

Pneumoperitoneum secondary to tubo-ovarian abscess: A case report

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ABSTRACT

Pneumoperitoneum seen on an X-ray or computed tomography (CT) image points to a diagnosis of ruptured viscus and immediate surgery is warranted. A case of tubo-ovarian abscess (TOA) presenting with pneumoperitoneum is unusual. Very few cases have been reported where the pneumoperitoneum is caused by an abscess involving the adnexa. We present the case of a 17-year-old patient who presented with acute abdomen and raised inflammatory markers and had laparoscopy for suspected bowel perforation based on the finding of pneumoperitoneum on CT scan. Bowel perforation was ruled out and the findings were consistent with TOA. She had drainage of the abscess, subsequently received intravenous antibiotics and postoperatively recovered well. The pneumoperitoneum could have been due to coinfection with *E. coli*, as the patient had had a urinary tract infection due to *E. coli* three weeks before presentation, or slow leakage of the TOA. In conclusion, gas under the diaphragm can be related to non-bowel-related gynaecological pathology, but it vital to rule out sinister causes.

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1. Introduction

Tubo-ovarian abscess (TOA) is a well-known life-threatening complication of pelvic inflammatory disease (PID) and occurs in 15–35% of females affected by PID (1). A case of TOA presenting with pneumoperitoneum is unusual, and only three such cases have hitherto been reported in the literature. Here we describe a case of acute abdomen, which was suspected to be secondary to perforated viscus, based on the finding of pneumoperitoneum on computed tomography (CT), which was subsequently demonstrated to be the result of TOA.

2. Case Discussion

A 17-year-old woman presented to the emergency department with gradual onset of pain in the right lower quadrant of two days duration, with no other associated symptoms. She was sexually active and was on oral contraceptive pills. There was no significant medical history. Physical examination demonstrated a soft abdomen with tenderness in the right iliac fossa, but no signs of peritonitis. She was afebrile and haemodynamically stable. BHCG was negative. Magnetic resonance imaging (MRI) of the abdomen was done to rule out appendicitis. Urine examination showed urinary tract infection (UTI) with *E. coli*, sensitive to cephalexin, and she was discharged on oral cephalexin.

Three weeks later, she represented with worsening upper abdominal pain radiating to the back, with shoulder tip pain and associated

vomiting. Examination revealed tenderness in the right upper and lower quadrants and involuntary guarding. White cell count and C-reactive protein (CRP) levels were elevated. Erect chest X-ray showed gas under the right hemidiaphragm, with elevation of the diaphragm suggestive of pneumoperitoneum (Fig. 1). An urgent ultrasound (US) scan of the abdomen showed 120 ml of free fluid in the pelvis but no other pathology. An urgent CT scan of the abdomen showed a large amount of free intra-abdominal gas and moderate fluid in the pouch of Douglas (Fig. 2).

An emergency laparoscopy was undertaken with a suspicion of perforated viscus. On laparoscopy, there was purulent peritonitis but no faecal matter in the cavity and the bowel examination showed intact bowel, an unexpected finding of bilateral hydrosalpinges, and a dilated left fallopian tube forming a complex mass involving the left ovary; pus was seen draining through the tube. Swabs were collected for culture and sensitivities including that for sexually transmitted diseases. A drain was inserted after drainage and washout of the pus. Subsequently, the patient was treated with intravenous ceftriaxone, metronidazole and azithromycin. The pus from the abdominal cavity did not reveal any significant growth but a urine specimen was positive for *Chlamydia* through polymerase chain reaction (PCR). The patient was commenced on oral amoxicillin clavulanic acid and doxycycline, as per therapeutic guidelines for severe sexually acquired PID. She recovered well postoperatively and was discharged home on day seven, with follow-up in outpatient clinic.

