CASE PRESENTATION

Fallopian tube tuberculosis: two cases from Baghdad

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ABSTRACT

Fallopian tube tuberculosis, also called female genital tuberculosis, is an infection of the female reproductive tract, affecting the fallopian tubes, caused by Mycobacterium tuberculosis.

Fallopian tube tuberculosis usually presents as a case of infertility or as chronic pelvic pain, although many patients are asymptomatic. Others presented with other symptoms such as menstrual irregularities, pelvic masses, vaginal bleeding, and discharge, and may have presented as a case of ectopic pregnancy. Here, we present two patient from Baghdad who visited our national tuberculosis institute with a diagnosis of TB of the fallopian tube, who started on a full course of anti-TB regimen with improvement in their health-related quality of life.

Key words: Tuberculosis, fallopian tube, infertility.

INTRODUCTION

Tuberculosis (TB) is one of the oldest diseases known to affect humans.[1] TB primarily impacts the lungs; extrapulmonary (EPTB) cases are also common, particularly among younger patients. Female genital tuberculosis (FGTB) is a common form of extrapulmonary tuberculosis.[2] GTB accounts for about 10%–15% of all TB infections. GTB is the second most common extrapulmonary manifestation (40%), following lymphatic involvement (50%) and pleural effusions (24%). The fallopian tubes are the most frequently affected (90%–100%), followed by the uterus (70%), the ovaries (30%), the cervix (10%), and, rarely, the vulva and vagina.[3,4]

Both fallopian tubes are involved in most (>90%) women with female genital tuberculosis FGTB, and the involvement can be TB endosalpingitis, exosalpingitis, interstitial TB salpingitis, and salpingitis isthmica nodosa.[5] Mycobacterium tuberculosis, an acid-fast aerobic bacillus, is the most virulent mycobacterium pathogen to the human species. Its slow replication rate accounts for the insidious nature of the infection and the resistance to ordinary antibiotics. Although the bacillus can remain dormant and cause no symptoms for a long time, reactivation may occur following a decline in immunity.[6]

Female genital tuberculosis may be asymptomatic and is often detected incidentally during the evaluation of infertility.[7] When symptoms are present, they commonly include chronic lower abdominal or pelvic pain, infertility, and menstrual disturbances—particularly oligomenorrhoea—as well as the presence of a pelvic mass.[8,9] The disease typically has an insidious onset, with few or nonspecific symptoms in its early stages. Consequently, diagnosis is frequently delayed until the disease has progressed, at which point significant and sometimes irreversible damage to the genital organs may have already

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occurred.[10]

Being a paucibacillary disease, its diagnosis remains a dilemma as the gold standard method of diagnosis, like AFB positivity on microscopy or culture, or positive Gene Xpert or epithelioid granuloma on endometrial and peritoneal biopsy, is positive in selected cases and may miss the diagnosis in most cases.[11]

Despite recent advances in imaging tools, such as computerised tomography (CT) scan, magnetic resonance imaging (MRI), and ultrasonography, hysterosalpingography is still the standard screening test for evaluation of tubal infertility and a valuable tool for diagnosis of female genital tuberculosis. Tuberculosis may present in various ways on hysterosalpingography.[12]

Laparoscopy, by direct visualisation of the abdomen and pelvis, can detect most cases of FGTB missed by traditional tests, show a definite or probable finding of FGTB, and help prognosticate infertility, in addition to planning further treatment.[13]

Drug therapy for female genital TB (FGTB) is similar to the standard treatment regimens used for pulmonary TB, which is a four-drug regimen including rifampin, isoniazid, pyrazinamide, and ethambutol, administered daily for two months, followed by isoniazid and rifampin for the rest of the course of 4 months.[14] In patients with infertility, the spontaneous conception rate is low with an increased risk of ectopic pregnancy even after anti-TB treatment (ATT).[15, 16]

CASE PRESENTATION

Case 1

A 36-year-old female from Baghdad presented to an obstetrician because of a 3-year history of infertility. Complete medical history, comprehensive clinical examination, and routine biochemical, hormonal, and immunological laboratory tests were non-significant for the patient and her husband.

