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Case Report

Adnexal and Ovarian Torsion in a Young Girl Managed by Mini-laparoscopy

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Abstract

Keyword:

Pediatric surgery; Obstetrics and gynecology; Laparoscopy

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A 6 -year-old girl attended the emergency department with left -sided abdominal pain and vomiting. Due to history and following examination, an ultrasound was requested which demonstrated a large complex midline mass. The most likely diagnosis was ovarian torsion, for which the patient underwent laparoscopy, detorsion and ovarian cystectomy and fixation to anterior abdominal wall. Although less common than in the adult population, it is important to consider ovarian torsion in children and adolescents. Presentation is usually with pain accompanied by vomiting and fever, although these symptoms are not always present. Current management is organ-sparing, with laparoscopy± cystectomy. We discuss the adaptations for this procedure with regard to the pediatric and adolescent population. Differences in the anatomy and physiology must lead to consideration for alterations in surgical technique and positioning to ensure the safest and best quality care for these young patients. **Summary:** Adnexal torsion, including ovarian torsion, is an uncommon but significant gynecological emergency in the pediatric population. It accounts for approximately 2.7% of all cases of acute abdominal pain in children. The condition is often challenging to diagnose due to its nonspecific clinical presentation, which may mimic other causes of acute abdominal or pelvic pain such as appendicitis, urinary tract infection, renal colic, or gastroenteritis. Sonographic findings in premenarchal girls under six years of age have been described as solid ovaries with homogeneous echogenicity, indicating the presence of normal ovarian parenchyma in the absence of cysts.

Background

Adnexal and Ovarian torsion represents a true surgical emergency. Prompt diagnosis is essential to ovarian salvage, and high clinical suspicion is important in this regard. Confounding the diagnosis in general are more commonly encountered abdominal complaints in the Emergency Department (ED) such as constipation, diarrhea, and urinary tract infections and more common surgical emergencies such as appendicitis.

Prompt diagnosis can be further complicated in low-risk populations such as young children. Adnexal and ovarian torsion can be an abdominal catastrophe for women, especially if ovarian salvage is not possible. Pathophysiological ramifications include ovarian loss, intra-abdominal infection, sepsis, and even death. The psychological impacts can also be profound [1, 2].

Early diagnosis and high clinical suspicion are keys to prompt identification and definitive surgical treatment of this diagnostic dilemma.

Ovarian torsion is defined as complete or partial twisting of the ovary on its ligamentous supply. This twisting ultimately compromises the ovarian circulation. **Adnexal torsion** refers to the twisting of the Fallopian tube along with the ovary. Ovarian or adnexal torsion is relatively rare in children, with an estimated incidence of 4.9 per 100,000 girls aged 1–20 years; however, it remains an important differential diagnosis in girls presenting with abdominal pain [1,2].

Ovarian torsion is more common in patients after menarche, but it can occur at any age—including in neonates and even in utero [2,6,7]. The majority of neonatal and antenatal cases are associated with ovarian cysts, which develop due to elevated maternal hormone levels and often resolve spontaneously postnatally [7]. In adolescents, ovarian torsion can occur even in the absence of an ovarian cyst [1]. Risk factors for ovarian torsion include ovarian masses or cysts, reproductive age, previous episodes of torsion, and pregnancy [1,6]. The pathophysiology involves twisting of the ovary and Fallopian tube around both the suspensory and ovarian ligaments. It has been hypothesized that elongation of the ovarian ligament in premenarchal girls may contribute to the risk of torsion [6]. Ovarian torsion is more commonly observed on the right side, likely due to the greater mobility of the cecum and ileum compared to the more fixed position of the sigmoid colon on the left, as well as a higher clinical suspicion of appendicitis prompting surgical exploration [3,4].

Prolonged torsion can result in vascular occlusion, hemorrhagic infarction, and eventual necrosis of the ovary. However, due to its dual blood supply and the possibility of partial or intermittent torsion, ovaries that appear necrotic at laparoscopy may still be viable and recover function post-detorsion [2,13].

Clinically, ovarian torsion most often presents as acute-onset, severe lower abdominal or pelvic pain, which may be intermittent. Associated symptoms can include nausea, vomiting, fever, and sometimes a palpable abdominal mass. Gastrointestinal or urinary symptoms may also occur, adding to the diagnostic challenge. No single symptom or clinical finding is definitive for excluding or confirming the diagnosis [5,6].

