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Review Article

Genital Tuberculosis in Women an Update

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Abstract

Tuberculosis (TB) remains a major global public health problem with the highest death rate from any infection causing 1.5 million deaths in 2018. Pulmonary tuberculosis is the most common presentation; extrapulmonary and genital tuberculosis are the second most common presentation with an increase in women of reproductive age.

The symptoms of tuberculosis are nonspecific, the available microbiological tests have low sensitivity, which delay the diagnosis, causing irreversible organ damage that requires surgery; to similar processes or suspicion of malignancies in various parts of the body; it should be ruled out before starting its management, especially when surgery is necessary; Treatment of tuberculosis lasts 6 months with the administration of multiple anti-tuberculosis drugs, and its response is evaluated clinically and after one month with imaging studies; when coexisting malignant pathology or strains resistant to antituberculous drugs are detected in women, they affect fertility due to the development of genital tuberculosis with multifocal involvement with fibrosis and anatomical distortion, which is not corrected or indicated by surgical reconstruction. The epidemiology, symptoms, diagnosis and treatment are reviewed.

Keywords: *Molecular Tests; Infertility; Surgery; Anti-Tuberculosis; Imaging*

Background

The word tuberculosis (TB) was used for the first time in 1834, although Koch did not discover tuberculosis bacilli until 1882; it is considered a communicable disease and important worldwide; At the beginning of the 20th century, the incidence has been decreasing in developed countries; However, it still continues to be one of the main causes of mortality and morbidity worldwide, mainly due to vaccination, medical treatment and better socioeconomic conditions, the pandemic of the human immunodeficiency virus (HIV) increased its incidence and morbidity and mortality; the incidence of female genital TB is often discovered incidentally or is asymptomatic; It was reported that there were 8 to 9.2 million cases and 1.2 to 1.5 million deaths worldwide [1-3].

Most in Asia (59%) and Africa (26%), and less in the Eastern Mediterranean (7%), Europe (5%) and America (3%). India reports 2 to 2.5 million or a quarter (26%) of the world, China (0.9 to 1.2 million), South Africa (0.4 to 0.59 million), Indonesia (0.37 to 0.54 million) and Pakistan (0.33 to 0.48). India and China together accounted for 38% globally. The development of early, rapid, sensitive, specific and cost-effective diagnostic tests is necessary for a timely and effective diagnosis and treatment, and includes microscopy of acid-fast sputum smear with a sensitivity of 44%, tuberculin test, chest radiograph and culture of mycobacteria; this is definitive, but it takes more than 2 weeks and delays the diagnosis; however, nucleic acid amplification-based molecular tests (NAAT) are more sensitive for the early and specific diagnosis of Mycobacterium tuberculosis [4-6].

Pathology

When tubercle bacilli infect a susceptible host, the initial reaction is a polymorphonuclear inflammatory exudate. Within 48 hours, it is replaced by mononuclear cells, which become the main sites for intracellular tuber replication. As cellular immunity develops, the tubercle bacilli are destroyed and caseous necrosis occurs [7,8] (Figure 1).

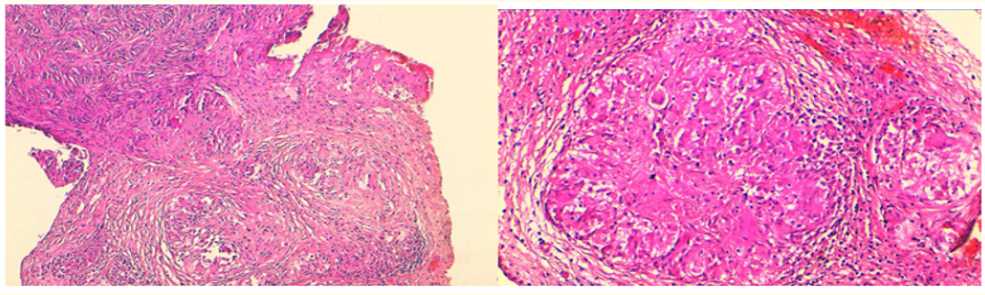

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Figure 1: *A. Histological view showing ovarian parenchyma with granulomatous lesions and caseous necrosis (HE × 100).B. At highermagnification, tuberculosis granulomas include epithelioid and giant cells, plasma cells, and caseous necrosis, along with fibrotic changes (H and E × 200).*

The subsequent reactivation of a focus of infection results in a proliferative granulomatous lesion, with central caseous necrosis surrounded by concentric layers of epithelial and giant cells, peripheral lymphocytes, monocytes and fibroblasts [8]. Pulmonary TB is observed in 50% of patients with Miliary TB with symptoms of dyspnea or cough and rales, with hypoxemia, pleural pain, accompanied by pleural rubbing or other signs of pleural effusion, a rare cause of acute respiratory failure and respiratory distress syndrome in 2% of adults. Patients with lymphatic TB usually present signs and symptoms referring to the site of the disease, although constitutional symptoms are the only discomfort. Suspected joint TB presents with bone pain (including back pain) with or without focal edema or fever. The clinical course is indolent and only pain is the first symptom. Forms of gastrointestinal involvement include liver disease, enteritis, and tuberculous peritonitis; or as pancreatitis or cholecystitis [9,10]. In the central nervous system, with meningitis or tuberculoma, in 15 to 20% and 33 to 54% respectively, the diagnostic suspicion and nonspecific clinical findings: such as headache, low fever and/or focal neurological findings. Tuberculosis of the urinary tract presents with hematuria, proteinuria and sterile pyuria [9,11]; 12% presented Addison's disease and cardiovascular disease is unusual, mainly as pericarditis, usually of late diagnosis. In the skin and mammary gland, they are rare [9,12]. It presents clinically as a solitary hard nodule, poorly defined, unilateral, with nipple discharge, thickening of the skin or lymph nodes in the armpit, clinically and radiographically simulating breast cancer or abscess, generalized spread is by the hematogenous route [7,9] (Figure 2).

