Abdominal Pain in the Adolescent Female - Gynecologic Concerns

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Disclosures

The presenters have no disclosures to report.

Learning Objectives

• The participant will be able to:
  – explain the common causes of gynecologic reasons for abdominal pain in the adolescent female.
  – identify several differential diagnoses of gynecologic reasons for abdominal pain in the adolescent female.
  – restate common diagnostic findings of gynecologic causes of abdominal pain in the adolescent female.

Overview

• Incidence
• Definitions
• Adolescent History
• Gynecologic Examination
• Pelvic Pain
  – Differential Diagnosis
  – Gynecologic**
  – Non gynecologic
• Diagnostic Considerations

• Gynecologic**
  – Ectopic Pregnancy
  – Pelvic Inflammatory Disease
  – Dysmenorrhea
  – Uterovaginal Anomalies
  • Obstructive
  • Nonobstructive
  – Ovarian Masses
  • Benign
  • Malignant
  – Adnexal Torsion

Incidence and Diagnostic Challenges

• Abdominal and pelvic pain are the most common reason female adolescents present to primary care/gynecology provider and to the emergency department
• Chronic abdominal pain (present at least 2 months) is common in pediatric patients – up to 18%
• Abdominal pain can be classified as organic or functional
  – Most (up to 90%) of adolescent females have no clear identifiable cause for abdominal pain → diagnosis functional or recurrent abdominal pain

Pelvic Pain

Acute
  – Pain in lower abdomen or pelvis
  – Present < 3 months
  – Presenting symptoms can be nonspecific
  – Clinical presentation can vary widely
  – Urgent etiologies
    • Ectopic pregnancy, ruptured ovarian cyst, ovarian torsion, PID, appendicitis

Chronic
  • ≥ 3 months
  • Gynecologic considerations
  • Non-gynecologic considerations
  • Up to 1/3 of women presenting with chronic pelvic pain will have no diagnosis after extensive testing
History: Gather data systematically
• History of Presenting Illness (HPI)
• Review of Systems (ROS)
• Menstrual history
• Medications
• Past Medical History (PMH)
  – Gynecologic, Obstetric
  – Abdominal/gynecologic surgeries
  – Chronic illness
• Family Medical History (FMH)
• Social History (SH)
  – Comprehensive psychosocial history
  – Confidential sexual history

HPI: Abdominal Pain
• Onset: gradual or sudden
  – May be subtle
• Location
  – Localized or diffuse
• Duration
  – Acute/chronic
• Characteristics
  – Often vary

Review of Systems (ROS)

Comprehensive
• Gastro-Intestinal
• Genito-Urinary
• Musculo-Skeletal

Focused
• Fever
• Pain related to menses/sexual activity
• Vaginal discharge
• Vaginal bleeding
• Dysuria
• Pubertal changes
• Menstrual history

Adolescent History Considerations
• Pubertal events
• Timing
• Menstrual history
  – Menarche, LMP
  – Cycle, duration
    – First day of cycle to first day of cycle
  – Pain
    – Catamenial conditions
      – Headaches, pre-menstrual symptoms
  – Flow
    – Amount: #pads/tampons
    – Characteristics: flooding, clots

Confidential Care
• PMH
• Obstetric history
• Contraception history
• Comprehensive psychosocial history
• HEADDSSS assessment
• Sexual history

HEADDSSS Assessment
• Home
• Education/Eating
• Activities
• Drug and alcohol/tobacco
• Depression
• Suicidality
• Sexuality
• Safety

Comprehensive Social History
• Sexual history
  – Sexual orientation, current relationship
  – Sexual activity: previous and current, # partners**, early coital debut**
    – Previous STI*, exposure, current partner symptoms
    – Use of condoms, recent unprotected coitus**
• Use of contraceptive devices
  – IUD* (hormonal/copper)
• Smoking*

* Risk factors (ectopic pregnancy)  **Pelvic Inflammatory Disease (PID)
Physical Examination

Inspection

- Vital signs, growth charts
  - Unexplained fever
  - Involuntary weight loss
- Sexual Maturity Rating
- General appearance
  - Facial expression
- Body positioning
  - Restlessness
  - Immobility, knees drawn up
- External signs of trauma/abuse

Palpation

- Note involuntary guarding, rebound tenderness, lower quadrant and suprapubic location of pain
- If patient unable to locate point of maximal pain – perform valsava
- Distinguish from abdominal wall pain
  - Carnett’s sign: pain increases with contraction of abdominal wall while tender area is palpated

