Non-sexually transmitted tubo-ovarian abscess in an adolescent

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Pelvic inflammatory disease and tubo-ovarian abscesses are infections that are typically transmitted sexually. Very few reports of non-sexually transmitted tubo-ovarian abscesses in children and adults have been published. We present a case of diffuse peritonitis secondary to a tubo-ovarian abscess in a 13-year-old non-sexually active, virginal female. The causative organisms were Streptococcus viridans and *Peptostreptococcus*. The disease was treated with salpingectomy and adnexal debridement. Despite the absence of recognizable ovarian tissue, a left ovary was found on subsequent imaging after recovery. The case, along with a review of previous literature, is presented to raise awareness of this rare entity in girls and discuss risk factors for its occurrence.

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**1. Case report**

A 13-year-old postmenarchal girl of South Asian origin presented to the emergency department with fever, anorexia, vomiting, and fluctuating abdominal pain. The pain had lasted four days, resolved, then recurred seven days later with increasing intensity. She also complained of difficulty urinating and foul-smelling, yellow vaginal discharge. She had never been sexually active and insisted that there was no history of sexual trauma or exploration. On exam, the patient was febrile (39.4 °C) and tachycardic (114 beats/min). She was toxic-appearing with diffuse peritoneal signs. No abdominal mass was appreciated. Pelvic exam was deferred due to her virginal status. Laboratory testing revealed increased white blood cell (26.75 × 10^9/L) and neutrophil counts (23.27 × 10^9/L). Urinalysis was normal and a pregnancy test was negative. Ultrasound could not identify the ovaries but revealed a large retrouterine heterogenous collection measuring 10 × 8 × 11.4 cm that was compatible with an abscess secondary to perforated appendicitis.

At laparoscopy, the appendix was found to be un-involved. There was a large abscess in the pelvis accompanied by a severe inflammatory process with omental caking, inflammatory debris, and gelatinous exudate (Fig. 1). After debridement and drainage of the pelvic abscess, the right adnexae were found to be secondarily inflamed due to a left tubo-ovarian abscess. The left pyosalpinx was aspirated for turbid, dark-colored fluid (Fig. 2), but the left ovary could not be visualized (Fig. 3). The procedure was converted to a laparotomy through a short Pfannenstiel incision. Again, no discrete left ovarian tissue could be visualized, with necrotic tissue found in the region of the left ovary. This was again debrided and a left salpingectomy was completed. The inflamed right fallopian tube and ovary were left intact.

Final cultures of abscess contents and fluid aspirated from the left fallopian tube grew *Streptococcus viridans* and *Peptostreptococcus*. Cultures for *Neisseria gonorrhoea* and *Chlamydia trachomatis* were negative. The patient was treated post-operatively with intravenous piperacillin/tazobactam for 5 days. She was discharged on oral amoxicillin/clavulanic acid for two weeks. There were no complications. Pathologic exam of the specimen confirmed a pyosalpinx and necrotic ovarian tissue, consistent with tubo-ovarian abscess.

An ultrasound performed by a gynecologist two months post-operatively identified normal right adnexae, without visualization of the left ovary. The patient continued to have regular menstrual periods without further symptoms. An ultrasound performed 18 months after the episode showed a normal right ovary, and a small, but present, left ovary.

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2. Discussion

Most tubo-ovarian abscesses (TOA) occur in the setting of sexually-transmitted pelvic inflammatory diseases (PID) due to N. gonorrhoea or C. trachomatis. Several case reports of TOA in non-sexually active female adolescent and virginal women have been reported [1–12]. Approximately two-thirds of the patients reported have been in the pediatric age group [1–4,6,7]. The condition may mimic perforated appendicitis, the most common etiology for peritonitis in the pediatric age group. We present this report to alert pediatric surgeons to this pathology.

Table 1 summarizes the prior reports of pelvic inflammatory disease and TOA in non-sexually active females. Most infections were due to single organisms. The organisms identified in our patient, S. viridans and Peptostreptococcus could be a reflection of her maturing vaginal flora. These bacteria are commonly found in healthy, commensal flora as non-pathogenic organisms [13]. In the human vaginal flora, their presence has been shown to change with the female’s pubertal stage, menstrual cycle, and pregnancy [13–15]. Peptostreptococcus in vaginal flora was also found to be higher in pre-pubertal girls than in normal adult women [16]. Disruption in the balance of the vaginal flora may alter bacterial replicative and pathogenic potential in a synergistic fashion [13,17]. This may have precipitated the condition in our pubertal patient with a maturing vaginal flora. Vaginal flora may also change with recent antibiotic use. Our patient had not used any antibiotics recently. We did not perform vaginal cultures, but it is likely the same organisms would have been retrieved.

This case report adds TOA to the differential diagnoses of pediatric appendicitis in children, both clinically and on imaging. Only one case of tuberculous TOA mimicking acute appendicitis has been previously reported [18]. Our service rarely performs CT scans in the work-up of abdominal pain in children to minimize radiation risks. Furthermore, differentiating appendicitis and TOA using CT scans is not straightforward, posing a challenge even to experienced radiologists [19,20]. The only symptom in our patient that was not consistent with perforated appendicitis was vaginal discharge. In retrospect, this should have raised the possibility of an infection of the reproductive organs. However, PID and TOA were not entertained due to her age and report of sexual inactivity. A literature review of previously reported TOA in non-sexually active females suggests that eliciting last menstrual periods or the presence of vaginal discharge did not offer diagnostic clues. Based on the etiology of TOA in these females, important factors that can be considered include body habitus, pet or animal exposure, gastrointestinal pathology, and genitourinary pathology [1,5–7,9–12].

Management of TOA remains controversial, but preserving reproductive potential is a priority. When possible, conservative management should be encouraged. Image-guided drainage, especially using ultrasound, is associated with fewer complications [21]. Significant fertility was preserved in women who were treated with a combination of antibiotics and ultrasound-guided TOA drainage [22]. This may have been a viable treatment alternative in our patient if the diagnosis was made pre-operatively. Surgical intervention should be considered if there is little improvement with antibiotics alone, unsuccessful drainage, increasing TOA size, or an uncertain diagnosis [23,24]. Laparoscopy is an ideal modality that allows for drainage and resection, if required. In our patient’s case, surgical intervention was driven by the septic picture associated with diffuse peritonitis. Excision of the pyosalpinx and debridement of the abscess contents were performed. The procedure was converted to a laparotomy in an
attempt to identify and preserve ovarian tissue. Although no discrete ovarian tissue was identified and some necrotic ovarian tissue was found in the pathology specimen, a left ovary was seen on ultrasound 18 months after the intervention. This most likely represented residual ovarian tissue within the abscess cavity that went on to recover. It lends further evidence to the resilience of ovarian tissue.

3. Conclusion

In conclusion, we report one of the youngest girls with a mixed bacterial TOA despite absence of sexual activity. The entity should be considered in the differential diagnoses of adolescent females with peritonitis, irrespective of their sexual activity, especially if vaginal discharge is an accompanying symptom. Pre-operative diagnosis based on imaging findings can be challenging, especially if the diagnosis is not suspected clinically. Multiple treatment options exist. If initial non-operative percutaneous drainage is not successful, laparoscopic drainage and possible salpingectomy is an ideal modality.

References