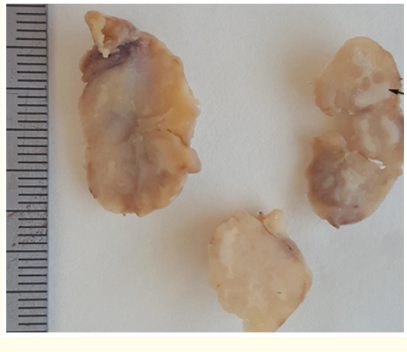

Figure 2: *Gross view: an illustrative case of cheese-like lymph node tuberculosis from caseous necrosis (arrow).*

Clinical aspects of tuberculosis

Pelvic TB can exist as tuberculous adenitis, in mesenteric or pelvic lymph nodes, without involvement of the genital tract. Generalized miliary peritoneal TB, the tubercles embedded in the abdomen, involving the serous surface, abdominal and pelvic organs without penetrating the mucosa, do not usually affect reproductive function and is different from genital TB [8]. Genital TB is rare; but, it is greater, in communities where pulmonary forms or other forms of extragenital TB are common; affects any organ of the body, without clinical manifestations and reactivates, is a public health problem and responsible for infertility. The true incidence of genital TB is not known, and it is diagnosed in 5% of women in infertility study, and in Overall has decreased, only increased by the presence of acquired immunodeficiency syndrome 36% from 1984 to 1986 [5,6,8].

The clinical diagnosis of genital TB is suspected in 20% of patients with a positive Combe sign, 50%; a history of primary infertility is an apparent cause of poor general health for months or years and associated with weight loss, excessive fatigue, low-grade fever or pelvic-abdominal discomfort, including extragenital TB in 30-50%; systemic symptoms (Table 1) [4].

Systemic	Weight loss Fatigue Mild temperature (low fever)
Sterility	Primary Secondary
Menstrual disorders	Amenorrhea oligomenorrhea Proiomenorrhea
Symptoms Pelvic Abdomnal	Inflammation Postcoital hemorrhage Vaginal discharge Dyspareunia

Table 1: *Symptoms related to genital tuberculosis.*

The common initial symptom is infertility, 85% have never been pregnant, 15% develop one-third to one-half within a year after the last pregnancy, or it occurs in 40-50% thereafter; pelvic-abdominal pain is common and occurs in 25 to 50%; for several months before going to the doctor; it is not serious and is accompanied by abdominal distention, with episodes of acute lower abdominal pain due to secondary bacterial infection; when it progresses, pelvic pain worsens, particularly with sexual intercourse, exercise and menstruation, menstrual disturbances that occur later are common 10 to 40%; they have normal menstrual cycles and the secretory endometrium is common. Tuberculous endometritis does not interfere with the menstrual cycle due to hormonal stimulation; ovarian failure is not the cause of amenorrhea; it is secondary to the caseous endometrium. Other less frequent symptoms are leucorrhoea, fistulas; It can even simulate ovarian cancer when it presents adnexal masses and ascites, with elevated serum levels of CA-125 and is only diagnosed histopathologically after surgery; physical examination is normal in 50% and only adnexal masses or ascites are palpated [5,6,8] (Table 2); there is no correlation between symptoms and physical findings, in 35 - 50%. Ovarian masses in the tuberculous tubes are less painful than those due to bacterial or pyogenic salpingitis, although secondary infection and acute exacerbation can develop an acute abdomen that requires emergency surgery. Other benign or malignant pelvic lesions can coexist with genital tuberculosis.

Normal
Abdominal mass
Pelvic mass
Adnexal mass
Abdominal tenderness
Pelvic/adnexal tenderness
Ascites
Excessive vaginal discharge
Ulcer on the vulva, vagina, and cervix
Enlarged uterus with pyometra
Fistulas

Table 2: *Physical signs in genital tuberculosis.*

Adnexal masses vary in size and consistency or conglomerate to form a frozen pelvis due to adhesions or abscesses of the fallopian tubes and ovary; It presents with a fever over 38°C in one third of the cases; acute bacterial infections, surgery, or trauma reactivate latent pelvic tuberculosis [8]. Genital tuberculosis is transmitted by direct inoculation during sexual intercourse; ascent and dissemination of the tuber to the vagina, cervix and vulva, in these cases 80% have a history of extragenital tuberculosis.

The possibility of primary sexual transmission is not excluded; after primary or secondary infection, the uterine tubas are affected in 95 - 100%, the endometrium 50 - 60%, ovaries, 20 - 30%, cervix 5 - 15%, vulva/vagina 1% and myometrium, 2.5%; Cervical TB simulates cervical cancer and only the biopsy rules it out [8,9,13]. Adhesions in the tubas, ovaries, omentum, intestine, liver and diaphragm (Fitz Hugh Curtis syndrome); they are common findings; Advances in the medical treatment of TB, pregnancy and live birth after genital TB diagnosis is low and when achieved it is more likely to be an ectopic pregnancy or spontaneous abortion. Early diagnosis and treatment achieves higher pregnancy rates (Table 3 and 4) [8].

