various gynecological causes responsible for CPP are endometriosis, Pelvic Inflammatory Disease (PID), adhesions, pelvic congestion syndrome, adenomyosis, ovarian neoplasm, ovarian remnant, residual syndrome and leiomyoma<sup>3</sup>.

CPP is a common complaint in female adolescents however patient may seek medical advice of pediatrician, gastroenterologist, and emergency department before going to gynecologist. It can lead to major functional problems such as changes in family dynamics or school absenteeism<sup>4</sup>.

CPP in teenagers poses more challenges for health care providers. Although, in young women, lower abdominal pain is usually attributed to gynecologic disorders, physicians are

often reluctant to obtain gynecologic histories and perform pelvic examinations. This tends to compound the difficulty of dealing with adolescents <sup>5</sup>.

### **Aim of the work**

The aim of this study was to evaluate CPP which is overlooked among adolescents, using TVS and laparoscopy to determine the main gynecological causes and the best method for investigation.

### **Patients and Methods**

This is a prospective cross sectional observational study conducted on 100 patients with CPP, attending the outpatient gynecology clinic in Al Azhar University Hospital of Assiut- Egypt over a period of one year. The study was approved by Ethical Committee of the University. A written consent was obtained from patients (>18 years) or parents of participants (<18 years) after explaining procedures to them before enrollment.

**Inclusion criteria:** adolescent women 14-20 years old having pain in the lower abdomen of at least 6 months duration occurring continuously or intermittently and severe enough to affect the usual daily activities of the patient and/or interfere with her sexual life. **Exclusion criteria:** Pregnancy and its related causes, acute pelvic infection, pelvic organ prolapse, malignancy, Renal and colonic patients, congenital and acquired spinal deformities.

#### **All patients were subjected to:**

**Proper history taking:** To emphasize duration, frequency, location and severity of the pain, situations exacerbating or relieving the pain, medications and therapies. Menstrual history focused on age at menarche, sexual activity, exposure to sexually transmitted diseases, menstrual irregularities, past history for illnesses and surgeries along with current medications, family history of endometriosis and history suggestive other system affection especially urological and GIT symptoms.

**General examination:** to roll out musculoskeletal causes.

**Pelvic examination:** for possible urologic and gynecologic causes. The uterus and adnexa are examined by bimanual exam, speculum and uterine sounding. A rectal exam is also done to roll out GIT causes or if endometriosis is suspected.

**Laboratory tests:** A complete blood cell count with differential, urinalysis, urine culture and sensitivity, and erythrocyte sedimentation rate. Cervical cultures and a B- HCG measurement were performed in sexually active patients.

### Specific investigations:

Transvaginal ultrasound: All subjects underwent transvaginal sonography using a 7.5MHz transvaginal ultrasound probe. Longitudinal and transverse views were taken to obtain information on uterus, ovaries, adnexa and pouch of Douglas.

Diagnostic laparoscopy: It was performed for all patients in the post menstrual week under general anesthesia. A 5 mm storz 30° angle laparoscope was used. Second puncture was established in every case lateral to rectus muscle to improve visualization and careful evaluation of entire pelvic peritoneum along with manipulation of pelvic organs. A third port was established similarly on other side whenever an operative procedure was undertaken.

**Statistical analysis:** The data was analyzed using Statistical Package for Social Science (SPSS) version 22. Qualitative data, quantitative data, frequency, mean, standard deviation (SD), and percent distribution were calculated. Chi square and t test were used to compare groups. Sensitivity, specificity, positive and negative predictive values were calculated for TVS. *Kappa* test was calculated to find the agreement between TVS and laparoscopy. For interpretation of results, p-value < 0.05 was considered significant.

## Results

**Table (1): Socio-Demographic Characteristics of the Studied Group**

Variable	No. (%)
<b>Age (years)</b>	
Mean ±SD	17 ±3.5
Rang	14-20
<b>Residence</b>	
Rural	69 (69%)
Urban	31 (31%)
<b>Parity</b>	
Nullipara	49 (49%)
Para 1-3	51 (51%)
<b>Social class</b>	
High	35 (35%)
Low	65 (65%)

**Table (2): Clinical Characteristics of the Studied Group**

<b>Variable</b>	<b>No. (%)</b>
<b>Onset of pain</b>	
steady	71 (71%)
progressive	29 (29%)
<b>Site of pain</b>	
Diffuse pelvic	62 (62%)
Left iliac	5 (5%)
Right iliac	21 (21%)
Suprapubic	12 (12%)
<b>Reference of pain</b>	
No	46 (46%)
Yes	54 (54%)
<b>Relation to menses (dysmenorrhea)</b>	
No	39 (39%)
yes	61 (61%)
<b>Tenderness on Abdominal examination</b>	
No	45 (45%)
Yes	55 (55%)
<b>Tenderness on pelvic examination</b>	
No	20 (20%)
Yes	80 (80%)
<b>Previous Laparotomy</b>	
No	80 (80%)
Yes	20 (20%)