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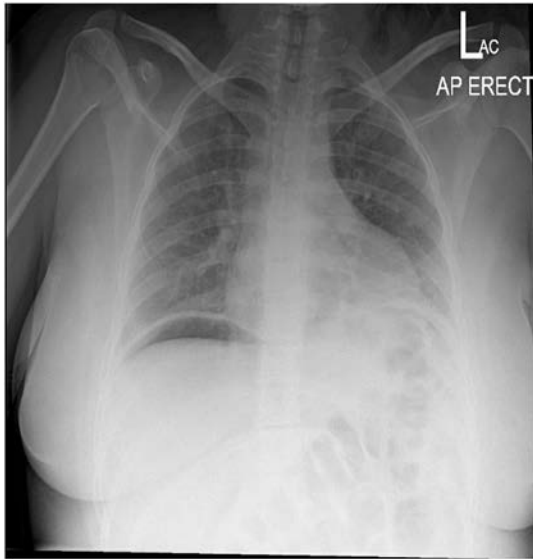


Fig. 1. Chest X-ray showing gas under the diaphragm.

3. Discussion

TOA is a serious complication of untreated PID. It most commonly affects women of reproductive age and nearly 60% of women with TOA are nulliparous [1]. In the majority of cases, TOA is polymicrobial [2]. *Chlamydia trachomatis*, gonorrhoea, *E. coli* and anaerobes are the pathogens most commonly involved. The diagnosis of TOA is based on the symptoms and signs: adnexal tenderness (bilateral or unilateral), cervical excitation, abnormal cervical or vaginal discharge, elevated white cell count, elevated erythrocyte sedimentation rate, elevated CRP and an adnexal mass on abdominal palpation [3]. Differential diagnoses of TOA include an appendicular mass, an endometrioma (or other ovarian cysts), an extrauterine pregnancy, diverticulitis or underlying malignancy. TOA presenting with pneumoperitoneum is unusual.

The common imaging modalities used to diagnose TOA are US and CT. US can identify masses involving ovaries and tubes and is the first investigation of choice [4]. A few studies suggest that CT may have greater sensitivity in detecting a TOA than US (78 to 100% versus 75 to 82%, respectively) [5]. In our patient, no masses were seen on US or CT of the



Fig. 2. CT scan of the abdomen showing gas under the diaphragm.

abdomen. The finding of pneumoperitoneum led to a suspicion of bowel perforation and warranted urgent laparoscopy. Interestingly, the bowel was found to be intact and leaking TOA was found to be the cause of pneumoperitoneum.

TOA can cause pneumoperitoneum when the abscess ruptures [6] and releases gas or when a gas-producing organism is present. Approximately 15% of women with TOA present with signs and symptoms suggestive of a ruptured TOA [5]. *E. coli*, which is a gas-producing organism, was found to be the cause of TOA in 30% of cases in one large case series [7]. In one of the three reported cases of TOA with pneumoperitoneum, *E. coli* was cultured from one patient [2] and no organisms were identified in the others [8]. Our patient had a urine test positive for *Chlamydia*, but no organisms were grown from the culture of abscess fluid. Interestingly, our patient had a history of UTI due to *E. coli*, which was treated with antibiotics shortly before the presentation. A slow leakage of the abscess could also be considered as the cause of gas in the peritoneal cavity in this patient.

The treatment of TOA depends on the clinical severity at the time of presentation. Success rates of 67–75% have been reported with prolonged use of intravenous antibiotics alone [9]. In patients diagnosed with TOA and pelvic abscess, antibiotic therapy has been reported to have a failure rate of 12–76% [10,11]. A study showed early laparoscopic treatment may be associated with a better clinical prognosis than conservative treatment followed by late laparoscopy for patients with TOA or pelvic abscess [12]. Our patient had an early laparoscopic drainage of the abscess followed by antibiotic treatment for PID and had an excellent clinical response. PID with TOA is a rare but possible cause of pneumoperitoneum in young females.

Contributors

Both authors were involved in the clinical care of the patient and contributed to the conception, drafting, review, and revision of the manuscript. Both authors read and approved the final version of the paper and take full responsibility for the work.

Conflict of Interest

The authors declare that they have no conflict of interest regarding the publication of this case report.

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Patient Consent

Informed consent was obtained from the patient for publication of this work.

Provenance and Peer Review

This case report was peer reviewed.