Organ	Frequency (%)
Uterine Tubas	90 - 100
Endometrium	50 - 60
Ovary o	20 - 30
Cervix	5 - 15
Vulva and vagina	1

Table 3: *Frequency of tuberculosis in genital organs.*

Complete Blood Count	Of Mycobacterium Tuberculosis	Endoscopy
Chest X-rays	Liquid Culture of Ascites	Laparoscopy
Tuberculin test	Peritoneal biopsy for culture	Cystoscopy
Menstrual blood culture	Hysterosalpingography	Hysteroscopy
Endometrial curettage	Ultrasonography	
Histopathological examination	Cervical cytology	

Table 4: *Tests to confirm diagnosis of genital Tb.*

In 25 - 50% the tubas remain with recognizable fimbriae, with the appearance of a tobacco bag; granulomas and a chronic inflammatory infiltrate affect the entire thickness of the tubal wall, and caseous necrosis is common in advanced cases. Adnexal masses vary in size and consistency or conglomerate with frozen pelvis due to adhesions, or ovarian tube abscess; fever greater than 38°C occurs in one third; Acute bacterial infections, surgery, or trauma reactivate latent pelvic TB [5,6,8].

Genital tuberculosis is transmitted by direct inoculation during sexual intercourse; ascent and spread of the tuber to the vagina, cervix and vulva, 80% have a history of extragenital tuberculosis. The possibility of primary sexual transmission is not excluded; After primary or secondary infection, the uterine tubas are affected in 95 - 100%, the endometrium 50 - 60%, ovaries, 20 - 30%, cervix 5 - 15%, vulva/vagina 1% and myometrium, 2.5%; Cervical tuberculosis simulates cervical cancer and only the biopsy for histopathological study rules it out [5,8,13].

In 25 - 50% the uterine tubas are left with recognizable fimbriae, with the appearance of a tobacco bag; granulomas and a chronic inflammatory infiltrate see TB of the endometrium, the size and shape of the uterus are normal. The tubercular process is generally lo-

cated in the endometrium, is more extensive in the fundus of the uterus and decreases towards the cervix. The myometrium is usually not affected, in 2.5% of cases of tuberculous endometritis there is total destruction of the endometrium and secondary amenorrhea or pyometra occurs in case of internal occlusion; in advanced cases fibrosis, calcification and caseous necrosis are formed; It is rarely observed during the reproductive period due to regular cyclical menstruation. The classic lesion in tuberculous endometritis is noncaseating granuloma, composed of epithelial cells, giant Langhans cells, and lymphocytes; it is located along the endometrium with greater density in the superficial layers. Granulomatous lesions are identified on cycle days 24 - 26 or within 12 hours after menstruation [8,10,14,15].

TB of the ovary is affected from 11 to 30%, it is generally bilateral, there are two forms of perioophoritis, in which the ovary may be surrounded or enclosed in adhesions and covered with tubercles caused by direct extension of the uterine tube and oophoritis, or the infection; it begins in the ovarian stroma, due to hematogenous spread that produces a caseating granuloma within the parenchyma [5,8].

Tuberculosis of the vulva and vagina occurs in 2%. On the vulva, it begins as a nodule on the labia or vestibular region, forming an irregular ulcer with holes that secrete hyaline caseous material and/or pus. In the Bartholin gland it presents as an irregular hypertrophic growth. A tuberculous lesion in the vagina mimics a gross carcinoma. The microscopic appearance is a granulomatous inflammation that tends to cause central caseification and an associated chronic inflammatory infiltrate [5,6,8,16,17].

Tuberculous peritonitis is observed in combination with female genital TB in 45%. In peritonitis, an associated pleural effusion is not uncommon; most do not present parenchymal abnormalities on chest radiography [8,12,13-22]; Endometrial sampling is recommended for histological and microbiological examination to make the diagnosis of genital TB, it is useful if granulomas are found or, if smears or cultures are positive for TB. Laparoscopy with targeted biopsies of suspicious areas may be helpful if less invasive methods do not provide the necessary diagnostic information.

Hysterosalpingography is contraindicated in the presence of recent acute pelvic TB, the exacerbation may reactivate pelvic TB; but, reveals certain abnormalities that suggest the possibility of pelvic TB. The uterine cavity is deformed, with associated intrauterine adhesions and lymphatic extravasation [7] (Figure 3).

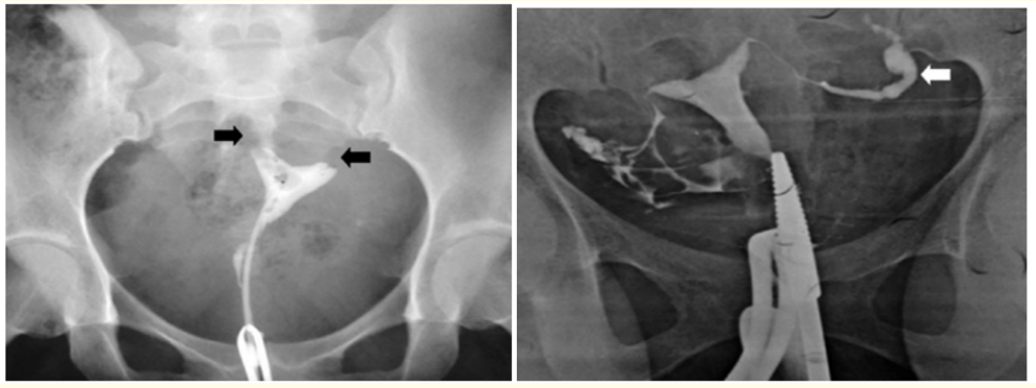

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Figure 3: *A. Hysterosalpingography showing bilateral tubal blockage (arrows). B. Hysterosalpingogram showing left hydrosalpinx with fimbrial block (arrow).*

High resolution abdominal and transvaginal ultrasound can demonstrate ascites; bilateral masses, predominantly solid. Laparoscopy suspected pelvic TB in 14.7% [15,23-28] (Figure 4).

