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Original Research Article

Comparative analysis of fetomaternal outcome in antenatal women infected with pulmonary and extrapulmonary tuberculosis

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ABSTRACT

Background: Active tuberculosis is a multiorgan disease caused by primary infection or as a re-activation of latent tuberculosis. The studies comparing maternal and fetal outcome in antenatal women with extrapulmonary tuberculosis and pulmonary tuberculosis is scanty therefore, in current study we outline and identify the demographic and clinical characteristics of pulmonary tuberculosis and extrapulmonary tuberculosis and comparing fetal and maternal outcome in pulmonary and extrapulmonary tuberculosis. The maternal complications and fetal complications of pulmonary tuberculosis were analysed compare with extra pulmonary tuberculosis.

Methods: This was prospective observational study done in tertiary care centre over a period 1.5 year from January 2019 to June 2020. Institute ethical committee approval was obtained. Pregnant women in the age group of 18-42 years diagnosed with tuberculosis in antenatal period were included in our study for comparing fetal and maternal outcomes. They were evaluated for their symptom including clinical examination, microbiological, radiological and biochemical testing. We excluded those antenatal women with tuberculosis and adequately treated and cured and those women with tuberculosis who did not delivered during study period.

Results: Most common complication associated with pulmonary tuberculosis was intrauterine growth restriction whereas in extrapulmonary preterm labour most common complication. Perinatal outcome worse in extrapulmonary tuberculosis as compared to pulmonary tuberculosis.

Conclusions: Pregnancy with tuberculosis worsen the outcome of both mother and fetus. Our study depicted perinatal outcome is worse in Extrapulmonary TB than pulmonary TB. Atypical presentation of the Extrapulmonary TB may constitute diagnostic and therapeutic challenges thus a high clinical suspicion is needed.

Keywords: Antenatal women, Comparative, Extra pulmonary, Fetomaternal outcome, Pulmonary tuberculosis

INTRODUCTION

About one fourth of world's population is estimated to be infected with tuberculosis.¹ Active tuberculosis is a multiorgan disease caused by primary infection or as a re-activation of latent tuberculosis. Active tuberculosis might be primary tuberculosis or reactivation tuberculosis. Primary tuberculosis occurs when the immune system is unable to defend against the

Mycobacterium tuberculosis bacterium (MTB) infection. On average 5-10 % of those infected will develop tuberculosis disease over the course of time.² Pregnancy is immunocompromised state so chances of getting disease are substantially high during this period. Globally it is estimated that 216500 pregnant women have active tuberculosis. Tuberculosis is one of the leading cause of death in women of reproductive age group (15-45 years).³ Indirect maternal death now account for 28% of total

maternal death out of these 15-35% deaths were due to tuberculosis.⁴

Pulmonary tuberculosis is highly contagious infection that may disseminate in the initial period after infection.⁵ The proportion of pulmonary tuberculosis and extrapulmonary tuberculosis varies with respect to geographical, social, ethical and economical parameter.⁶

Lung most common site of infection and now extra pulmonary site become more prevalent in antenatal women. In extrapulmonary tuberculosis lymph node, abdomen, brain and spine are site of involvement. It has been seen that there is delay in diagnosis of tuberculosis in pregnancy due to various symptoms with which patients present are many times converging to physiological changes in pregnancy.⁷ Extrapulmonary tuberculosis attributed to atypical presentation, diagnostic difficulties, increasing prevalence and potential to result in hazardous sequelae hence increase in clinical awareness for extrapulmonary tuberculosis is crucial.⁸

Active pulmonary tuberculosis infection in pregnancy associated with small for gestation, spontaneous abortion, preterm labour, low birth weight, intrauterine growth restriction, anaemia, perinatal mortality and maternal mortality.⁹ In recent post mortem analysis of maternal death highlight that infections including tuberculosis, is an important contributor to maternal death in India.¹⁰ However the studies comparing maternal and fetal outcome in antenatal women with extrapulmonary tuberculosis and pulmonary tuberculosis is scanty therefore, in current study we outline and identify the demographic and clinical characteristics of pulmonary tuberculosis and extrapulmonary tuberculosis. We compared the course of pregnancy, pregnancy outcome and perinatal outcome among antenatal women with extrapulmonary tuberculosis and pulmonary tuberculosis. Thereby, we hope to figure out clinical clues may be determined for better recognition and more effective management of disease.

