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# The Clinical differentiation between acute appendicitis and right overian cyst

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## Abstract

Evaluating female patients with severe lower abdominal pain in the casualty department presents a significant diagnostic challenge due to the presence of multiple pelvic organs with overlapping symptoms. Conditions such as pelvic inflammatory disease, endometriosis, ovarian cysts, urinary tract infections, and acute appendicitis often mimic one another. Among these, differentiating right ovarian cysts from acute appendicitis is particularly difficult because both can present with similar right lower abdominal pain.This study aimed to differentiate them clinically based on history, clinical examination, and laboratory studies .The history of presentation is based on an analysis of pain (including severity, duration, time and location of onset, nature of pain, and associated symptoms such as nausea or vomiting), as well as factors like loss of appetite, abdominal distension, fever, frequency of urination, vaginal bleeding, irregular menstrual cycles, hormonal drug history, trauma to the abdomen, gynecological history, and surgical history. Physical examination relies on inspection, palpation, percussion, and auscultation**.** Our investigation indicates that acute appendicitis can induce abrupt and strong pain in the lower abdomen. A pain starts in the middle of the abdomen, around the belly button, and typically in the right iliac fossa. It could come and go for a few hours, and the pain moves to the lower right side of the abdomen. will lead to nausea and vomiting, the nausea goes away after a few hours, and the fever is caused by the immune system. (feel sick in general). This is because the appendix is bothering the colon next to it .Symptoms of ovarian cysts that don't involve speaking include pelvic pain, a feeling of fullness or pressure in the abdomen, bloating, changes in bowel habits (like constipation or trouble going to the bathroom), urinary problems (like needing to urinate often or having trouble emptying the bladder), and in some cases, problems with fertility or irregular periods. Yet when these symptoms change, they get worse when a cyst gets bigger, breaks, or twists.To tell the difference between acute appendicitis and a right ovarian cyst, you need to do a full history, physical exam, blood testing, and imaging studies. For the safety of the patient, it is important to resuscitate them quickly in the emergency room using intravenous fluids, blood transfusions, antibiotics, and bladder catheterization before surgery**.**

**How to cite**

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## Introduction:

Fifty patients aged 12 to 40 were enrolled in our study from April 2022 to April 2024 at two hospitals in Thi-Qar city. The study aims to differentiate between surgical cases of right ovarian cysts and acute appendicitis presenting with distinct symptoms in the casualty unit by:

- History.
- physical examination.
- laboratory tests.

indicate that pain is a prevalent symptom with numerous etiologies, including appendicitis, (the most frequent surgical cause), gynecological disorders such as (ovarian cyst disease and ectopic pregnancy); ureteric colic; Crohn's disease; and diverticulitis. We should consult a doctor as soon as possible to find out what is causing symptoms like fever or severe pain and to receive the right treatment.This is because the causes might range from mild to deadly [(1)], the usual reasons Common Causes:

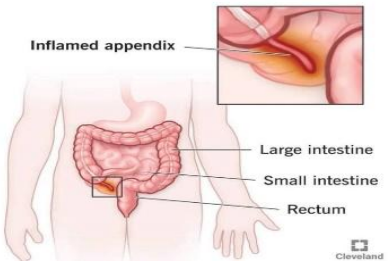
• Appendicitis: An inflamed appendix is a common and serious cause of RIF pain (Figure 1) .

• Gynecological Problems:In women,RIF pain can be caused by ovarian cyst rupture,pelvic inflammatory disease,or an ectopic pregnancy(Anectopic pregnancy occurs when a pregnancy happens outside of the uterus[(2)].This is a hazardous condition that needs immediate medical attention).

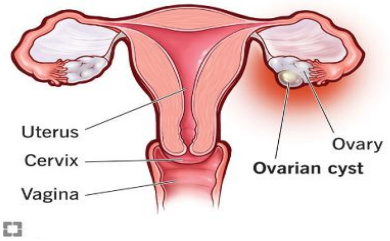
• Ureteric pain: Pain caused by a stone in the ureter [3].
• Inflamed Meckel's Diverticulum: A birth defect that causes a tiny pouch on the small intestine to enlarge.
• Diverticulitis: Inflammation of small pouches in the digestive tract can cause pain in the lower abdomen.
• Crohn's disease: This inflammatory bowel disease usually affects the terminal ileum and can be very painful.
Other Possible Reasons [4]:

- Constipation is a typical reason for intestinal pain, especially in the lower right abdomen.

