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Review Article

Adnexal Torsion: Review of the Literature

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ABSTRACT Adnexal torsion is one of a few gynecologic surgical emergencies. Misdiagnosis or delay in treatment can have permanent sequelae including loss of an ovary with effect on future fertility, peritonitis, and even death. A PubMed search was performed between 1985 and 2012 for reviews, comparative studies, and case reports to provide a review of the epidemiology, risk factors, clinical presentation, common laboratory and imaging findings, and treatments of adnexal torsion. Common symptoms of torsion include pain, nausea, and vomiting, with associated abdominal or pelvic tenderness, and may differ in premenarchal and pregnant patients. Laboratory and imaging findings including ultrasound with Doppler analysis, computed tomography, and magnetic resonance imaging can assist in making the diagnosis but should not trump clinical judgment; normal Doppler flow can be observed in up to 60% of adnexal torsion cases. Treatment depends on the individual patient but commonly includes detorsion, even if the adnexae initially seem necrotic, with removal of any associated cysts or salpingo-oophorectomy, because recurrence rates are higher with detorsion alone or detorsion with only cyst aspiration. Journal of Minimally Invasive Gynecology (2014) 21, 196–202 © 2014 AAGL. All rights reserved.

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Adnexal torsion occurs when the ovary and fallopian tube twist on the axis created between the infundibulopelvic ligament and the utero-ovarian ligament. It generally involves both structures, but can involve only the ovary and more rarely only the fallopian tube. It can occur in patients of any age, from in utero to post-menopausal, but is most commonly found in women of reproductive age including during pregnancy. The true incidence is unknown because the diagnosis is made definitively only during surgery, and in some patients it may be misdiagnosed if they are not taken to the operating room. However, the annual prevalence is approximately 2% to 6% [1]. It is estimated that up to 3% of patients with acute abdominal pain who come to the emergency department have adnexal torsion [2]. Fitzhugh et al [3] and Mordehai et al [4] have demonstrated the potential complications of torsion, including death, in several case reports of pediatric patients who were seen in the emergency department with adnexal torsion.

Torsion generally occurs in women with moderately enlarged ovaries, often in association with an ovarian cyst. Although more common in premenarchal girls, normal-appearing ovaries are involved in up to 46% of torsion cases [5,6]. Torsion also occurs less commonly in markedly enlarged ovaries because these tend to weigh the ovary down and prevent it from twisting. There is debate as to which size ovary is more likely to torse; in retrospective cohort studies, Huchon and Fauconnier [7] and Huchon et al [8] found that ovaries with cysts >5 cm were at greater risk for torsion, whereas a comparative study by Warner et al [9] found that cysts >5 cm were unlikely to torse. Common cysts associated with torsion include follicular cysts, corpus lutei, benign cystic teratomas, and cystadenomas. Endometriomas and malignant lesions that are associated with adhesions are relatively rare causes of torsion, with malignant lesions accounting for approximating 2% of torsion cases [10].

Rarely the fallopian tube will torse on its own, but more often if will torse concomitantly with the ovary. When a fallopian tube torses alone, it is often enlarged from a hydrosalpinx or hematosalpinx, is abnormally

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long, has previously been ligated, or is associated with adhesions or paratubal cysts.

Torsion occurs more commonly on the right than the left, with an incidence of approximately 3:2 [2]. This is likely due to the proximity of the left ovary to the relatively fixed sigmoid colon compared with the hypermobility of the cecum and ileum on the right.

Risk Factors

Ovulation induction, ovarian hyperstimulation syndrome, history of adnexal torsion, polycystic ovarian syndrome, previous tubal ligation, and pregnancy have all been cited as risk factors for adnexal torsion [11]. The risk of torsion with ovarian hyperstimulation syndrome further increased with a successful pregnancy, from 2.3% to 16% in a retrospective study by Mashiach et al [12] of 201 hyperstimulated cycles. Pansky et al [5] demonstrated in a retrospective study that women who experienced a first episode of torsion with a morphologically normal-appearing ovary were more likely to experience another episode of torsion (60%) than were those with a pathologic adnexa (8%). Twelve percent to 25% of adnexal torsion cases occur during pregnancy [13,14]. There are case reports of patients with multiple episodes of torsion during one gestation, with the risk of recurrent torsion as high as 19% [14].

Clinical Presentation

A thorough patient history and physical examination are key to making the diagnosis of adnexal torsion. The most common symptom in women with adnexal torsion is acute onset of abdominal pain (90% to 100%), usually isolated to one side [2,6]. This pain may be described as constant or intermittent because the ovary may torse and untorse over time and may have an onset with sudden change in position or activity. Sometimes these episodes of pain can occur for several days to months before admission, and there may be a history of similar transient episodes of pain, indicating previous partial torsion. The intensity of pain varies and is not always severe. The pain is due to occlusion of the vascular pedicle, with subsequent hypoxia; generally, the venous and lymphatic systems are affected first because they are lower pressure systems [15].

Additional symptoms can include nausea (70%), vomiting (45%), flank pain, and fever (20%) [5,6]. If torsion is prolonged, the adnexa can become necrotic and even infected, at which time the patient may exhibit signs of peritonitis [15]. This constellation of symptoms can be found in a number of other conditions including appendicitis, nephrolithiasis, pelvic inflammatory disease, ectopic pregnancy, colitis, necrosis of a leiomyoma, and ruptured ovarian cysts, thus making the diagnosis even more difficult to establish (Table 1).

Scoring systems and questionnaires have been created to facilitate making the diagnosis of torsion [8,16]. Huchon et al [16] performed a multicenter prospective study and demonstrated that a questionnaire revealing absence of unilateral pain, presence of leukorrhea or metrorrhagia, and absence of ovarian pain, unbearable pain, and vomiting excluded patients at low risk without torsion (negative predictive value, 99.7%) but was unable to differentiate patients with torsion from those with other diagnoses when all of these findings were met (positive predictive value, 52%).

Table 1

Common differential diagnosis of adnexal torsion

- Appendicitis
- Ruptured ovarian cyst
- Pelvic inflammatory disease
- Nephrolithiasis
- Pyelonephritis
- Ectopic pregnancy
- Colitis
- Necrosis of a leiomyoma

Physical Examination

Adnexal torsion is a clinical diagnosis that can be supported with laboratory and imaging findings. The signs and symptoms can mimic those of several other diagnoses. Multiple studies have demonstrated the difficulty of correctly diagnosing adnexal torsion preoperatively, as the diagnosis is confirmed at laparoscopy in approximately only 10% to 44% of patients [1,17–19].

Findings at physical examination include normal temperature to low-grade fever (18%) [6], slight tachycardia, and elevated blood pressure if severe pain is present. Tenderness is often unilateral in the lower abdomen but may wrap around to the flank; however, as many as 30% of patients may have no pain on examination, as demonstrated by Houry and Abbott [20] in a retrospective chart review of 87 women seen in the emergency department who were confirmed to have torsion during surgery. On pelvic examination, an enlarged tender adnexa may be palpable; however, Moore et al [21] demonstrated in a retrospective review of 167 patients that up to 75% with proved adnexal torsion did not have a palpable mass.

Laboratory Tests

A pregnancy test should be performed to rule out ectopic pregnancy, and a complete blood cell count and electrolyte values are usually determined. Most laboratory findings are normal, although a slight leukocytosis may be observed in 27% to 50% of patients [5,6]. The white blood cell count and C-reactive protein value are generally lower than in acute appendicitis [22]. Several serum markers have been studied to determine whether they can assist in making a