Adolescent Considerations for Pelvic Exam

- Confidential Care
- Trauma Informed Care
- Validity and reliability of pelvic exam
  - Reports of poor inter-rater reliability
  - Low sensitivity of detecting adnexal mass
- CDC recommendation: low threshold for treating PID

Pelvic Exam

- External exam only
  - Inspection: Tanner stage/SMR, discharge, lesions, infestation
- External and bimanual exam
  - Vaginal NAAT testing
- Speculum and bimanual exam
  - Speculum size/type
  - Lubrication
  - Speculum insertion: position of OS
  - Bimanual exam: CMT/adnexal tenderness

Adolescent Considerations
Does Patient Need a Pelvic Exam?

Type of Exam
- Speculum exam
- Bimanual exam
  - With/without speculum

Screening indicated
- PAP screening
- STI cultures

Primary Care Diagnostic Considerations

- Ectopic Pregnancy
- Pelvic Inflammatory Disease (PID)
- Endometritis
- Dysmenorrhea

Urgent Considerations

Life-threatening
- Ectopic pregnancy
- Ruptured ovarian cyst

Fertility-threatening
- PID
- Ovarian torsion
Onset/Timing of Pain

- Cyclic premenstrual pain or onset soon after menses begins lasting first few days of period – can be severe
  - Dysmenorrhea
- Sudden onset 6-8 weeks after LMP
  - Ectopic Pregnancy
- New onset associated with menses or coitus
  - PID, uterine fibroids
- Dyspareunia with post-coital bleeding
  - PID
- Post-partum associated with prolonged labor, C-section or ruptured membranes
  - Endometritis

Characteristics of Pain

- Constant, cramping; may be exacerbated with walking or sexual activity
  - PID
- Uterine cramping, vaginal bleeding
  - Ectopic pregnancy
  - Endometritis
- Sudden severe pain, nausea and vomiting
  - Ovarian torsion

Aggravating Factors

- Dyspareunia – pain with sexual activity?
  
  Consider Pelvic Inflammatory Disease

- Pain with movement?
  
  Include Consideration for Peritonitis

Risk Factors

- Pelvic Inflammatory Disease
  - Age (> 35 years old)
  - History of Sexually Transmitted Infection, pelvic surgery (tubal ligation)
  - Ethnicity (African Americans)
  - Smoking
  - Adolescent ectropion
  - Presence of cervicitis and/or Bacterial Vaginosis
  - Previous history of PID
  - IUD placement in past 3 weeks
  - Ethnicity (African American)
  - Sexual health risk behaviors
    - Unprotected sexual activity
    - Frequent change in partners/short duration relationships
    - Sexual activity during menses
    - Sexual activity during use of D&A

Physical Exam: Location of Tenderness

<table>
<thead>
<tr>
<th>Location</th>
<th>Consider</th>
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<tbody>
<tr>
<td>Suprapubic</td>
<td>Urinary Tract Infection (UTI), Cystitis</td>
</tr>
<tr>
<td>Lower abdomen</td>
<td>Ovarian cyst, PID, Endometritis/eilitis</td>
</tr>
<tr>
<td>Painful Pelvic Exam</td>
<td>Ectopic Pregnancy</td>
</tr>
<tr>
<td>Pelvic tenderness</td>
<td>Pelvic Inflammatory Disease (PID), Endometritis</td>
</tr>
<tr>
<td>CMT, adnexal</td>
<td>Pelvic Inflammatory Disease (PID), Endometritis</td>
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</table>

Abdominal Examination

- Breath sounds
- Murphy’s sign
  - “Sausage”
- Hemias
- Breath sounds
  - Spleen edge
- Pain at McBurney’s point
  - Torsion
- Constipation
  - Rovsing’s sign

Breath sounds
Adolescent Variation: Ectropion

- Squamo-columnar Junction (SCJ)
- Circular area at the cervical os where mucous-producing lining of cervical canal is ectopic as compared to pink, smooth skin of cervix in adults

Likelihood Ratios and Posttest Probability

- Pelvic Inflammatory Disease
  - Presence
    - Purulent endocervical discharge
    - Abdominal rebound tenderness
  - Absence
    - CMT
    - Adnexal tenderness

- Ectopic Pregnancy
  - Noncystic extraovarian adnexal mass on USN

- Appendicitis
  - Right lower quadrant pain
  - Migration of pain from periumbilical to right lower abdominal quadrant
  - Fever, Psoas sign