• UTIs (urinary tract infections): An infection of the kidneys or bladder can sometimes produce pain in the lower abdomen[5]. Ovarian cysts can form at any age, but they are more prevalent in women who are in their reproductive years. Ovarian cysts are also becoming more common in women who have started menstruating, as their bodies produce more hormones. The simple cyst is the most common type of cyst and can happen at any age(Figure 2)[6]. Ovarian lesions that are completely solid or mixed cystic ,and solid have a higher chance of being cancerous. A thorough medical history must be obtained at each appointment, focusing on gynecological history, family history, and physical examination, although most ovarian cysts are incidentally identified during a physical examination or pelvic imaging [7].




**( Figure 1) Normal postion of appendix**




**( Figure 2) normal postion of overies and cyst**

## Patients and Methods:

This study encompassed 50 female patients hospitalized to emergency departments in two hospitals in Thi-Qar City, presenting with pain in the lower abdomen or right iliac fossa, aged between 12 and 40 years, from April 2022 to April 2024, adhering to the following procedures:
• A history.
• A physical examination.
• Laboratory tests.
• Imaging .

## History This encompasses

- pain that is generally dull, severe, or colicky, nonspecific to the periumbilical region, and may be related with menstruation (cyclical) or not Acute severe colicky pain or discomfort that progressively intensifies and persists, accompanied with anorexia, nausea, vomiting, and rapid relief followed by generalized pain (peritoneal symptoms).Pain is confined to the pelvis or the right adnexal region, or it radiates to the right iliac fossa (RIF) or extend to the posterior or femoral region. The discomfort may intensify during ovulation or menstruation, both of which pertain to the menstrual cycle .
- The gynecological history include menstrual disorders like amenorrhea, menorrhagia, dysmenorrhea, infertility, and prior cysts.
- The urinary system is impacted. These symptoms may be associated with frequent urination, pyuria, and dysuria.

• Gastrointestinal system, bowel manifestations (diarrhea, constipation) .
• Hormonal medications (Medical History).
• Surgical history: any prior surgical procedures performed.
• Systemic history Moderate fever ,Hirsutism occurs when the body produces an excess of masculinizing hormones, resulting in abnormal hair growth in atypical areas on the face and body .
• familial history

## A physical examination encompasses:

The abdominal examination entails visual evaluation for general condition and for prior scars and palpated of the abdomen to evaluate superficial and deep localized soreness whether localized or generalized in the lower abdomen. Amass maybe felt if it is(substantial ,marked by movement, cystic characteristics, detachment from the uterus, solid components, irregularity, thick septations ), or signs of ascites. The patient will exhibit soreness, guarding ,and rebound tenderness at McBurney's point or possesses distinctive symbols: Rovsing's sign refers to the elicitation of pain in the right lower quadrant of the abdomen upon palpation of the left lower quadrant .Psoas sign :discomfort in the right hip during extension if the appendix is positioned retrocecal .Obturator sign (indicates pain during internal rotation of a flexed hip in the presence of a pelvic appendix) .Digital rectal examination (suggesting soreness in the right rectal wall if a pelvic appendix is present). Avaginal examination for cervical pain may suggest the rupture or torsion of a cyst. Systemic symptoms encompassed overall appearance and vital indicators, including pulse rate, blood pressure, breathing rate, and temperature. Typically afebrile unless complications arise (unless there is hemorrhage or arupture),and pelvic examination by bimanual technique to identify palpable adnexal cysts or neoplasms.

## Laboratory analyses:

• Volume of the packed cells
• Complete Blood Count (leukocytosis with neutrophilia)
• General Urinalysis
• General Stool Examination
• Chemical investigations (B. Urea, S. Creatinine, TSB, CA125)
• Hormonal assessments (BHCG, TSH, and LH)
• To assess for pelvic inflammatory disease, endocervical swabs should be collected.