References

- [1] M. Rosen, D. Breitkopf, K. Waud, Tubo-ovarian abscess management options for women who desire fertility, *Obstet. Gynecol. Surv.* 64 (2009). https://journals.lww.com/obgynsurvey/Fulltext/2009/10000/Tubo_Ovarian_Abscess_Managem_tent_Options_for_Women.22.aspx.
- [2] Y. Chan, W. Parchment, J.H. Skurnick, L. Goldsmith, J.J. Apuzzio, Epidemiology and clinical outcome of patients hospitalized with pelvic inflammatory disease complicated by tubo-ovarian abscess, *Infect. Dis. Obstet. Gynecol.* 3 (1995) 135–139, <https://doi.org/10.1155/S1064744995000470>.
- [3] K. Munro, A. Gharaibeh, S. Nagabushanam, C. Martin, Diagnosis and management of tubo-ovarian abscesses, *Obstet. Gynaecol.* 20 (2018) 11–19, <https://doi.org/10.1111/tog.12447>.
- [4] C.A. Chappell, H.C. Wiesenfeld, Pathogenesis, diagnosis, and management of severe pelvic inflammatory disease and tubo ovarian abscess, *Clin. Obstet. Gynecol.* 55

- (2012). <https://journals.lww.com/clinicalobgyn/Fulltext/2012/12000/Pathogenesis,Diagnosis,andManagementofSevere.8.aspx>.
- [5] Richard H Beigi, Management and complications of tubo-ovarian abscess. Post TW, ed. UpToDate. Waltham, MA: UpToDate Inc. <https://www.uptodate.com> (Accessed on December 14).
- [6] J.H. McClenathan, N. Dabadghav, Pneumoperitoneum secondary to ruptured ovarian abscess, *J. Am. Coll. Surg.* 196 (2003) 325, [https://doi.org/10.1016/S1072-7515\(02\)01768-4](https://doi.org/10.1016/S1072-7515(02)01768-4).
- [7] J. Hakim, K.J. Childress, A.M. Hernandez, J.L. Bercaw-Pratt, Tubo-ovarian abscesses in nonsexually active adolescent females: a large case series, *J. Adolesc. Health* 65 (2019) 303–305, <https://doi.org/10.1016/j.jadohealth.2019.02.009>.
- [8] F. Aguilera, T.O. Dabiri, D.T. Farkas, Pneumoperitoneum caused by tubo-ovarian abscess in an elderly patient, *J. Surg. Case Rep.* 2018 (2018) <https://doi.org/10.1093/jscr/rjy191rjy191>.
- [9] N. Goharkhay, U. Verma, F. Maggiorotto, Comparison of CT- or ultrasound-guided drainage with concomitant intravenous antibiotics vs. intravenous antibiotics alone in the management of tubo-ovarian abscesses, *Ultrasound Obstet. Gynecol.* 29 (2007) 65–69, <https://doi.org/10.1002/uog.3890>.
- [10] J.F. Peipert, R.B. Ness, J. Blume, D.E. Soper, R. Holley, H. Randall, R.L. Sweet, S.J. Sondheimer, S.L. Hendrix, A. Amortegui, G. Trucco, D.C. Bass, Clinical predictors of endometritis in women with symptoms and signs of pelvic inflammatory disease, *Am. J. Obstet. Gynecol.* 184 (2001) 856–864, <https://doi.org/10.1067/mob.2001.113847>.
- [11] H. Gaitán, E. Angel, R. Diaz, A. Parada, L. Sanchez, C. Vargas, Accuracy of five different diagnostic techniques in mild-to-moderate pelvic inflammatory disease, *Infect. Dis. Obstet. Gynecol.* 10 (2002) 171–180, <https://doi.org/10.1155/S1064744902000194>.
- [12] X. Jiang, M. Shi, M. Sui, T. Wang, H. Yang, H. Zhou, K. Zhao, Clinical value of early laparoscopic therapy in the management of tubo-ovarian or pelvic abscess, *Exp. Ther. Med.* 18 (2019) 1115–1122, <https://doi.org/10.3892/etm.2019.7699>.