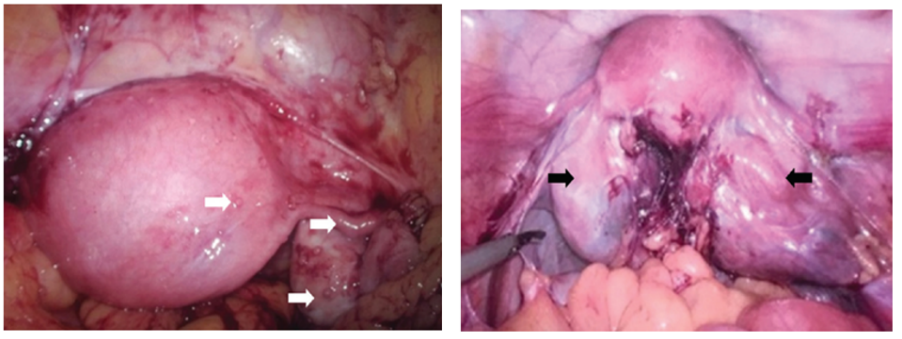

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Figure 4: *A. Laparoscopy showing tubercles in the uterus, fallopian tubes, and ovaries (arrows).B. Laparoscopy showing bilateral hydrosalpinx, Tubo-ovarian masses, adhesions, and frozen pelvis (arrows).*

On ultrasound, the fallopian tubes may appear dilated, thickened, and may be filled with a clear fluid called hydrosalpinx or a thick caseous hyaline material forming a process called pyosalpinx. The endometrium is affected in a percentage of genital tuberculosis cases, and uterine enlargement may be due to filling of hyaline caseous material [29]. The endometrium may appear heterogeneous with hyperechoic areas representing foci of calcification or fibrosis, intrauterine adhesions, and a distorted uterine cavity. Findings can range from a normal examination to abnormalities such as thin or thickened endometrium, cornual obliteration, altered endometrial vascularization during the middle of the cycle in stimulated menstrual cycles, subendometrial calcification, variation in uterine artery flow during the middle of the cycle, tubal fluid, free and loculated peritoneal fluid, heterogeneous ovarian enlargement and adnexal fixation. Ultrasound reveals multiple echogenic lesions with surrounding hypoechoic halos [9].

Molecular methods are complementary for the identification of TB; with the polymerase chain reaction (PCR), the diagnosis is in a few days or hours with sensitivities of 47 to 100%, the amplification techniques can be used for broth cultures in the detection of growth as soon as possible. Under these conditions, the diagnosis is obtained in 7 - 10 days with a sensitivity and specificity of 100%; Several nucleic acid amplification techniques (NAAT) allow the detection of TB, identify it directly, allow early identification, and management decisions [8-14,18-22,30-34].

In the differential diagnosis of genital tuberculosis, the granulomatous lesions other than tuberculosis are sarcoidosis, Crohn's disease, actinomycosis, leprosy, inguinal granuloma, lymphogranuloma venereum, syphilis, histoplasmosis, brucellosis, berylliosis, silicosis, tularemia, and foreign body reaction. Schistosomiasis and filariasis directly damage the uterine tubas and produce granulomas [8,9]; Acute and chronic bacterial pelvic infection should be excluded when there is ascites, peritonitis, hepatitis, cholecystitis, appendicitis, ovarian cancer, kidney and heart disease [9,11]. Complications of genital tuberculosis, sterility is still a major complication. Treatment has been successful in alleviating symptoms, even in cured patients, extensive damage to the uterine tubes and endometrium is irreversible and the chances of a successful intrauterine pregnancy are significantly decreased. After medical treatment, the risk of ectopic pregnancy in patients with pelvic TB is estimated to be 33 - 72%. A rare but potentially serious complication is congenital TB that involves the transmission of the maternal tubercular endometrium to the fetus. It is rare, 300 cases have been reported; it is a serious systemic infection in the newborn.

Clinical characteristics of tuberculosis

The clinical characteristics of pulmonary or extrapulmonary TB are nonspecific. The most common is fever, cough, weight loss, night sweats, fatigue, contact with tuberculosis (Combe positive), malnutrition, lymphadenopathy, organomegaly, confirmed bacteriological diagnosis is possible in 30 - 40%. The presence of concomitant HIV infection further complicates the diagnosis and extrapulmonary and miliary TB are more common [8,9,35,36].

Diagnosis

The diagnosis of TB requires sufficient clinical suspicion; however, it is made difficult by nonspecific symptoms and a careful diagnostic evaluation of extrapulmonary findings is warranted if systemic disease is suspected. The clinical evaluation begins with a complete history and physical examination, evaluation of lung disease, including a chest X-ray (followed by CT scan), culture of acid fast bacilli, and purified protein derivative. If sputum cannot be obtained, bronchoscopy or gastric secretions, mycobacterial blood culture or mycobacterial culture [19]; molecular tests are useful for rapid diagnosis [14] Culture or search for acid-fast bacilli in tissues, fluids, or drains from an infected site is the gold standard for establishing the diagnosis of TB; it must be differentiated from other nontuberculous mycobacteria [22].