Premenarchal patients may present with nonspecific or atypical symptoms. In a study examining premenarchal girls with ovarian torsion, abdominal pain was reported in 92.3% of cases, and nausea and vomiting in 84.6%. On physical examination, abdominal tenderness was present in 64.1% of patients [1].

Case Presentation

A previously healthy six-year-old girl presented to our Emergency Department (ED) with a two-day history of fever and left lower abdominal quadrant pain, she diagnosed as acute gastroenteritis by a pediatrician. The symptoms progressed and became more severe and she was admitted to the ED by for further evaluation.

Upon presentation to the ED, the patient appeared ill and uncomfortable. She complained of constant pain not relieved with acetaminophen or ibuprofen. Her review of symptoms was positive for fever, one episode of vomiting, and abdominal pain. She was born full-term. She has two siblings who were healthy, and she had no ill contacts.

On physical exam, the patient's vital signs were within normal parameters for her age. Her oral temperature was 36.5◦C, heart rate of 90, blood pressure of 110/70, and respiratory rate of 18, and oxygen saturation was 100% on room air.

The patient's abdomen was slightly distended and tender in the left lower quadrant, pelvic, and suprapubic areas.

She had some involuntary guarding but no rebound tenderness, hepatosplenomegaly, or costovertebral angle tenderness. Pain was elicited specifically at the left inguinal ligament. Classic signs for appendicitis, including Rovsing's and Psoas signs, were absent. The remainder of the exam was normal including heart tones, lung sounds, capillary refill, and skin turgor. Her urine sample showed no protein, ketones, nitrites, or leukocyte esterase; the microscopic urine analysis showed 30–50 red blood cells with no white cells or bacteria. The patient's white blood count was elevated at 14.6 thousand/mm3 while hemoglobin, hematocrit, and platelets were within normal levels.

A basic chemistry panel was normal.

Computed tomography (CT) scan of the abdomen and pelvis with intravenous contrast demonstrated normal solid organs and normal bowel-gas pattern. A non-inflamed appendix was visualized. A complex loculated fluid collection within the left adnexa and associated pelvic free fluid were seen

(Video 1)

https://drive.google.com/file/d/1dz5TKprvuV8Y_vx2qJEMrviSZe2Cr4X5/view?usp=sharing

A follow-up abdominal ultrasound with Doppler performed, the left lower quadrant, revealed a significantly enlarged left ovary with preserved arterial flow. A preliminary diagnosis as torsion left ovarian cyst so a relevant consent done.

Exploratory Mini-laparoscopy used one port 5 mm for telescope 5 mm, and tow port 3 mm as secondary trocar in left and right iliac region demonstrated large left adnexal and ovarian cyst (6.5 cm × 5.9 cm × 4.7 cm) with the left adnexa twisted more than 360°

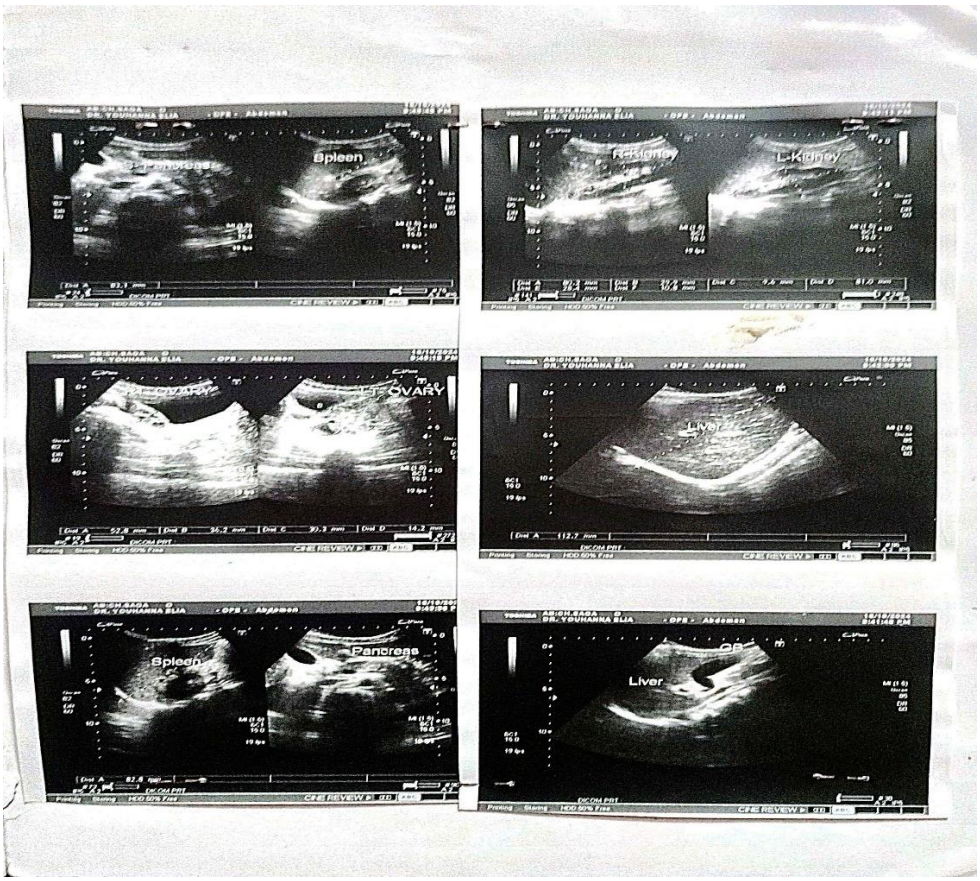
The torsion corrected and a left ovarian cyst drained, washed by hot saline 0.9 %. Then fixation of the ovary by proline suture (nonabsorbable) suture to anterior abdominal wall to prevent recurrence and to be easily removed later on, intra-abdominal drain was placed for one week then removed. The patient was discharged on postoperative day without further complications.