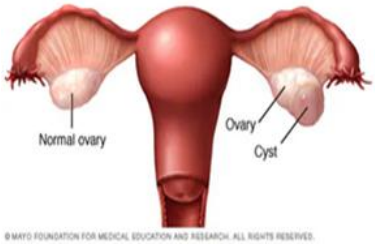
**Imaging tests**: (abdominal X-ray, erect, supine, electrocardiogram)

Subsequently, we initiate cautious management for acute appendicitis for three hours before to the procedure.The majority of those diagnosed with appendicitis require antibiotic treatment. Antibiotics are frequently recommended even in the absence of an illness. Prior to surgery, the administration of antibiotics
is typically employed to prevent infection.In cases of early and mild appendicitis depending on Alvarado score(Table 1), a healthcare provider may opt for a conservative approach, monitoring the condition to determine if it resolves independently with antibiotic treatment.Individuals with risk factors that compromise surgical safety may prefer this procedure.However, physicians seldom recommend it, as appendicitis often recurs if the appendix is not excised.This may result in chronic appendicitis .We can administer an intravenous ceftriaxone vial of 1 gram, metronidazole 500 milligrams, provide intravenous hydration, and offer intravenous analgesia, thereafter preparing her for surgery.

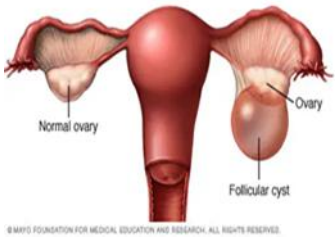
In the overian cyst,the patient's age, overall health, cyst size, and symptoms will all influence the treatment of an ovarian cyst. In the absence of critical signals, the physician will adopt a watchful (waiting approach)(Figure 3,4). We can typically defer and reassess the cyst after many months to determine if it resolves. In the absence of symptoms, this option is often available to individuals of any age. An ultrasound can also be obtained, and a consultation with a gynecological surgeon is advisable. These are the types of cysts:

- Cystadenomas are cysts that develop on the outside of the ovary. They may contain either a thin, aqueous fluid or a thicker, mucous-like substance.
- Teratomas are frequently known as dermoid cysts.
- Dermoid cysts contain cells analogous to those found in hair, teeth, or skin. They possess a smooth, rubbery texture and are non-malignant.
- Endometriomas. These cysts contain menstrual blood and typically indicate the presence of endometriosis.These cysts may result in the onset of ovarian cancer. Ovarian cancer cysts are solid masses composed of cancerous cells.This form of cyst can occur at any age, though it is more prevalent post-menopause.

In the presence of critical signs (such as ruptures and torsions)(Figure 5) necessitating immediate medical intervention, the following symptoms of shock may be observed: lethargy, hypotension, tachycardia, tenderness, and abdominal guarding. We initiated ABC to address the patient's condition and conducted certain tests (CXR, ECG, and US).We prepared packed red blood cells and plasma prior to the emergency surgery.




**(Figure 3) overian cyst**




**( Figure 4) folicular cyst**

**( Figure 5) torsion overian cyst**

## RESULTS:

**(Table 1) Alvarado score :**

| | |
|---|---|
| **Migratory right iliac fossa pain** | **1 point** |
| **Anorexia** | **1 point** |
| **Nausea and vomiting** | **1 point** |
| **Right iliac fossa tenderness** | **2 points** |
| **Rebound abdominal tenderness** | **1 point** |
| **Fever** | **1 point** |

| | |
|---|---|
| **High white blood cell count (leukocytosis)** | **2 points** |
| **Shift to left (segmented neutrophils)** | **1 point** |

Total score 10 points

The Alvarado Score is a clinical scoring system used to assist in the diagnosis of acute appendicitis. It is based on symptoms, clinical signs, and laboratory findings, each assigned a specific score according to their diagnostic value. The total possible score is 10 points.

Symptoms (3 points): Migratory right iliac fossa pain, anorexia, and nausea or vomiting.

Signs (3 points): Tenderness and rebound tenderness in the right iliac fossa, and fever.

Laboratory findings (4 points): Leukocytosis and a shift to the left (increase in segmented neutrophils).

Interpretation of the total score:

1–4 points: Appendicitis is unlikely; other causes of abdominal pain should be considered.

5–6 points: Appendicitis is possible; observation and further investigation are advised.

7–10 points: Appendicitis is very likely; surgical consultation or intervention is recommended.