Positive blood cultures for disseminated TB are rare and are observed in immunocompromised patients with HIV infection; mainly in this COVID19 pandemic. Tissue biopsy samples, histopathology typically demonstrates granulomatous inflammation, molecular tests are useful for rapid diagnosis, nucleic acid amplification test (NAAT) is used, they are sensitive for rapid detection in a variety of specimens, including blood, sputum and urine [3-5], as the polymerase chain reaction offer high specificity, when they are positive, they are useful to support a clinical diagnosis of TB [11,30,37-43] (Figure 5).

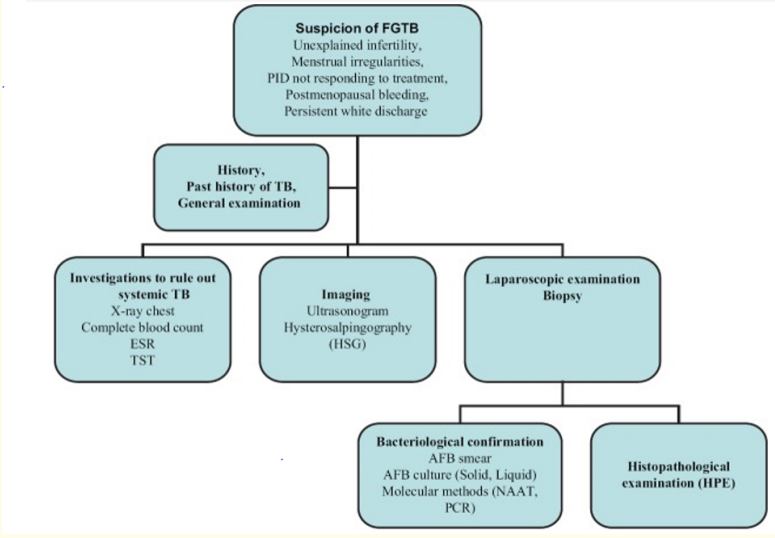


Figure 5: *Diagnostic algorithm for female genital tuberculosis (FGTB). PID, pelvic inflammatory disease; ESR: Erythrocyte Sedimentation Rate; TST: Tuberculin Skin Test; AFB: Acid Fast Bacilli; NAAT: Nucleic Acid Amplification Test; PCR: Polymerase Chain Reaction.*

Diagnosis of latent tuberculosis infection

The denatured protein derivative has great limitations; sensitivity low, false positives or negatives in HIV infection, corticosteroid therapy, chronic kidney failure, malnutrition, cancer or a serious illness [30,33,37-42].

Diagnosis of active tuberculosis

It is based on clinical suspicion, imaging with chest radiography, computed tomography (CT) and, more recently, positron emission tomography (PET) have been used for surveillance and microbiological with bacterial culture and molecular methods such as tests of NAAT nucleic acid amplification. Hematological abnormalities are prominent with normochromic normocytic anemia observed in half of patients, hypercalcemia is rare. Sterile pyuria was found in 32%, negative urine cultures, may be positive for miliary TB [9,40].

Imaging

More than two-thirds have a chest radiograph with a miliary pattern, when the miliary nodules are large enough. Other abnormalities include pleural reactions, hilar or mediastinal adenopathy, and evidence of active or healed parenchymal TB (infiltrates or interstitial or alveolar cavities) [9]. High-resolution computed tomography of the chest is more sensitive. Numerous nodules of 2 to 3mm are seen distributed throughout the lung. Contrast abdominal computed tomography can demonstrate multiple low-attenuation foci, typically without enhancement after contrast administration (Figure 6-8) [9,39-44].

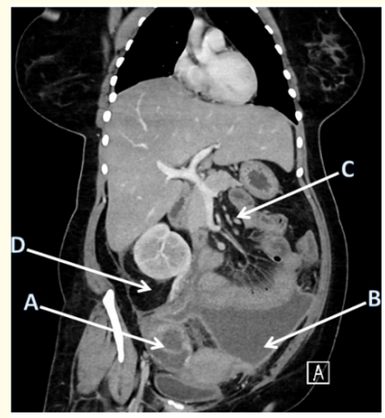
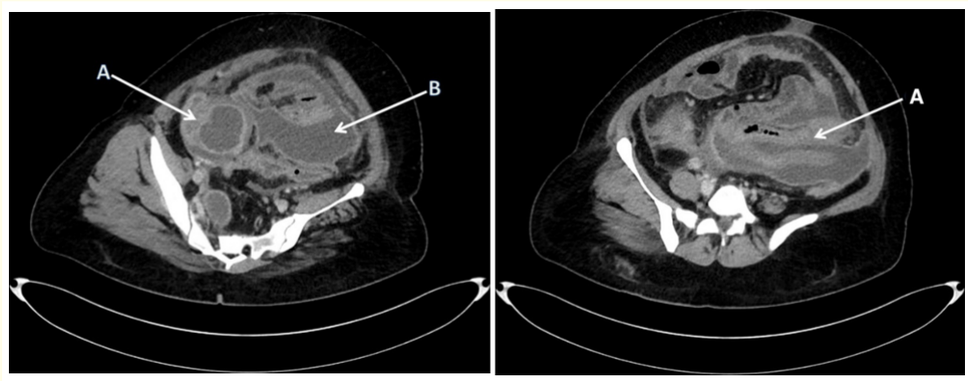


Figure 6: *CT image (coronal section) showing A: Right tube-ovarian mass, B: Pelvic collection, C: Mesenteric lymph nodes and D: Free abdominal fluid.*