The patient's ultrasound showed a normal uterine shape and size, with an endometrial thickness of 7.5 mm. The right and left ovaries were normal, with 11, 9.5, and 8.5 mm follicles on the right, and 15 and 10 mm follicles on the left. The cul-de-sac space was clear, with no free fluid collection. **Figure a &b**

A Hysterosalpingogram (HSG) was conducted and showed a normal size and shape of the uterine cavity, with no filling defect in the endometrial cavity. Both fallopian tubes are patent. The uterine cavity is of normal size and normal configuration. No filling defect is seen in the endometrial cavity. Both fallopian tubes are patent with mild to moderate dilatation, showing partial spillage of contrast media into the peritoneal cavity, mainly from the left tube, a feature that may suggest hydrosalpinx. A delayed film after changing the patient's position showed a loculated distribution of contrast media. Laparoscopy and bilateral salpingectomy were performed, with excisional biopsy sent for histopathological examination. Microscopically, sections from both tubes

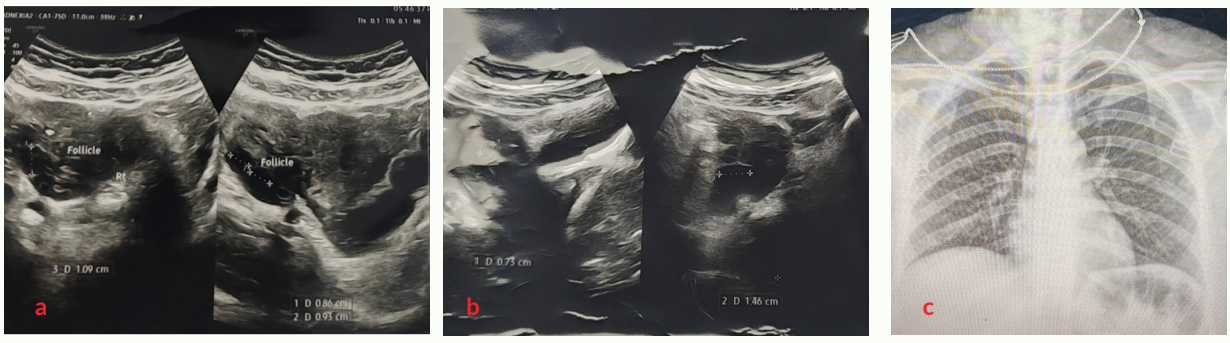

Figure 1 | The First Patient **a & b:** Ultrasound picture of the pelvis of the first patient showing many follicles with normal other structures. **c:** Normal chest XR.

showed destruction of normal architecture by necrotising granulomatous inflammation, composed of a central necrotic zone surrounded by epithelioid histiocytes, multinucleated giant cells, and Lymphocytes, associated with epithelial hyperplasia. The morphological features are those of tuberculous salpingitis.

The patient was diagnosed with tuberculous salpingitis and referred to the National TB Institute in Baghdad. At the TB institute, a chest X-ray (**Figure 1 c**), sputum examination, and urine for genXpert for the patient and her husband were negative. The patient started on a full anti-TB medication course.

Case 2

A 35-year-old female from Baghdad with a 5-year history of fallopian tube ligation for birth control following a history of 3 caesarean sections was presented to her doctor with vague abdominal pain, mainly near the pelvic area, not associated with tenderness. Ultrasound of the abdomen showed normal results apart from fatty liver and mildly enlarged left kidney. The pelvic exam showed normal organs, except for nodular lesions in both fallopian tubes, **Figure 2 (a+b)**.

A laparoscopy was done for her, and bilateral fallopian tubal nodular fibrotic lesions were resected. The histopathology showed characteristic multiple variable-sized areas of endometrial glandular and stromal elements, including variable-sized caseating and non-caseating granulomas with rare scattered giant cells and Langerhans cells, a morphological feature suggestive of chronic specific TB salpingitis. Polarised-lens microscopic examination was negative for a foreign body. No evidence of any associated malignancy was seen.

The patient was diagnosed with tuberculous salpingitis and referred to the National TB Institute for treatment. At the institute, the chest X-ray was normal (**Figure 2 c**). The patient started on a full course of anti-TB medication with full clinical improvement.