(Video 2)

https://drive.google.com/file/d/1v7l7l0girmJ_YmB-Cs3KTa940b_jxdfk/view?usp=sharing

Investigations

Picture (1) 2D ultrasound show left adnexal torsion:



Picture (2) ultrasonic report:

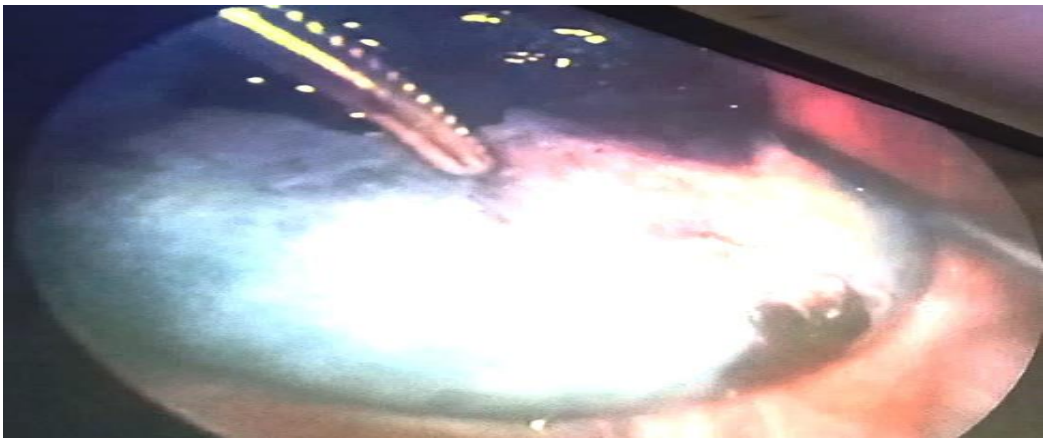
Adrenals	Are of normal size with no masses seen.
Abd.aorta &IVC	Unremarkable.
	No para-aortic or pelvic lymph node enlargement.
	No ascites.
Urinary bladder	Is of average size ,shape & distensibility .
	No vesical mural masses ,stones, or diverticular outpouchings.
Uterus & ovaries	Average-sized AVF uterus having smooth outline with homogeneous myometrium.No uterine myomas.
	Enlarged left ovary showing heterogeneous stromal texture with areas of recent hemorrhages ,no flow seen within using color duplex.
	Multiple small subcortical follicles are seen in both ovaries ranging from 3-5 mm in diameters.
	Moderate free pelvic collection.