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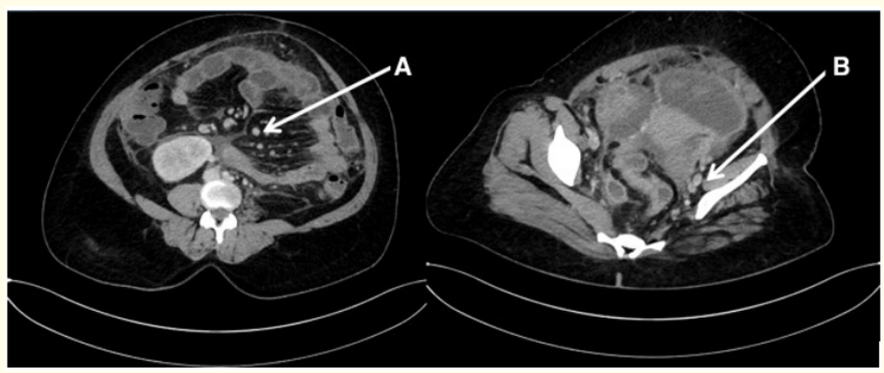

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Figure 8: *Computed tomography (cross section) showing A: Mesenteric lymph nodes and B: Pelvic lymph nodes.*

Differential diagnosis of tuberculosis

It is broad and depends on the degree of dissemination and involvement of specific tissues and organs; from disorders of the respiratory tract (such as inhalation diseases) or lymphatic processes (sarcoidosis). A miliary pattern on chest X-ray is due to many conditions, including histoplasmosis. Pulmonary manifestations can include pneumonia, adenopathy, lung mass, pulmonary nodule and/or cavitary lung disease [8,9,35].

Management of tuberculosis

In general, it is similar to pulmonary [8,9] or extrapulmonary TB, with individualization of the case, surgery may be necessary for diagnostic and/or therapeutic management. In some circumstances, corticosteroids are used for the treatment of tuberculosis involving the CNS or pericardium [8,9]. To plan an effective treatment, check if there is an active extragenital focus; extension of Tb in the genital tract; assess whether medical treatment will cure genital TB; if surgery is necessary; assess the possibility of pregnancy after treatment. The extent of the genital lesion is divided into minimal and advanced. Minimal genital Tb is usually asymptomatic, except for sterility. In advanced genital TB, Tubo-ovarian masses are present. Before effective antiphymic medical treatment, surgery was the basis of treatment and postoperative complications were high, such as intestinal fistula (14%) and mortality (2.2%), anti-tuberculosis drugs are effective before surgery, [8,9,38,43,45], the schemes with:

A) 6 months of isoniazid (INH), rifampicin (RIF), and pyrazinamide (PZA) for 2 months, followed by INH and RIF for 4 months, is the preferred treatment for patients with a fully susceptible organism who adhere to treatment.

B) A 9-month regimen of INH and RIF is acceptable in patients who cannot tolerate PZA.

C) The main determinant of the favorable outcome is the patient's adherence to the drug regimen.

The therapeutic follow-up is with weekly biopsies after 12 weeks are negative and the tuberculous endometritis is considered cured. In patients with minimal genital tuberculosis, no evidence of active TB was found in the tubas after 10 months of treatment. For advanced disease, surgery followed by anti-tuberculosis therapy was advised [11].

Patients should be closely followed for an indefinite period. Recurrence or spread to other organs is rare but occurs occasionally, surgery is recommended only if there is no other treatment option and indications include; persistent and recurrent disease despite adequate treatment; persistent or recurrent pelvic masses after 6 months of adequate therapy; persistent or recurring symptoms such as pelvic pain and abnormal genital bleeding; persistent non-healing fistula; multidrug-resistant disease; Concomitant genital tract neoplasia or other pathology, the patient should receive it at least 1 - 2 weeks preoperatively. Surgery is performed mid-cycle in premenopausal patients, and continue for 6 - 12 months, anti-tuberculosis after surgery, and morbidity and mortality are significantly reduced; late complications are rare. The surgery of choice is total abdominal hysterectomy with bilateral salpingo-oopherectomy followed by hormone replacement therapy, especially in a premenopausal woman. If the patient is premenopausal and the ovaries appear normal, they can be preserved, successful pregnancies are reported by early treatment, the patient has a 50% chance of conceiving and achieving a newborn; Although pregnancy can follow a proven minimal TB, patients with advanced disease should be considered infertile, pregnancy after a diagnosis of genital TB is rare. With early diagnosis and appropriate therapy, a more favorable outcome can be expected; the post-treatment fertility rate is 6.7% [11].

Tubal surgery has a poor prognosis. For this group of women, IVF with ET is an option to achieve successful pregnancy after such assisted reproductive technique is not as good as in women who do not have genital tuberculosis. Perinatal morbidity is similar in pregnant women if treated early. Extrapulmonary TB lesions other than lymphatic adenitis are associated with adverse outcomes after pregnancy and delivery. Infection with M. tuberculosis during pregnancy represents a risk of maternal and neonatal complications, and the incidence of preterm delivery, perinatal death, and low birth weight is higher. Vaccination in childhood with Bacillus Calmette-Guerin (BCG) in en-

demic areas reduces the incidence of TB, with a protective effect of 78% [12]. TB decreased with isoniazid-based combination therapy (5%). Age, late presentation, severe underlying disease, and nonreactive tuberculin skin test are predictors of mortality [11].

Discussion

Tuberculosis (TB) represents the highest death rate from any infectious disease causing 1.5 million deaths in 2018 alone. More than 10 million people develop active tuberculosis each year with 1.33 million deaths [46].

Pulmonary tuberculosis remains the most common presentation. In extrapulmonary TB, female genital TB is the second most common presentation; mainly in emerging countries from 5 - 21% [35], mainly affecting women of reproductive age worldwide [28] spreads from the lungs or other organs via the hematogenous lymphatic pathway or spreads directly from adjacent organs. It can be sexually transmitted from a sexual partner with active genital TB; infection with immunodeficiency virus and the current COVID-19 pandemic worsens the clinical outcomes of TB by impeding the immune response of the host [26,29,46].