METHODS

This was prospective observational study done in tertiary care centre over a period 1.5 year from January 2019 to June 2020. Institute ethical committee approval was obtained. Pregnant women in the age group of 18-42 years diagnosed with tuberculosis in antenatal period were included in our study for comparing fetal and maternal outcomes. They were evaluated for their symptom including clinical examination, microbiological, radiological and biochemical testing. We excluded those antenatal women with tuberculosis and adequately treated and cured and those women with tuberculosis who did not delivered during study period.

Data collected from individual case records included age, parity, time of diagnosis, socioeconomic status, mode of delivery, complication in antenatal period, intrapartum period and postpartum period. The mean birth weight of

infant, frequency of small for gestation, NICU admission, neonatal mortality and still birth were noted and perinatal outcome was seen.

Statistical analysis

After collection of data, it was entered in Microsoft excel sheet and analysis was done using SPSS (statistical package of social sciences) version 20 and Epilnfo version 7.2.1. Data is represented in frequencies and mean SD. Chi square test used to check association.

The research is in accordance with ethical guidelines of the institute's ethical committee. Informed consent was taken from the participants involved in this study in the language best known to them.

RESULTS

Characteristics of the antenatal women with tuberculosis

In our study, as shown in Table 1 mean age of antenatal women for pulmonary tuberculosis was 22.63±3.42 years and for extrapulmonary tuberculosis was 25.32±1.63. Majority of women were multigravida in both group. In our study pulmonary tuberculosis 48/60 (80%) cases belonged to lower socioeconomic status whereas extrapulmonary 15/20 (75%) cases belonged to middle socioeconomic status.

Table 1: Characteristics of the antenatal women with tuberculosis.

Characteristics	Pulmonary (n-60)	Extrapulmonary (n-20)
Age (years)	22.63±3.42	25.32±1.63
Parity (%)	Multi (66.66%)	Multi (65%)
Socioeconomic status (prasad scale)	Lower (80%)	Middle (75%)
Registration status	Registered (83.33%)	Unregistered (60%)

Table 2: Clinical presentation of pulmonary tuberculosis.

Clinical presentation	No of patients (n=60)	Methods of diagnosis
Chronic cough with expectoration	50/60 (83.33%)	Sputum AFB, sputum gene expert
Fever, breathlessness, haemoptysis	7/60 (11.66%)	Pleural fluid cytology, tracheal aspiration gene expert and cytology
Weight loss, weakness	3/60 (5%)	Serial weight scale

Table 3: Clinical presentation of extrapulmonary tuberculosis.

Site of tuberculosis	Clinical presentation	No of patients (n=20)	Methods of diagnosis
Tubercular lymphadenitis	Swelling in neck and fever	10/20 (50%)	FNAC of lymph node, USG neck
Tubercular meningitis	Headache, convulsion, vomiting	4/20 (20%)	CSF analysis, MRI brain
Abdominal tuberculosis	Abdominal distension, pain in abdomen, diarrhoea	4/20 (20%)	Usg guided biopsy, ascitic fluid cytology, ADA, CT scan
Potts spine	Back pain, weakness	1/20 (5%)	MRI spine, spinal fluid cytology
Renal tuberculosis	Burning micturition , flank pain , perinephric abscess	1/20 (5%)	Urine analysis, pus culture sensitivity and gene expert and renal biopsy

As shown in Table 2 Chronic cough with expectoration (83.33%) was most common presenting symptom in pulmonary tuberculosis. In extrapulmonary tuberculosis swelling in neck and fever (50%) was most common symptom.

Antenatal complication

As shown in Figure 1 the most common antenatal complication was anaemia (25%) in both groups. Apart from this preterm labour (15%) second most common complication in extrapulmonary tuberculosis whereas intrauterine growth restriction (8.33%) was second most common complication in pulmonary tuberculosis.