**Table (3): Ultrasonographic Findings in Adolescents**

<b>Finding</b>	<b>Number</b>
<b>Normal</b>	<b>40</b>
Tubo ovarian Mass	16
Endometriosis	9
Ovarian Cysts	8
IUCD	8
Adenomyosis	7
Chronic PID	3
Myoma	3
Retroverted Uterus	3
Haematocolpos	2
Bicornuate Uterus	1
<b>Total</b>	<b>100</b>

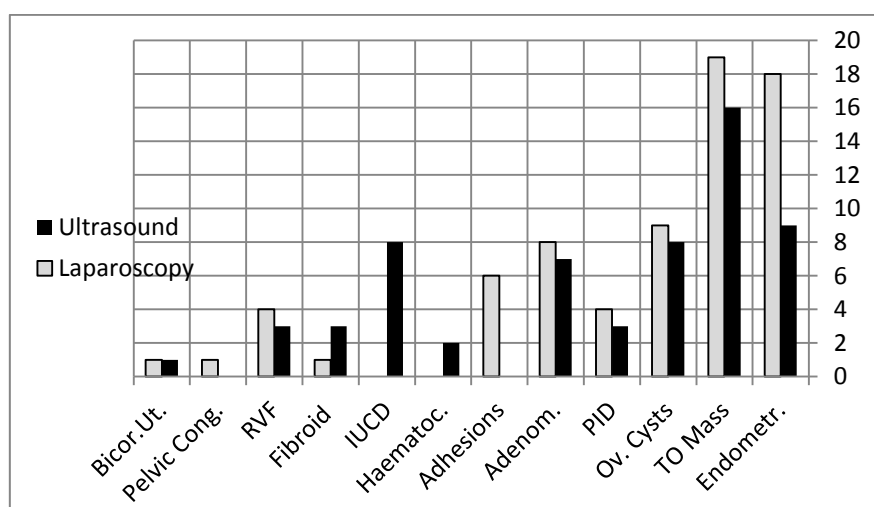
**Table (4): Laparoscopic Findings in Adolescents**

<b>Finding</b>	<b>Number</b>
<b>Normal</b>	<b>29</b>
Tubo ovarian Mass	19
Endometriosis	18
Ovarian Cysts	9
Adenomyosis	8
Adhesions	6
Chronic PID	4
Retroverted Uterus	4
Myoma	1
Pelvic Congestion	1
Bicornuate Uterus	1
<b>Total</b>	<b>100</b>

**Table (5): Correlation between TVS and Laparoscopy findings in Adolescents**

Laparoscopy (n=100)		Ultrasound (n=100)	
		Normal	Abnormal
Abnormal	71	13	58
Normal	29	27	2

**Kappa=0.67**



**Figure 1: Distribution of Adolescents According To TVS and Laparoscopy**

## Discussion

CPP is a common symptom experienced by prepubertal and adolescent girls. It is defined as pain occur below the umbilicus and lasts for at least six months; it may or may not be associated with menstrual pain<sup>1</sup>.

In our study the mean age of adolescents was  $17 \pm 3.5$ . Maximum number of cases was parous (51%), rural (69%) and of low social class (65%) (Table1). Diffuse pelvic pain was the most common type of pain presents in (62%) of them. This can be explained by the fact that many organs in the pelvic region are in close proximity to one another and these organs frequently share a similar nerve supply. Dysmenorrhea was present in (61%) of our cases and was associated with deep abdominal and pelvic tenderness in (55% and (80%) respectively (Table 2). these findings were similar to Kamilya et al (2005) and Seema and Ashok (2013)<sup>6,7</sup>.

Referred pain to back was present in (54%) patients. On examination, (55% and 80%) of adolescents had abdominal and plevic tenderness respectively.

TVS was accepted and tolerated by all cases in this study. This was agreed with the study done by Yong et al., (2013) who reported that it has considerable impact in alleviating the physical and psychological aspects of pelvic pain besides being rapid and non-invasive technique <sup>8</sup>.

TVS examination of our adolescents revealed normal findings in (40%) and abnormal findings in (60%) (Table3). These results were comparable to Rather et al (2015) who found in their study that normal and abnormal ultrasonographic findings were (51.25%) and (48.75%) respectively<sup>9</sup>.

Abnormal ultrasound findings were tubo-ovarian mass (16%), endometriosis (9%), IUCD and ovarian cysts (8% for each), Bulky uterus with adenomyosis (7%), RVF, PID and fibroid (3% for each), hematocolpos (2%), and bicornuate uterus (1%).

Laparoscopic evaluation of adolescents in our study showed normal findings in (29%) while (71%) showed abnormal findings. Tubo-ovarian mass was the most common finding among them (19%) followed by endometriosis (18%), ovarian cysts (9%), adenomyosis (8%), adhesion (6%), PID and RVF (4% for each), bicornuate uterus, fibroid and pelvic congestion (1% for each) (Table 4).