Genital TB can present with infertility, menstrual problems, unexplained abdominal pain, or a pelvic mass. Patients present with systemic symptoms of fever, weight loss, and night sweats. Ectopic pregnancy and cervical/vulvar lesions are rare presenting features. A postmenopausal woman with vaginal bleeding should also be evaluated. Rare presentations of genital TB include a cervical growth that mimics carcinoma of the cervix, vulvar and vaginal ulcers; TB treatment should be started only after confirmation with microbiology, histopathology, or laparoscopic appearance suggestive of TB [35]. Laparoscopy plays an important role for the diagnosis of genital TB with the presence of tubercles in the peritoneum, Tubo-ovarian mass, caseous nodules, cystic ascites, pelvic adhesions, hydrosalpinx, appearance of uterine tubas in tobacco bag or pearl necklace [9,19,47,48]. The fertility outcome is poor in female genital TB, IVF-ET can be performed for tubal blockage with normal endometrium with a good result. Surrogacy may be recommended in case of damaged endometrium and adoption if the ovaries are damaged. Newer vaccines, diagnostics and drugs (such as bedaquiline, delamanid) and stem cell therapy are being developed and tested [13,15,26,27,29,47,49-51].

Conclusion

Tb continues to be a public health problem in emerging countries and genital TB is responsible for infertility; Sometimes it simulates cancer of the genital tract, and its diagnosis is challenging, the true incidence is not known, due to its asymptomatic presentation and many cases are not diagnosed. Early medical management improves the prognosis of the woman and in the demonstrated minimum TB; pregnancy can be achieved, unlike the advanced who are infertile and occasionally require surgery. Genital tuberculosis is one of the main causes of infertility in women Most patients present in an advanced stage with scarring, severe fibrosis, and adhesions, and the results of treatment, especially with regard to infertility, are poor. Therefore, early diagnosis and correct treatment are vital to avoid complications and restore fertility.

Bibliography

1. World Health Organization Global Tuberculosis Report (2019): 1-297.
2. Global tuberculosis control: WHO report (2011).
3. WHO. WHO global tuberculosis report (2016).
4. Zayet S., *et al*. "Epidemio-clinical features of genital tuberculosis among Tunisian women: a series of 47 cases". *The Pan African Medical Journal* 30 (2018): 71.
5. Grace GA., *et al*. "Genital tuberculosis in females". *Indian Journal of Medical Research* 145.4 (2017): 425-436.
6. Ying Wang., *et al*. "Emerging progress on diagnosis and treatment of female genital tuberculosis". *Journal of International Medical Research* 49.5 (2021): 03000605211014999.

7. Boubacar Efared., *et al*. "Female genital tuberculosis: a clinicopathological report of 13 cases". *Journal of Surgical Case Reports* 3 (2019): rjz083.

8. Lange C and Mori T. "Advances in the diagnosis of tuberculosis". *Respirology* 15 (2010): 220-240.

9. Alcaide F and Coll P. "Advances in rapid diagnosis of tuberculosis disease and anti-tuberculous drug Resistance". *Enfermedad Infecc Microbiología Clínica* 29 (2011): 34-40.

10. Varma TR. "Tuberculosis of the female genital tract". *Global Library Of Women's Medicine* (2008).

11. G Angeline Grace., *et al*. "Genital tuberculosis in females". *Indian Journal of Medical Research* 145.4 (2017): 425-436.

12. Gupta S and Gupta P. "Etiopathogenesis, Challenges and Remedies Associated With Female Genital Tuberculosis: Potential Role of Nuclear Receptors". *Immunology Frontiers* 11 (2020): 02161.

13. Bagchi B., *et al*. "Role of latent female genital tuberculosis in recurrent early pregnancy loss: A retrospective analysis". *International Journal of Reproductive Bio Medicine* 17.12 (2019): 929-934.

14. Hoppe LE., *et al*. "Development Group. Tuberculosis—diagnosis, management, prevention, and control: Summary of updated NICE guidance". *British Medical Journal* 352 (2016): h6747.

15. Sah SK., *et al*. "Ct findings and analysis for misdiagnosis of female pelvic tuberculosis". *Radiology of Infectious Diseases* 4 (2017): 19-25.

16. Sharma S., *et al*. "A Rare Case of Cervical Tuberculosis Masquerading as Carcinoma Cervix". *Ann Woman Child Health* 2 (2016): C20-23.

17. Gupta B., *et al*. "Genital tuberculosis: Unusual presentations". *International Journal of Mycobacteriology* 5 (2016): 357-359.

18. Abdelrub AS., *et al*. "Genital tuberculosis is common among females with tubal factor infertility: Observational study". *Alexandria Journal of Medicine* 51 (2015): 321-324.

19. Hoppe LE., *et al*. "Abubakar I Guideline Development Group. Tuberculosis—diagnosis, management, prevention, and control: Summary of updated NICE guidance". *British Medical Journal* 352 (2016): h6747.

20. Sharma JB., *et al*. "Comparative Study of Laparoscopic Abdominopelvic and Fallopian Tube Findings Before and After Antitubercular Therapy in Female Genital Tuberculosis With Infertility". *The Journal of Minimally Invasive Gynecology* 23.2 (2016): 215-222.

21. Bernardo J. "Clinical manifestations, diagnosis, and treatment of extrapulmonary and miliary tuberculosis Literature review current through (2016).