Opinion:-

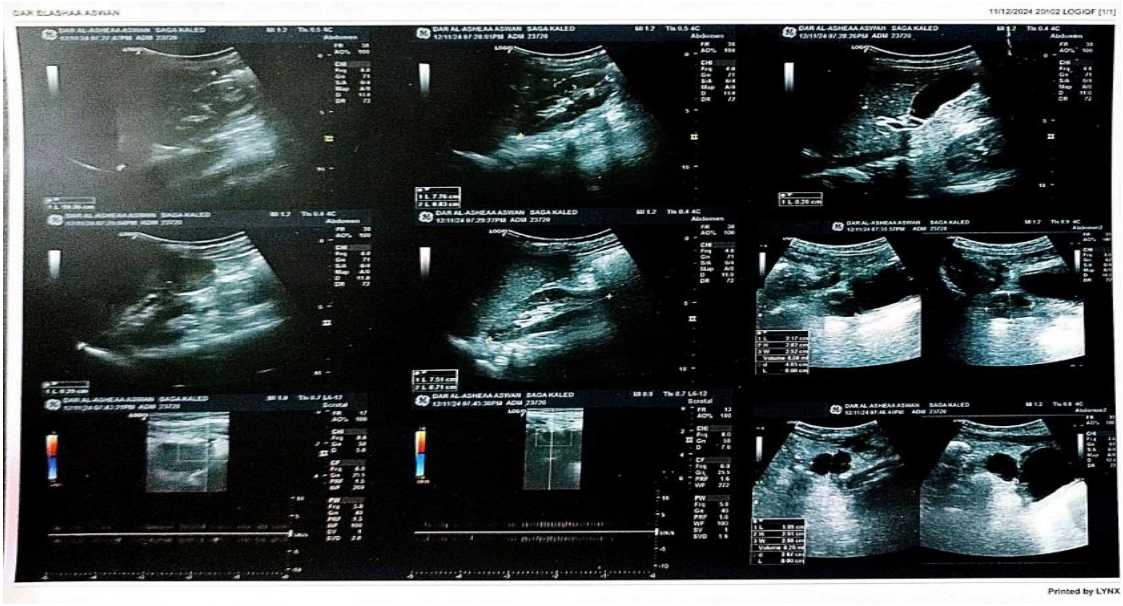
Left ovarian torsion.
Moderate free pelvic collection.

Picture (3)- Laparoscopic picture of adnexal torsion

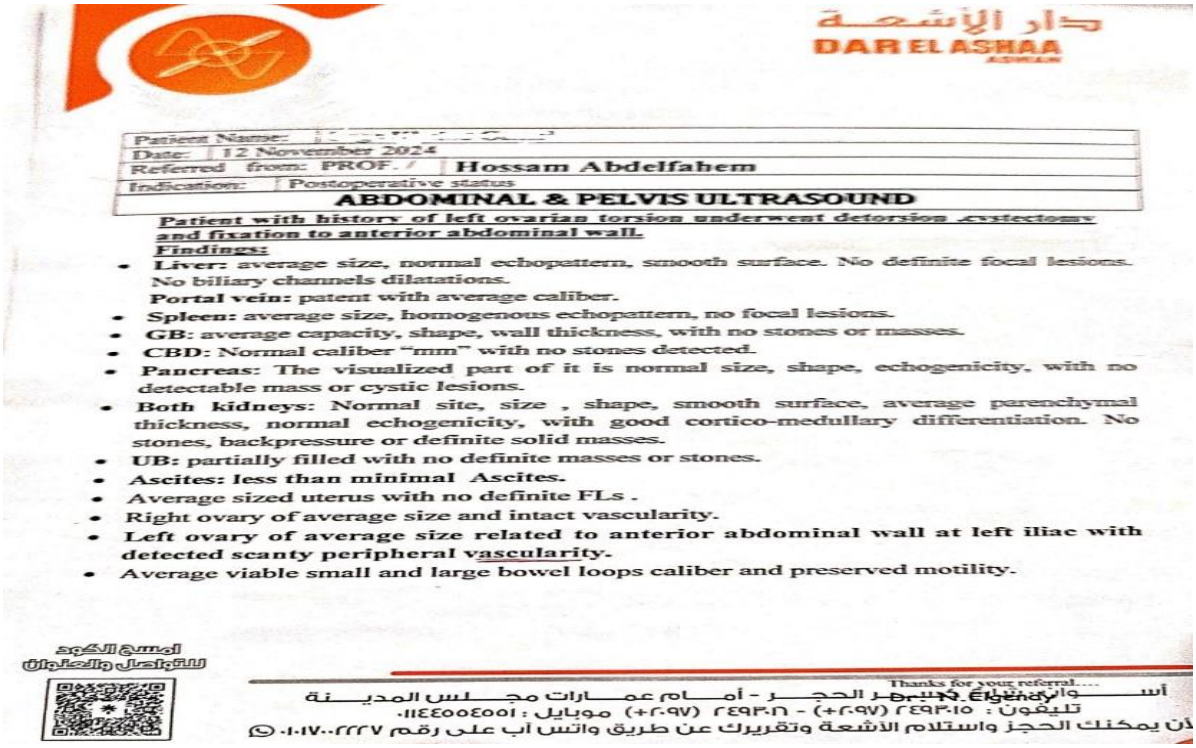
Picture (4) - Laparoscopic picture of adnexal torsion and anterior abdominal wall fixation