Red Flags for Urgent Consideration

- Early ectopic pregnancy
  - Significant unilateral adnexal pain, LMP > 6 weeks ago
  - Free fluid peritoneal cavity

- Endometritis
  - Frank uterine bleeding; postpartum/post-abortion (>7 days)
  - Fever or significant abdominal pain; postpartum or post-abortion

- Malignancy
  - Fixed hard or nodular uterus or ovaries on bimanual exam

Primary Imaging Modalities

- Plain films
- Ultrasound (USN)
  - Transvaginal
- Computed Tomography (CT) Scan

Consider sensitivity/specificity, risk/benefit to patient, rapidity of diagnosis, cost

Ultrasound (USN)

- Advantages
  - Radiation/contrast free
  - Portable
  - Easy
  - Rapid preliminary results
Best Test Imaging Method

Ultrasound
- Pregnancy
  - Intrauterine
  - Ectopic
- Pelvic Disease
  - Ovarian neoplasm
  - Ovarian torsion
  - Fibroids
  - Pelvic abscess

Other Tests
- CT scan
  - Further evaluation due to diagnostic uncertainty
  - Radiographic films: not useful
- Laparoscopy
  - Diagnosis not clear after less invasive testing
  - Life-threatening or organ threatening
  - Endometriosis, PID

Pregnancy and Pelvic Pain

- USN immediately to evaluate for ectopic pregnancy if βHCG levels are detected
- Positive serum βHCG
  - Gestational sac visible βHCG level > 1500 mIU/mL
  - One half women with ectopic pregnancy βHCG level < 2000 mIU/mL
- Challenge evaluating early pregnancy vs ectopic pregnancy
  - Pseudo sac mimics intrauterine pregnancy in 5-10% ectopic pregnancies
  - Single echogenic ring
  - Gestational sac
  - Double echogenic ring

Outpatient Evaluation

- If βHCG levels are decreasing, may indicate resolving pregnancy
  - Decline by 50-66% every 3 days
  - Observe and obtain serial βHCG levels
  - Follow until levels are undetectable

Pelvic Inflammatory Disease (PID)

- Clinical Diagnosis
  - Not diagnosis of exclusion
  - Must meet clinical criteria
  - Low threshold for clinical diagnosis
    - 65-90% sensitivity

  - 1 of the following enhances criteria
    - T > 101, abnormal cervical mucopurulent discharge
    - Increased WBC’s on wet prep, increased ESR/CRP
  - Most specific criteria
    - Transvaginal USN, laparoscopy, biopsy

STI Testing

Nucleic Acid Amplification Tests (NAAT)

- Detect DNA and RNA sequences in chlamydia and gonorrhea
- Recommended by CDC
- High sensitivity and specificity; comparable to cervical cultures via DNP probe
  - Vaginal swab
  - Urine sample

Other Diagnostic Testing Considerations

- Serum βHCG / Urine βHCG
  - All child-bearing age adolescents/women
- Wet prep/KOH
  - Bacterial Vaginosis is linked to PID
- CBC/HCT, WBC’s
  - Bleeding, infection
- Urinalysis
  - Leucocytes
  - Pyuria-culture
Uterovaginal Anomalies

**OBSTRUCTION**
- Imperforate hymen and variants
- Fusion Anomalies
  - TRANSVERSE: Failure of upper and lower vaginal fusion,
  - VERTICAL: Imperfect fusion of paired Müllerian structures

**ABSENCE**
- Atresia
- Androgen Insensitivity

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**Embryology**

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**Development - What Goes Wrong?**

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**Imperforate Hymen**
Imperforate Hymen Can Be Problematic

Normal Variations of Hymen

Imperforate Hymen

Presenting Symptoms

- Adolescence
  - At the time of puberty, symptoms may include amenorrhea, cyclic abdominal pain, and an abdominal mass secondary to hematocolpos or hydrometrocolpos
  - Introital examination may show a bulging membrane with bluish discoloration behind it due to hematocolpos.

Case – Imperforate Hymen

What Goes Wrong?

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Transverse Vaginal Septum

What Goes Wrong?

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Müllerian Malfusion

- If there is no obstruction, these are usually asymptomatic and found serendipitously.
- If anatomy asymmetrical, get renal ultrasound.
- Counseling regarding high risk pregnancy in order

Fusion Failure + Obstruction = Symptoms

Herlyn-Werner-Wunderlich or OHVIRA Syndrome (Obstructed hemi-vagina ipsilateral renal agenesis)
Herlyn-Werner-Wunderlich or OHVIRA Syndrome

Development - What Goes Wrong?