The Alvarado Score helps clinicians make faster, evidence-based decisions, especially in emergency settings, and reduces unnecessary surgical procedures.

**(Table 2) features :**

| **Features** | **Acute appendicitis** | **Rt.Overian cyst** |
|---|---|---|
| **Onset of pain** | Classically migratory (periumbilical → RIF) | Sudden(torsion/rupture) or gradual (cyst growth) |
| **Duration of pain** | 3-6 hr | 5-7 days |
| **Nature of pain** | colicky | Dull |
| **Site of pain** | Mcburny point | Lowerabdomineor pelvic |
| **Shifting** | To RIF Region | To back |
| **Related to menstual cycle** | No relation | Oftenrelated(ovulation/menstruation) |
| **GIT Symptums** | Anorexia,nausea,vomiting common | Minimal(unlesstorsion:vomiting) |
| **Urinary system** | Pyurea ,freqauncy | Anurea |
| **Gyneacological syst.** | none | Menstrualirregularity,adnexalmass, infertility |
| **Systmic signs** | FeverCommon(low-grade) | Rare(unless complicated) |
| **Surgical history** | not has prevouse scar of appendecectomy | Has prevouse scar of appendecectomy,with or without to the gyneacological scar |

**(Table 3) examinations:**

| **Examinations** | **Acute appendicitis** | **Rt.Overian cyst** |
|---|---|---|
| **Abdominal examintion** | Tendernss in Rt.Iliac fossa | Pelivc ,cervical tendernss |
| **Pelvic examiation** | Usually normal | Adnexaltenderness/mass ,cervicaltendernss |
| **Rectal exanimtion** | Tenderness at RT.rectal wall | May be normal |
| **Systemic examintion** | Generalwell, : Low-grade fever, mild tachycardia, leukocytosis | Unwell,febrile,tachcardia, , leukocytosis,if rapture |
| **Spacial signs** | Rovsing's,psoas,obturator positive Dunphy's sign. | normal |

(Table 2) , (Table 3) In acute appendicitis, physical examination typically reveals the patient to be afebrile with a mild increase in white blood cell count. In contrast, a cyst may present as asymptomatic or symptomatic, exhibiting symptoms such as fatigue, tachycardia, fever, tachypnea, or shock due to rupture. Additionally, tenderness is more pronounced in the right iliac fossa in acute appendicitis, accompanied by positive special signs, whereas pelvic or cervical tenderness is more prevalent in ovarian cysts, depending on their location. A mass may be detected in this region;conversely, rectal examination shows increased tenderness at the rectal wall in acute appendicitis, while it remains negligible in ovarian cysts.

## Laberotory investigation:

**(Table 4) lab investagations**

| **Lab investagtions** | **Acute appendicitis** | **Rt.Overian cyst** |
|---|---|---|
| **Pack cell volume** | Normal | decrease |
| **CBC** | Usually normal, mild leukocytosis with neutrophilia, | normal or mild elevated |
| **GUE** | mild pyuria/ freqauncy | hematuria |

| | | |
|---|---|---|
| **Hormonal testing (β-hCG)** | Normal | Normal or elevated in pregnancy |
| **Pregnancy test in urine** | None | +ve or –ve |

- Measure the packed cell volume, hematocrit, and hemoglobin levels to check for anemia induced by sudden bleeding. which demonstrate a decrease in rupture cyst, torsion, and a normal state in acute appendicitis.
-CBC in Appendicitis: leukocytosis with neutrophilia and C-reactive protein count, only if complex, while normal or mildly elevated in the cyst unless torsion or rupture, sepsis (peritonitis) which elevated.
-β-hCG to rule out pregnancy, which is high and typical in non-pregnant individuals. An ectopic pregnancy is one of the problems that can happen during pregnancy that can seem like an ovarian cyst. To figure out what other tests are needed to check on an ovarian cyst, you need to know if the person is pregnant.
-Chemical test.
• A CA125 blood test looks for a protein that is typically present in women with ovarian cancer. A blood level of less than 35U/ml is normal. In 85% of people with epithelial ovarian cancer, the CA125 levels are higher than normal. It is crucial to acknowledge that CA125 levels are not diagnostic, as they may also be high in noncancerous disorders such as endometriosis, uterine fibroids, and pelvic inflammatory disease.
• TSH may be Hypothyroidism.
- GUE, Pregnancy test, pyuria,( frequency greater see A. appendicitis than cyst ),while hematuria higher in cyst indact rupture.