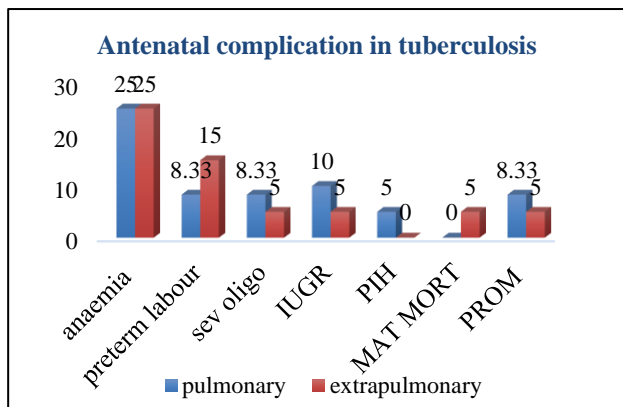


Figure 1: Comparison of antenatal complication in pulmonary and extrapulmonary tuberculosis.

Mode of delivery

Full term normal vaginal delivery (FTND) was most common mode of delivery in both groups as shown in Figure 2. Preterm vaginal deliveries were more common in extrapulmonary tuberculosis 7 cases (35%) as compared to pulmonary tuberculosis 15 cases (25%). 10 cases (16.66%) in pulmonary and 2 (10%) in extrapulmonary tuberculosis were underwent caesarean section with most common indication fetal distress.

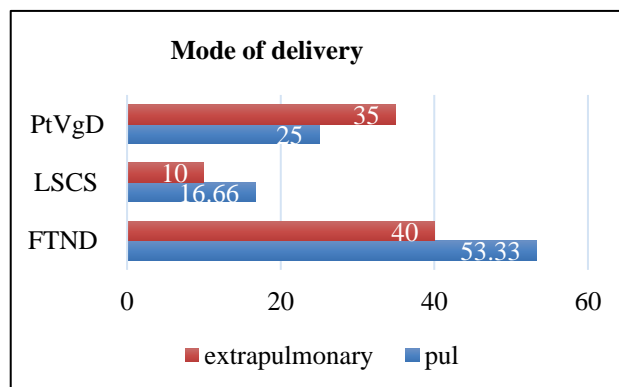


Figure 2: Comparison of pregnancy outcome in pulmonary and extrapulmonary tuberculosis.

Correlation of type of tuberculosis and pregnancy outcome

Table 4: Correlation of type of tuberculosis and pregnancy outcome.

Correlation	Group		Total	
	EP	P		
Outcome	Live	12	47	59
	Abortion	3	1	4
	Perinatal mortality	5	11	16
	Undelivered	1	0	1
Total	17	58	80	

X² =6.47, p=0.039

There was significant association between adverse pregnancy outcome and extrapulmonary tuberculosis (p=0.009). Perinatal mortality were seen more in extrapulmonary tuberculosis group with 5 perinatal mortality (29.41%) as compared to 9 (15.51%) perinatal mortality in pulmonary tuberculosis as shown in Table 4. Abortion was more in extrapulmonary tuberculosis. 3 (15%) had spontaneous abortion in extrapulmonary tuberculosis and 1 (1.66%) in pulmonary tuberculosis. One antenatal woman succumbed in 5 month gestation due to complication of extra pulmonary tuberculosis.

Table 5: Comparison of fetal outcome in pulmonary and extrapulmonary tuberculosis.

Fetal outcome	Pulmonary (n=47)	Extrapulmonary (n=12)
Mean birth weight	2.192±346	2.375±682
SGA	37 (78.72%)	8 (66.66%)
APGAR <8	12 (25.53%)	8 (66.66%)
Respiratory distress	10 (21.27 %)	3 (25%)
NICU admission	15 (31.91 %)	10 (83.33%)

Fetal outcome

As shown in Table 5 the mean birth weight was 2.192±346 kg for pulmonary tuberculosis whereas 2.375±682 kg for extrapulmonary tuberculosis. There were more number of small for gestational age (SGA) babies in patient with pulmonary tuberculosis (78.72%) as compared to extrapulmonary tuberculosis (66.66 %).¹⁰ (16.96%) babies required respiratory support due to prematurity but later 3 babies given to mother in stable condition and were healthy on discharge whereas in extrapulmonary tuberculosis, 3 (17.64%) babies required respiratory support due to prematurity but 2 babies died. There was no case of congenital tuberculosis observed.

Table 6: Comparison of maternal mortality in pulmonary and extrapulmonary tuberculosis.