DISCUSSION

Morgagni was the first to describe the signs of genital TB in women.[17] Genital tuberculosis is secondary mainly to pulmonary TB or extrapulmonary foci such as the kidneys, meninges, skeletal system, and gastrointestinal system. TB bacilli infect the genital tract by four routes: haematogenous (with the lungs as the common primary focus), descending direct spread, lymphatic spread, and, rarely, primary infection of the genitalia through sexual transmission.[18] The genital organs affected by Mycobacterium tuberculosis are as follows, in descending order of frequency: fallopian tubes (95-100%), uterine endometrium (50-60%), ovaries (20-30%), cervix (5-15%), uterine myometrium (2.5%) and vagina/vulva (1%).[19]

Our patients' ages are 35,36 years old, and most cases of genital TB have been reported in fertile people between the ages of 20 and 45 years.[20] A substantial proportion of patients presenting with genital TB can easily be

Figure 2 | The Second Patient **a:** Ultrasound picture shows enlarged left kidney. **b:** nodular fallopian tubes. **c:** Normal CXR.

overlooked owing to nonspecific symptoms.[21] and can be a symptomless disease inadvertently uncovered during investigation for infertility.[22] Both primary and secondary infertility can occur in FGTB (40-80% among FGTB cases),[23] with both tubes usually affected.[24]

Female genital tuberculosis (FGTB) is a significant cause of morbidity and is associated with both short- and long-term sequelae, particularly infertility[25] and an increased risk of ectopic pregnancy.[26] In our first case, the patient was asymptomatic, and tuberculous salpingitis was identified during routine infertility evaluation. In contrast, tuberculous salpingitis may present with symptoms such as dyspareunia, menstrual irregularities, and chronic pelvic inflammatory disease (PID),[27] as observed in the second patient following tubal ligation surgery.

Genital TB is associated with characteristic structural changes in the organs involved, and hysterosalpingography (HSG) is a useful tool for visualising these abnormalities. In HSG, presentation of tubal TB varies from nonspecific changes such as tubal dilatation, tubal occlusion, irregular contour, diverticular outpouching (salpingitis isthmica nodosa), hydrosalpinx to specific pattern such as 'cotton wool plug', 'pipestem tube', 'golf club tube', 'cobblestone tube', 'beaded tube', 'leopard skin tube', tubal occlusion and adhesions in the peri tubal region which may present as straight spill, corkscrew appearance and peritubal halo,[28] or May show calcification of the fallopian tubes in a small proportion of patients. Tubal calcification can take the form of linear streaks, which lie in the course of the fallopian tube or appear as faint or dense tiny nodules.[29] HSG of the first patient shows a bilateral, loculated distribution of the contrast media, while the second patient underwent laparoscopy without HSG.

Laparoscopy is a useful modality for diagnosing FGTB, with a higher case pickup rate,[30] as reported in both of our patients.

Histological study is the main method for verifying the diagnosis.[31] It usually reveals a specific granuloma composed mainly of epithelioid cells, lymphoid cells, and Langerhans giant cells. The presence of caseous necrosis with a significant number of lymphocytes, plasma cells, and fibroblasts is typical for tubercular inflammation.[32] In both cases, histopathology was instrumental in establishing the final diagnosis.

Gynaecologists should maintain a high index of suspicion, as tuberculosis (TB) can present in atypical and misleading ways. Genital TB is often referred to as "the great pretender" because its clinical and radiological features may closely mimic other gynaecological conditions, including advanced ovarian carcinoma.[33] Careful and detailed history-taking, combined with thorough clinical examination and appropriate sampling guided by multiple imaging modalities, is essential to reduce diagnostic delays and overcome the challenges of diagnosing genital TB.[34]

Antituberculosis treatment (ATT) has been shown to improve laparoscopic findings in women with female genital tuberculosis (FGTB), particularly in cases associated with infertility and early inflammatory changes. However, ATT is less effective in reversing advanced fibrotic damage, such as dense pelvic or perihepatic adhesions and bilateral tubal obstruction, which are often irreversible and significantly compromise fertility outcomes.[35]

The major challenges in the management of FGTB include early and accurate diagnosis, increased clinical awareness among healthcare providers, the development of rapid, highly sensitive diagnostic tools for TB, and the optimisation of treatment strategies to improve both reproductive and long-term health outcomes.