22. Ramesh J., *et al*. "Abdominal tuberculosis in a district general hospital: a retrospective review of 86 cases". *QJM: An International Journal of Medicine* 101 (2008): 189.

23. Shah HU., *et al*. "Hysterosalpingography and ultrasonography findings of female genital tuberculosis". *Diagnostic and Interventional Radiology* 21 (2015): 10-15.

24. Farrokh D., *et al*. "Hysterosalpingographic findings in women with genital tuberculosis". *Iranian Journal of Reproductive Medicine* 13 (2015): 297-304.

25. Sharma JB., *et al*. "Female genital tuberculosis: revisited". *Indian Journal of Medical Research* 148 (2018): 71.

26. Sharma SK., *et al*. "Index-TB guidelines: guidelines on extrapulmonary tuberculosis for India". *Indian Journal of Medical Research* 145 (2017): 448-463.

27. Sharma JB., *et al*. "Laparoscopic findings in female genital tuberculosis". *Archives of Gynecology and Obstetrics* 278 (2008): 359-364.

28. Ying Wang., *et al*. "Emerging progress on diagnosis and treatment of female genital tuberculosis". *Journal of International Medical Research* 49.5 (2021): 03000605211014999.

29. Khurana A and Sahi G. "OC14.04: ultrasound in female genital tuberculosis: a retrospective series". *Ultrasound in Obstetrics and Gynecology* 42 (2013): 28.

30. Munne KR., *et al*. "Female genital tuberculosis in light of newer laboratory tests: A narrative review". *Indian Journal of Tuberculosis* 67.1 (2020): 112-120.

31. Jindal UN., *et al*. "Favorable infertility outcomes following anti-tubercular treatment prescribed on the sole basis of a positive polymerase chain reaction test for endometrial tuberculosis". *Human Reproduction* 27 (2012): 1368.

32. Bhanothu V and Venkatesan V. "Conventional polymerase chain reaction and amplification refractory mutation system-multi-gene/multi-primer PCR in the diagnosis of female genital tuberculosis". *Archives of Microbiology* 201.3 (2019): 267-281.

33. Ishrat S and Fatima P. "Genital tuberculosis in the infertile women - an update". *Mymensingh Medical Journal* 24.1 (2015): 215-220.

34. Seo H., *et al*. "Temporal trends in the misdiagnosis rates between Crohn's disease and intestinal tuberculosis". *World Journal of Gastroenterology* 23 (2017): 6306-6314.

35. Zayet S., *et al*. "Epidemio-clinical features of genital tuberculosis among Tunisian women: a series of 47 cases". *The Pan African Medical Journal* 30 (2018): 71.

36. Lee J., *et al*. "Clinical relevance of ground glass opacity in 105 patients with miliary tuberculosis". *Respiratory Medicine* 108 (2014): 924.

37. David M Lewinsohn., *et al*. "Official American Thoracic Society/Infectious Diseases Society of America/Centers for Disease Control and Prevention Clinical Practice Guidelines: Diagnosis of Tuberculosis in Adults and Children". *Clinical Infectious Diseases*® 64.2 (2017): e1-e33.

38. Munseri PJ., *et al*. "The bacteraemia of disseminated tuberculosis among HIV-infected patients with prolonged fever in Tanzania". *Scandinavian Journal of Infectious Diseases* 43 (2011): 696.

39. Dowdy DW., *et al*. "Serological testing versus other strategies for diagnosis of active tuberculosis in India: a cost-effectiveness analysis". *PLOS Medicine* 8 (2011): e1001074.

40. Sharma JB. "Current diagnosis and management of female genital tuberculosis". *The Journal of Obstetrics and Gynecology of India* 65 (2015): 362-371.

41. Steingart KR., *et al*. "Commercial serological tests for the diagnosis of active pulmonary and extrapulmonary tuberculosis: an updated systematic review and meta-analysis". *PLOS Medicine* 8 (2011): e1001062.

42. Tortoli E., *et al*. "Clinical validation of Xpert MTB/RIF for the diagnosis of extrapulmonary tuberculosis". *European Respiratory Journal* 40 (2012): 442.

43. Fernando Alcaide. Actual microbiológico diagnóstico de tuberculosis". *Enfermedades Infecciosas y Microbiología Clínica* 35.7 (2017): 399-402.

44. Niranjana Subramanian., *et al*. "Imaging as an alternate diagnostic modality in a presumptive case of abdominopelvic TB in a COVID-19 patient". *BMJ Case Reports* 14.3 (2021): e241882.

45. Agrawal S Madan M., *et al*. "Rare case of cervical tuberculosis simulating carcinoma cervix: a case report". *Cases Journal* 2 (2009): 161.

46. World Health Organization. WHO global tuberculosis report 2018. Geneva: WHO (2018).

47. Crisan-Dabija R., *et al*. "Tuberculosis and COVID-19: lessons from the past viral outbreaks and possible future outcomes". *Canadian Respiratory Journal* (2020): 1-10.

48. Sharma JB. "In vitro fertilization and embryo transfer in female genital tuberculosis". *IVF Lite* 2 (2015): 14-25.

49. Abdelrub AS., *et al*. "Genital tuberculosis is common among females with tubal factor infertility: Observational study". *Alexandria Journal of Medicine* 51 (2015): 321-324.

50. Siddharth Yadav., *et al*. "Genital tuberculosis: current status of diagnosis and management". *Translational Andrology and Urology* 6 (2017): 2.

51. Ying Wang., *et al*. "Emerging progress on diagnosis and treatment of female genital tuberculosis". *Journal of International Medical Research* 49.5 (2021): 03000605211014999.

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