In our study both TVS and laparoscopy showed that the most frequent causes of CPP in adolescents were tubo- ovarian masses, endometriosis, ovarian cysts and adenomyosis. Adhesions were diagnosed by laparoscopy in (6%) only of adolescents (figure 1).

Results of our study may be partially different from many other studies because most conducted studies evaluated CPP in older women but very few studies evaluated it in the younger adolescent age.

Zubor et al., (2005) conducted a prospective study on 86 women with CPP, The most frequent laparoscopic finding was endometriosis (31.4%). Pelvic adhesions, myomas, pelvic varicosities and chronic inflammatory process were present in (25.6%, 15.1%, 9.3% and 3.5% of the cases) respectively. Preoperative ultrasonic examination with pelvic pathology findings were performed in 36 patients, and laparoscopy correlated with ultrasonographic findings in 31(86.1%) cases<sup>10</sup>.



Kang et al., (2007) analyzed the clinical data of 3068 cases of diagnostic laparoscopy, TVS and computed tomography performed for CPP. They found that pelvic endometriosis was the most common (60.2%), followed by normal pelvic findings (21.2%) and pelvic congestion (13.0%)<sup>11</sup>. In our study we found a much lower incidence of endometriosis (18%) that could be explained by younger age of our population.

Sharma et al (2011) in their study found the mean age of the patients with CPP ( $30.88 \pm 7.71$  years). The commonest finding on laparoscopy was adhesions (40%), endometriosis (18%), and pelvic congestion syndrome (20%), while 10% of the patients had normal pelvis<sup>12</sup>.

In the current study the most common laparoscopic finding in adolescents was tubo ovarian masses that could be a sequel of chronic PID due to lack of good hygiene and bad practices during childbearing period as most adolescents with CPP were parous and rural this may be a major contributors to this difference in our community.

Adhesions as a cause and/or an association with pelvic pain were diagnosed in (6%) of adolescents. The prevalence of pelvic adhesions in other studies ranged from (18-31.5%)<sup>11</sup>. This difference could be explained by fewer laparotomies (20%) performed to our adolescents.

The overall incidence of PID as a cause of pelvic pain (4%) was much lower than *Okaro et al.*, (2006) who found PID in (20%) of cases. This difference was due to the higher prevalence of sexually transmitted diseases in such community when compared to our community<sup>13</sup>.

With re-arrangement of findings obtained by TVS and laparoscopy, we found that of the 100 adolescents, 60 cases showed abnormal finding by TVS of them only 58 cases were confirmed by laparoscopy while 2 cases show normal laparoscopic finding. On the other hand only 27 out of 40 cases with normal TVS were confirmed by laparoscopy while the remaining 13 cases showed abnormal findings (Table 5). Sensitivity and specificity of TVS in adolescents were (81.7% and 93.1% respectively). Positive and negative predictive values were (96.7% and 67.5% respectively). These findings were similar to Seema et al (2013) who report ultrasound sensitivity and Positive predictive values to be (90.43% and 67.5% respectively) while they report much lower specificity (89.4%)<sup>7</sup>. Also our results were different from Rather et al (2015) who found in their study on 80 women aged 17-50 years old that TVS sensitivity and specificity were (58.57% and 100% respectively), positive and negative predictive values to be (100% and 24.3% respectively)<sup>9</sup>, however these differences may be attributed to different age category of those studies and to different sample size.

In our study although TVS failed to give positive findings in (13%) of cases that showed abnormalities by laparoscopy indicating higher sensitivity of laparoscopy than TVS especially for diagnosis of pelvic adhesions (0% vs.6%), but TVS gives similar results comparable to diagnostic laparoscopy in diagnosis of tubo- ovarian mass (16% vs. 19%), endometriosis (9% vs. 18%), ovarian cysts (8% vs. 9%) and adenomyosis (7% vs. 8%) for TVS and laparoscopy respectively ( $p < 0.05$ ). This was agreed with the conclusion of Yong et al., (2013) that TVS is a major means for diagnosing ovarian lesions such as ovarian cysts, endometrioma, benign cystoma and teratoma <sup>8</sup>.

By application of a statistical test, kappa test, to estimate the agreement of TVS to laparoscopy in evaluating adolescents CPP, it was found that there is a good agreement between both tools ( $kappa = 0.67$ ) (Table 5). This result is comparable to Seema et al 2013 who found good agreement ( $kappa = 0.71$ ) between ultrasound and laparoscopy in their study on 110 cases of 18-50 years old with CPP<sup>7</sup>.

## **Conclusion**

Tubo- ovarian masses, endometriosis, ovarian cysts, adenomyosis and adhesions are the most frequent findings encountered in adolescents with CPP. Good agreement was present between TVS and laparoscopic finding however, laparoscopy is considered as a gold standard tool in evaluating adolescent CPP because of higher sensitivity and negative predictive value indicating its superiority in diagnosis and management.

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