CONCLUSION

Fallopian tube TB can be asymptomatic; it should be diagnosed and treated early because it can lead to infertility due to damage to the fallopian tubes or can lead to ectopic pregnancy

REFERENCES

1. Jahromi BN, Parsanezhad ME, Ghane-Shirazi R. Female geni-

tal tuberculosis and infertility. *International Journal of Gynecology & Obstetrics*. 2001 Dec 1;75(3):269-72.

2. Golden MP, Vikram HR. Extrapulmonary tuberculosis: an overview. *American family physician*. 2005 Nov 1;72(9):1761-8.
3. Muneer A, Macrae B, Krishnamoorthy S, Zumla A. Urogenital tuberculosis—epidemiology, pathogenesis and clinical features. *Nature Reviews Urology*. 2019 Oct;16(10):573-98.
4. Cantres-Fonseca OJ, Rodriguez-Cintrón W, Del Olmo-Arroyo F, Baez-Corujo S. Extra Pulmonary Tuberculosis: An. Role of microbes in human health and diseases. 2019 Jun 5:55.
5. Neonakis IK, Spandidos DA, Petinaki E. Female genital tuberculosis: a review. *Scandinavian journal of infectious diseases*. 2011 Aug 1;43(8):564-72.
6. Gow JG. Genitourinary tuberculosis. InSuki and Massry's Therapy of Renal Diseases and Related Disorders 1998 (pp. 451-458). Boston, MA: Springer US.
7. Marcus SF, Rizle B, Fountain S, Brinsden P. Tuberculosis infertility and in vitro fertilisation. *Am J Obstet Gynecol*. 1994;171:1593–96
8. Dhall K, Das SS, Dey P. Tuberculosis of Bartholin's gland. *Int J Gynaecol Obstet*. 1995 Feb;48(2):223-4. doi: 10.1016/0020-7292(94)02272-z. PMID: 7789602.
9. Munne KR, Tandon D, Chauhan SL, Patil AD. Female genital tuberculosis in light of newer laboratory tests: A narrative review. *Indian Journal of Tuberculosis*. 2020 Jan 1;67(1):112-20.
10. Rajaratnam A, D'Cunha P, Furtado Z, Fernandes H. Tuberculous salpingitis: a case report. *Journal of Clinical and Diagnostic Research: JCDR*. 2013 Jun 1;7(6):1186.
11. Wang Y, Shao R, He C, Chen L. Emerging progress on diagnosis and treatment of female genital tuberculosis. *Journal of International Medical Research*. 2021 May;49(5):03000605211014999.
12. Khurana A, Sahi G. OC 14.04: Ultrasound in female genital tuberculosis: a retrospective series. *Ultrasound in Obstetrics & Gynecology*. 2013 Oct;42(s1):28.
13. Dosanjh DP, Hinks TS, Innes JA, Deeks JJ, Pasvol G, Hackforth S, Varia H, Millington KA, Gunatheesan R, Guyot-Revol V, Lalvani A. Improved diagnostic evaluation of suspected tuberculosis. *Annals of internal medicine*. 2008 Mar 4;148(5):325-36.
14. WHO consolidated guidelines on tuberculosis: module 6: tuberculosis andco comorbidities 2024.
15. Aliyu MH, Aliyu SH, Salihu HM. Female genital tuberculosis: a global review. *International Journal of Fertility and Women's Medicine*. 2004 May 1;49(3):123-36.
16. Grace GA, Devaleenal DB, Natrajan M. Genital tuberculosis in females. *Indian Journal of Medical Research*. 2017 Apr 1;145(4):425-36.
17. Ghosh K, Chowdhury JR. Tuberculosis and female reproductive health. *Journal of Postgraduate Medicine*. 2011 Oct 1;57(4):307-13.
18. Schaefer G. Female genital tuberculosis. *Clinical Obstetrics and Gynecology*. 1976 Mar 1;19(1):223-39.
19. Das P, Ahuja A, Gupta SD. Incidence, etiopathogenesis and pathological aspects of genitourinary tuberculosis in India: A journey revisited. *Indian Journal of Urology*. 2008 Jul 1;24(3):356-61.