Maternal death in cases of tuberculosis	Frequency	Percentage (%)
Pulmonary	10	16.66
Extrapulmonary	3	15
Total	13	31.66

Maternal mortality

As shown in Table 6 maternal mortality due to pulmonary tuberculosis and its complication was 10 cases (16.66%) whereas in maternal mortality due to extrapulmonary tuberculosis and its complication was 3 cases (15%).

DISCUSSION

In this study, we aimed to investigate and compare the demographic, clinical, obstetrics and fetal outcome of extrapulmonary and pulmonary tuberculosis. In our study pulmonary tuberculosis more common than extrapulmonary tuberculosis. In our study, 60/80 (75%) were diagnosed with pulmonary tuberculosis and 20/80 (25%) were diagnosed with extrapulmonary tuberculosis as compared to 38% of pulmonary and 62 % of extrapulmonary cases seen in study conducted by Chopra et al and in Tripathi study cases of pulmonary tuberculosis were 90.88% and extrapulmonary cases were 9.12%.^{11,12} In our study average age index 25.63±3.42 years in pulmonary and 25.32±1.63 years in extrapulmonary tuberculosis which is comparable to

25.7±4.22 years and 28.7±3.9 years in study conducted by Chopra et al and Yadav et al respectively.^{11,13}

In our study, 48 (80%) women were of lower socioeconomic status in pulmonary tuberculosis whereas in extrapulmonary tuberculosis 15 (75%) antenatal women belonged to middle socioeconomic status. According to Muniyandi's study prevalence tuberculosis higher in those who are living below poverty line.¹⁴

In our study pulmonary tuberculosis was more prevalent. In extrapulmonary tuberculosis sites of distribution were as follow lymph node (11.25%), meninges (6.25%), abdominal (5%), spinal and renal (1.25%). Similar distribution seen in Chopra et al study whereas according to Yadav et al study in extra pulmonary tuberculosis genital tuberculosis was the most common site.^{11,13}

The effect of tuberculosis depends on various factors such as severity of disease, site of tuberculosis, time of gestation at the time of diagnosis, treatment and compliance to treatment.¹⁵ Tuberculosis in pregnancy associated with complication like small for gestation, IUGR, preterm labour, spontaneous abortion, low birth weight and increase in neonatal mortality.⁹ In present study anaemia was the most common complication in both groups. Apart from this preterm labour (15%) second most common complication in extrapulmonary tuberculosis whereas intrauterine growth restriction (8.33%) was second most common complication in pulmonary tuberculosis.

According to Mahendru et al tuberculosis associated with low birth weight, poor Apgar score and neonatal mortality similar result seen in our study.¹⁶ Perinatal morbidity was similar in pregnant women receiving anti tuberculous drugs from early pregnancy to that uninfected women. Tuberculosis associated with pregnancy is an important risk factor for adverse neonatal outcome.¹⁷ In our study, we found an increased risk of NICU admission, small for gestational age and perinatal mortality in pregnant women with extrapulmonary tuberculosis. The mean birth weight in pulmonary tuberculosis was 2.192±346 kgs and 2.375±682 kgs in extrapulmonary tuberculosis. Our study contributes robust evidence suggesting that extrapulmonary tuberculosis has adverse effect on pregnancy outcome and perinatal outcome. In our study 13 maternal mortality were reported; 10 maternal mortality due to pulmonary tuberculosis and its complication and 3 maternal mortality due to extrapulmonary tuberculosis and its complication.

CONCLUSION

India is the highest Tuberculosis burdened country as per WHO statistics. Pregnancy with tuberculosis worsen the outcome of both mother and fetus. Our study depicted perinatal outcome is worse in extrapulmonary TB than pulmonary TB. Atypical presentation of the

extrapulmonary TB may constitute diagnostic and therapeutic challenges thus a high clinical suspicion is needed.

Recommendations

Perinatal tuberculosis difficult to diagnose and can be fatal. All neonates born to tuberculosis mother should be screened for tuberculosis and placenta should be studied for evidence of tuberculosis. Recently, the W.H.O. recommends that “In settings where the tuberculosis prevalence in the general population is 100/100 000 population or higher, systematic screening for active TB should be considered for pregnant women as part of antenatal care. Pre conceptional counselling and early antenatal visits are important opportunities to screen and diagnose TB early in its course and ensure adequate treatment as per national programme. This will optimize the maternal and perinatal outcome.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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