Picture (5) ultrasonic film and Doppler show the vasculature of the ovary after 3 weeks



Picture (6) Sonographic report of postoperative after 3 weeks



دار الأشعة
DAR EL ASHAA

Patient Name:
Date: 12 November 2024
Referred from: PROF. / Hossam Abdelfahem
Indication: Postoperative status

ABDOMINAL & PELVIS ULTRASOUND

Patient with history of left ovarian torsion underwent detorsion ,cystectomy and fixation to anterior abdominal wall.

Findings:

- **Liver:** average size, normal echopettern, smooth surface. No definite focal lesions. No biliary channels dilatations.
  Portal vein: patent with average caliber.
- **Spleen:** average size, homogenous echopattern, no focal lesions.
- **GB:** average capacity, shape, wall thickness, with no stones or masses.
- **CBD:** Normal caliber "mm" with no stones detected.
- **Pancreas:** The visualized part of it is normal size, shape, echogenicity, with no detectable mass or cystic lesions.
- **Both kidneys:** Normal site, size , shape, smooth surface, average perenchymal thickness, normal echogenicity, with good cortico-medullary differentiation. No stones, backpressure or definite solid masses.
- **UB:** partially filled with no definite masses or stones.
- **Ascites:** less than minimal Ascites.
- Average sized uterus with no definite FLs .
- Right ovary of average size and intact vascularity.
- **Left ovary of average size related to anterior abdominal wall at left iliac with detected scanty peripheral vascularity.**
- Average viable small and large bowel loops caliber and preserved motility.

امسح الكود للتواصل والحجز

Thanks for your referral....

أسوان - الحجر - أمام عمارات مجلس المدينة
تليفون : ٢٤٩٣٠١٥ (٠٩٧+) ٢٤٩٣٠٦ (٠٩٧+) موبايل : ٠١١٤٣٥٥٤٥٥١
يمكنك الحجز واستلام الأشعة وتقريرك عن طريق واتس آب على رقم ٠١٠١٧٠٠٢٢٢٧

Differential Diagnosis

Differential diagnoses, depending on age and clinical symptoms, include pyelonephritis, renal stones, ruptured or hemorrhagic ovarian cysts, pelvic inflammatory disease (PID), or ectopic pregnancy. Due to the nature of the pain and the ultrasound findings, ovarian torsion was thought to be the most likely diagnosis. The patient was premenarchal and not sexually active, making the likelihood of ectopic pregnancy or PID unlikely. Except for abdominal pain she had no other urinary symptoms and no abnormalities on urine testing, making a renal condition less likely. However, in this case, the presence of a mass on ultrasound indicated the possibility of ovarian pathology, which would increase the chance of ovarian torsion

Ethical Aspects and Informed Consent

Informed consent was appropriately obtained from the guardian prior to the procedure and publication of this report.

Outcome and Follow-Up

Ultrasound scans were done every three days for three weeks. Over time, the scans showed that follicles were developing normally in both ovaries, with healthy blood flow through both arteries and veins.

Discussion

It is standard practice to conserve the ovaries after detorsion. Studies have shown that adnexa and ovaries which appear infarcted at the time of laparoscopy may later demonstrate follicular activity on ultrasound following conservative management [13]. If ischemia and tissue necrosis are confirmed, removal of the necrotic tissue is indicated. In the reported case, the Fallopian tube was left in situ because, despite appearing necrotic initially, it showed signs of viability after detorsion [6].

Mini-laparoscopy, compared to traditional laparoscopy and laparotomy, typically allows for faster recovery and may reduce postoperative adhesion formation [14]. Historically, ovarian torsion was managed with oophorectomy due to concerns about malignancy risk if a cyst was present. However, ovarian-sparing cystectomy is now preferred when the risk of malignancy is low [6].

When malignancy is a concern, referral to a gynecologic oncology center should be considered, and ovarian tumor markers obtained before surgery [5]. In the reported case,

tumor markers were requested, although the procedure was performed before the results became available. The decision to proceed with detorsion and cystectomy in a single session was based on the clinical context. Ultrasound and mini-laparoscopy revealed adnexal torsion. An alternative approach could have involved local detorsion followed by referral to a specialized center, pending further imaging such as MRI and tumor marker results [5,6].