20. Kesharwani H, Mohammad S, Pathak P. Tuberculosis in the female genital tract. *Cureus*. 2022 Sep 2;14(9):e28708. doi: 10.7759/cureus.28708. PMID: 36204039; PMCID: PMC9527183.
21. Kulchavenya E, Naber K, Johansen TE. Urogenital tuberculosis: classification, diagnosis, and treatment. *European Urology Supplements*. 2016 Jul 1;15(4):112-21.
22. Girish S. Evaluation of Genital TB Infertail Women by Endometerial Tb PCR and HPE-Its Correlationto Hysteroscopy Features (Doctoral dissertation, Rajiv Gandhi University of Health Sciences (India))
23. Shahzad S. Investigation of the prevalence of female genital tract tuberculosis and its relation to female infertility: An observational analytical study. *Iranian journal of reproductive medicine*. 2012 Nov;10(6):581.
24. Tzelios C, Neuhausser WM, Ryley D, Vo N, Hurtado RM, Nathavitharana RR. Female genital tuberculosis. InOpen Forum Infectious Diseases 2022 Nov 1 (Vol. 9, No. 11, p. ofac543). US: Oxford University Press.
25. Malik S. Genital tuberculosis and its impact on male and female infertility. *US Endocrinol*. 2020;16(2):97-103.
26. Sharma JB, Sneha J, Singh UB, Kumar S, Roy KK, Singh N, Dharmendra S, Vanamail P. Comparative study of laparoscopic abdominopelvic and fallopian tube findings before and after antitubercular therapy in female genital tuberculosis with infertility. *Journal of Minimally Invasive Gynecology*. 2016 Feb 1;23(2):215-22.
27. Khurana A, Sahi G. OC 14.04: Ultrasound in female genital tuberculosis: a retrospective series. *Ultrasound in Obstetrics & Gynecology*. 2013 Oct;42(s1):28.
28. Munne KR, Tandon D, Chauhan SL, Patil AD. Female genital tuberculosis in light of newer laboratory tests: A narrative review. *Indian Journal of Tuberculosis*. 2020 Jan 1;67(1):112-20.
29. Farrokh D, Layegh P, Afzalaghaee M, Mohammadi M, Rastegar YF. Hysterosalpingographic findings in women with genital tuberculosis. *Iranian Journal of Reproductive Medicine*. 2015 May;13(5):297.
30. Wang Y, Shao R, He C, Chen L. Emerging progress on diagnosis and treatment of female genital tuberculosis. *Journal of International Medical Research*. 2021 May;49(5):03000605211014999.
31. Goel G, Khatuja R, Radhakrishnan G, Agarwal R, Agarwal S, Kaur I. Role of newer methods of diagnosing genital tuberculosis in infertile women. *Indian Journal of Pathology and Microbiology*. 2013 Apr 1;56(2):155-7.
32. Coremans L, de Clerck F. Fitz-Hugh-Curtis syndrome associated with tuberculous salpingitis and peritonitis: a case presentation and review of literature. *BMC gastroenterology*. 2018 Mar 20;18(1):42.
33. Rajaratnam A, D'Cunha P, Furtado Z, Fernandes H. Tuberculous salpingitis: a case report. *Journal of Clinical and Diagnostic Research: JCDR*. 2013 Jun 1;7(6):1186.
34. Dosanjh DP, Hinks TS, Innes JA, Deeks JJ, Pasvol G, Hackforth S, Varia H, Millington KA, Gunatheesan R, Guyot-Revol V, Lalvani A. Improved diagnostic evaluation of suspected tuberculosis. *Annals of Internal Medicine*. 2008 Mar 4;148(5):325-36.

Abbreviations list: Acid Fast Bacillus (**AFB**), Anti-TB treatment (**ATT**), Computerised tomography (**CT**), Extrapulmonary Tuberculosis (**EPTB**), Female genital tuberculosis (**FGTB**), Hysterosalpingogram (**HSG**), Magnetic resonance imaging (**MRI**), Tuberculosis (**TB**).

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