Obstruction
- Imperforate hymen and variants
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Absence
- Atresia
- Androgen Insensitivity

Absence of Vagina/Uterus

ATRESIA
- Mayer-Rokitansky-Kuster-Hauser
  - Normal female (XX) with Müllerian agenesis
  - No vagina or short dimple
  - Variable fallopian tube and rarely uterine cavity
  - No cervix
  - Present with primary amenorrhea
  - Normal ovaries
  - Renal anomalies (agenesis) common
  - Rare skeletal issues

©2017 Herlyn-Werner-Wunderlich or OHVIRA Syndrome

©2017 Development - What Goes Wrong?

©2017 Absence of Vagina/Uterus
Physiologic Phenomenon

Ovarian Cysts

Hemorrhagic Cyst in 6 weeks

Indications for Surgical Intervention in Children with Ovarian Mass

- Persistent symptoms
- Clinical suspicion of torsion
- Signs and symptoms of complications such as hydronephrosis
- Imaging characteristic suggestive of neoplasm (complex/solid mass, metastasis, ascites)
- Positive tumor markers
- Unclear origin of mass
- Failure of cyst resolution or cyst growth in serial imaging
- Large masses with complex imaging
- Rapid virilization or estrogenization
- Precocious puberty
### Serum Tumor Markers Elevated in Ovarian Neoplasms

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<thead>
<tr>
<th>Tumor Markers</th>
<th>Associated Neoplasm</th>
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<tbody>
<tr>
<td>Alpha fetoprotein</td>
<td>immature teratoma, Sertoli-Leydig cell tumors, yolk sac tumors, embryonal carcinoma</td>
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<tr>
<td>β-Human chorionic gonadotropin (βHCG)</td>
<td>dysgerminoma, embryonal carcinoma, choriocarcinoma</td>
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<td>Lactate dehydrogenase (LDH)</td>
<td>immature teratoma</td>
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<tr>
<td>CA-125</td>
<td>epithelial tumors</td>
</tr>
<tr>
<td>CA-19-9</td>
<td>epithelial tumors</td>
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<tr>
<td>Carcinoembryonic antigen (CEA)</td>
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<tr>
<td>Testosterone</td>
<td>Sertoli-Leydig tumors</td>
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<tr>
<td>Estradiol</td>
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### Classification of Ovarian Masses

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<th>Sex Cord - Stromal</th>
<th>Metastasis to Ovaries</th>
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**SEER Cancer Stat Facts: Ovarian Cancer. National Cancer Institute.**

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<tr>
<th>Percent of New Cases</th>
<th>Age Group</th>
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<tbody>
<tr>
<td>13.3%</td>
<td>&lt;20</td>
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<tr>
<td>6.2%</td>
<td>20-34</td>
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<tr>
<td>3.8%</td>
<td>35-44</td>
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<tr>
<td>6.9%</td>
<td>45-54</td>
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<tr>
<td>18.0%</td>
<td>55-64</td>
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<tr>
<td>24.2%</td>
<td>65-74</td>
</tr>
<tr>
<td>21.3%</td>
<td>75-84</td>
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<td>&gt;84</td>
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**FIGO and COG**

**Clinical Pathologic Staging of Ovarian Germ Cell Tumors:**

- **Stage I:** Limited to the ovary (peritoneal evaluation should be negative); no clinical, radiographic, or histologic evidence of disease in the ovary, contralateral ovary, uterine tube, fallopian tube, or peritoneum; tumor has not spread to more than one ovary, but unilocular cystic teratoma has not been excluded; tumor has not invaded the uterine wall, mesosalpinx, or mesovarium.
- **Stage II:** Clinical or radiographic or histologic evidence of disease in the ovary, contralateral ovary, uterine tube, fallopian tube, or peritoneum; tumor has not invaded the uterine wall, mesosalpinx, or mesovarium.
- **Stage III:** Lymph node involvement (metastatic nodules) or gross residual or bulky non-contiguous visceral involvement (omentum, intestine, bladder), peritoneal evaluation positive for malignancy.
- **Stage IV:** Distant metastasis, including liver.
Mature Cystic Teratoma

- Tumor from other side
- Peeled off ovary to preserve gonad

Normal Right Ovary

Rolled Up Ovary, Sewn, Closed