## Imaging test:

Imaging test: Abdominal XR (erect, supine) may indicate a tiny, fluid-filled cyst, numerous bowel gasses, and a dilated colon

## Discussion

This study is the first to properly evaluate the etiology of right-sided lower abdomen discomfort in 50 patients aged 12 to 40 years, delineating the differences among them[8]. Acute appendicitis and ovarian cysts were the predominant diagnoses. About half of patients with appendicitis show the usual signs and symptoms. Adults and pregnant women may not show the usual signs and symptoms as often. The ache in the stomach started in the midsection, near the belly button. It could stay in one place or move after few hours[10]. Eventually, the discomfort gets worse, and nausea and vomiting start to happen. A few hours later, the nausea goes away, and the discomfort moves to the lower right abdomen. The agony becomes worse and more focused. This condition is linked to moderate leucocytosis, which may occur with or without pyuria and diarrhea[12].

In case is known as chronic appendicitis, characterized by intermittent minor inflammation that persists for an extended period. It could be a long-term problem like inflammatory bowel disease or a small case of too many germs[13]. If chronic inflammation lasts a long period, it can create lymphoid hyperplasia or even scar tissue in the appendix. Such an issue may go unnoticed because the symptoms don't get worse like they do in acute appendicitis. But all kinds of appendicitis are fatal. If you have chronic abdominal pain and don't know why, see a doctor and treat it the same way[15].

We can also require medicine to help with the pain. Inflammation makes the appendix enlarge, and when it does, it might break, A burst appendix is a medical emergency. It moves bacteria from inside the bowels to the rest of the abdomen[17]. This infection, known as peritonitis, can spread to the bloodstream and lead to serious complications, including sepsis, which can be fatal. Ovarian cysts are formations filled with fluid that can be simple or complicated. They are often found during physical examinations, usually by accident. Most ovarian cysts in women of reproductive age are functional and benign, and they don't cause any symptoms. Cysts that are less than 10 cm in size are normally benign, no matter how old the patient is[19]. They can cause pain or pressure on one side of the lower abdomen. The pain can come and go or be constant, and it can be strong or dull. Because of this, she can be watched carefully.

If a cyst persists over multiple menstrual cycles, it is improbable that it is a functioning cyst, necessitating additional evaluation[23]. Ovarian cysts can cause problems like ruptured ovarian cysts or torsion, which are both considered gynecological emergencies. The patient may experience sudden, severe pain, possibly accompanied by nausea and vomiting. The menstrual cycle may become erratic, and abnormal vaginal bleeding may develop. Pelvic discomfort, hemorrhage, malaise, fever, tachycardia, leukocytosis, hematuria, or anuria necessitate immediate intervention to prevent elevated morbidity and mortality[26]. Adnexal masses, cystadenomas, dermoid cysts (teratomas), and ovarian cancer cysts are prevalent, with 20% of women experiencing at least one pelvic mass over their lifetime. The care is dictated by the lesion's features, the patient's age, and the malignancy risk factors[30].

## Conclusion

To tell the difference between acute appendicitis and a right ovarian cyst, you need to do a full history, physical exam, blood testing, and imaging studies. The goal is to ensure accurate diagnosis and management of these cases to mitigate life-threatening complications in the emergency unit resulting from false-positive diagnoses and to facilitate timely treatment of suspected appendicitis, thereby reducing the spread of bacterial infection both pre- and intraoperatively, particularly in complex ovarian cysts. For the safety of the patient, it is important to resuscitate them quickly in the emergency room using intravenous fluids, blood transfusions, antibiotics, and bladder catheterization before surgery.

## Recommendations

A thorough clinical assessment including history, physical examination, laboratory tests, and imaging should be performed for all female patients with lower abdominal pain to ensure accurate diagnosis. The Alvarado score can aid in distinguishing appendicitis from ovarian cysts. Early use of ultrasound or CT imaging is advised when the diagnosis is uncertain. Prompt resuscitation and supportive care are essential before surgery. Close cooperation between surgeons and gynecologists is recommended to achieve timely and effective patient management.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