Currently, there are no definitive guidelines to prevent recurrent torsion. The role of oophoropexy remains debated. Laparoscopic oophoropexy, often involving fixation to the round ligament, may be considered in high-risk cases—particularly when no cyst is present or when the ovarian ligament is elongated [22]. In this case, due to the patient's very small body size (a thin 6-year-old girl), fixation to the anterior abdominal wall was preferred [22].

Preoperative management of pediatric patients presents unique challenges, including consent complexities and differing clinical presentations and imaging findings [4,5]. Perioperative positioning may also differ from that in adults. A supine position is generally suitable, and pediatric stirrups may be used when available. If not, a frog-leg position can suffice. Vaginal preparation should be adapted to avoid hymenal injury in prepubertal or non-sexually active girls. Appropriate urinary catheter sizing is also critical, with 10 or 12 French catheters typically suitable for older children and adolescents [8,9].

Insufflation pressure must be adjusted according to patient age and size—typically 6–8 mmHg in infants, 8–10 mmHg in children, and 10–15 mmHg in adolescents [21]. Contraindications to laparoscopy may include congenital heart disease or chronic pulmonary conditions [20].

Pediatric anatomy poses additional surgical considerations. For example, the abdominal wall at the umbilicus is thinner, and the distance to major vessels is shorter than in adults, increasing the theoretical risk of vascular injury [8]. The bladder lies higher in children, raising the risk of injury during suprapubic port placement. Furthermore, premenarchal girls have shorter uterine lengths, and their ovaries are typically located above the pelvic brim within the abdominal cavity [8,9].

Laparoscopic entry techniques include Veress needle insufflation, Hasson open entry, and direct trocar placement under vision. Due to anatomical differences, open entry is often recommended in pediatric cases to avoid complications [18]. Port anchoring with sutures or use of balloon ports may also help accommodate the more pliable pediatric abdominal wall. Fascial herniation, even with small ports (3–5 mm), has been reported in children; therefore, fascial closure is generally advised, especially in patients under five years old [12,14].

Preventing ovarian cyst spillage during surgery is essential due to risks such as chemical peritonitis, pseudomyxoma peritonei, or potential malignant cell dissemination. Techniques to minimize this include direct puncture with suction or the use of a sterile surgical sheet over the cyst during extraction, as described by Watanabe et al.

A Cochrane review (2009) comparing laparoscopy and laparotomy for benign ovarian tumors found that laparoscopy was associated with significantly less postoperative pain, fewer complications, and shorter hospital stays. While cyst rupture was more frequent in laparoscopy overall, there was no significant difference in dermoid cyst cases. For smaller cysts (<5 cm), conservative management with detorsion followed by imaging and tumor marker surveillance may be appropriate [14].

Summary

Adnexal torsion, including ovarian torsion, is an uncommon but significant gynecological emergency in the pediatric population [1,2]. It accounts for approximately 2.7% of all cases of acute abdominal pain in children [3,4]. The condition is often challenging to diagnose due to its nonspecific clinical presentation, which may mimic other causes of acute abdominal or pelvic pain such as appendicitis, urinary tract infection, renal colic, or gastroenteritis [5].

Ovarian torsion is more frequently observed in adolescents and postmenarchal females [6]. In contrast, among premenarchal patients, the condition is most commonly reported in neonates [7]. Fetal and neonatal ovarian cysts are generally attributed to elevated maternal hormone levels in utero and typically resolve spontaneously after birth with the withdrawal of maternal hormonal influence.

Sonographic findings in premenarchal girls under six years of age have been described by Orsini et al. [8] and Salardi et al. [9] as solid ovaries with homogeneous echogenicity, indicating the presence of normal ovarian parenchyma in the absence of cysts. These findings were further supported by the work of Cohen et al. [10], who demonstrated the prevalence of physiological ovarian characteristics in this age group.

Learning Points:

Prompt diagnosis and emergent surgical intervention are essential for ovarian salvage, particularly given the sensitive implications of ovarian loss in prepubescent patients. Misdiagnosis can lead to serious consequences, including irreversible ovarian damage or loss.
Ovarian torsion can occur at any age; therefore, maintaining a high index of suspicion, along with careful evaluation of radiographic findings and clinical presentation, is crucial for timely diagnosis and effective intervention, which significantly reduces patient morbidity.

Mini-laparoscopic exploration with detorsion and ovarian fixation to prevent recurrence within a 3-week follow-up period appears to be a safe and effective option, especially when complete restoration of blood flow is achieved after correction.

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