MANAGEMENT OF A BABY OF TUBERCULOUS MOTHER

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Tuberculosis in the newborn has a very high mortality rate, if undiagnosed and not treated early. Nearly 1.9 million children under the age of 5 years get primary infection annually(1). Such a high prevalence rate is complicated by factors like poor patient compliance, poor follow-up and dangers of separating the mother and baby(2). This article proposes to review tuberculosis in mother and infant pair through perinatal period, as there is paucity of data as well as difference of opinion among Pediatricians on the management of a baby born to a tuberculous mother.

Pulmonary tuberculosis is the most common form of tuberculosis seen in the mother during pregnancy although extra-pulmonary forms of tuberculosis like tuberculous endometritis is also known(3). Tuberculosis in the mother does not alter

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the course of pregnancy except when untreated it may result in abortion(4-7).

Mechanism of Vertical Transmission

Four different modes of transmission of tuberculosis infection to the baby are known(2,8):

1. Tuberculosis lesions develop in the intervillous blood space after the bacilli localize there during bacillemia in the mother. A thrombus is formed, which is liberated into the fetal circulation, once the intervillous barrier is traumatized during labor.

2. Tuberculous endometritis may result in infection of the placenta, amniotic membranes and amniotic fluid. The fetus may acquire infection by ingesting or inhaling the infected fluid or through spread of placentitis.

3. The fetus may aspirate the infected material during its passage through the infected birth canal.

4. Post-partum transmission from other or close contacts through droplet inhalation, ingestion or traumatized mucous membrane. Although epidemiologic data do not exist, most perinatal and early infant infections with tuberculosis probably develop via air-borne inoculation from infected mother or close contacts(9).

Congenital Tuberculosis

Denotes infection with tubercle bacilli during intauterine life or before complete passage through the birth canal. Miliary or tuberculous meningitis in the mother has a 30% risk of congenital infection(4).

Baitzke laid down rigid criteria for the diagnosis of congenital tuberculosis(2):

1. Tuberculous nature of the lesion must be proved.

2. The infant should have a primary complex in the liver.

3. The lesions should be present within the first days of life, or

4. If the infant has neither a proven hepatic primary nor lesions present in the first days of life, all extrauterine sources of infection must be excluded with certainty.

Clinical Manifestations

At birth there may be no symptoms except baby may be low birth weight. Symptoms usually manifest by the second or third week of life with pallor, anorexia, poor weight gain, lethargy or irritability. Respiratory distress, fever and hepatosplenomegaly with abdominal distention may be present. Peripheral lymphadenopathy is seen in approximately one third of the cases. Chest roentgenograms may show evidence of pneumonitis and some show a miliary pattern.

Limitations in Diagnosis

The major pitfalls in establishing the diagnosis are:

(a) The diagnostic tools namely Mantoux test, chest X-ray and mycobacteriology are less useful in the neonate.

(b) Skin tests in the newborn rarely become positive before 3-5 weeks postnatally.

(c) A positive tuberculin test is significant, but a negative test does not exclude the disease. Many factors suppress tuberculin sensitivity. Also, Mantoux test may be positive in adults in developing countries

due to subclinical infection, without being infective.

(d) Although scoring systems have been proposed for diagnosis of childhood tuberculosis, a definitive diagnosis requires the demonstration of acid-fast bacillus by microscopy or culture(10,11).

Early morning gastric aspirates are highly productive of positive cultures. Direct smears from middle ear fluid, bone marrow or tracheal aspirates or biopsies of peripheral lymph nodes or lung tissue may show AFB. The cerebrospinal fluid yield is often very low(12). Liver biopsy is highly productive and presence of classical granuloma clinches the diagnosis.

Congenitally and neonatally acquired tuberculosis has a 50% mortality and is often diagnosed at autopsy(12). Suspicion should be triggered if mother is known to have had recent active tuberculosis or if she develops an active lesion during the puerperium. It is equally important to screen family members and close contacts for open cases. The recommended drug therapy for congenital or neonatal tuberculosis is isoniazid (INH) and rifampicin each 10 mg/kg/day for a period of nine months(2,13). Regimens of 6 months are probably as effective as in adults(13). The Committee on Treatment, International Union against Tuberculosis and Lung Diseases, has recommended the dose of Isoniazid as 5 mg/kg/day(14). However, in general children tolerate larger doses per kilogram of body weight and have fewer adverse reactions than adults(15).

Guidelines for management of a tubercular mother and her baby are discussed under four separate categories:

1. *Mother has positive Mantoux test, but no clinical symptoms, negative sputum and negative chest X-ray:* Observe and follow up

the mother with sputum examination and chest X-ray for 3-6 months post-partum. Review family contacts and give BCG to the baby at birth.

2. *Mother had tuberculosis before pregnancy but received full anti-tuberculous treatment:* There is minimal risk to the newborn, although chance for reactivation is present. Observe and follow up the mother for 3-6 months after delivery for recurrence of symptoms and with sputum examination and chest X-ray. Give BCG to the baby at birth.

3. *Mother on anti-tuberculous therapy during pregnancy, but sputum negative:* Once treatment has been started, mother is no longer infective. However, observe fam-ily contacts for open cases and monitor the mother for regular adequate treatment. Do Mantoux test to the baby at birth and if negative, give BCG.

4. *High risk situation:* Mother on irregular treatment, sputum positive, suggestive chest X-ray, miliary tuberculosis or tuberculous meningitis or open contacts in the family, all these constitute a high risk of infection to the newborn.

Prompt and adequate anti-tuberculous therapy should be started for the mother (*Table I*). Regardless of the extent of active tuberculosis, the patient becomes non-infective soon after initiation of therapy. Hence, there is no need to isolate the baby or mother and breast feeding should be

TABLE I—*Tuberculous Drugs and Risk of Fetal Malformations*

Drug	Trans-placental transfer	Teratogenic effect	Remarks
1. INH	+	Insignificant even in first trimester	Risk of INH induced hepatotoxicity in the child-bearing age group, relatively low.
2. Rifampicin	+	— Less than 3% risk — Limb reduction — CNS abnormality — Hypoprothrombinemia	Mechanism—inhibit DNA dependent RNA polymerase
3. Pyrazinamide		—Not well studied in pregnancy—	
4. Ethambutol	—	Nil	Avoid in infants since optometric testing is not feasible
5. Streptomycin	+	17% chance of vestibular damage and severe bilateral deafness	Better avoid during pregnancy
6. Ethionamide	+	Potent teratogen CNS, skeletal and heart abnormalities	Avoid

+ = Present   — = Negative.

continued. In developing countries, it may be disastrous to isolate the baby and stop breast-feeding(2,9,16).

The baby is given prophylactic INH (10 mg per kg body weight per day) for a period of 3 months. Daily INH can protect the newborn against acquiring tuberculosis. At the end of 3 months, while the mother is kept under surveillance, the infant is skin tested and if negative, given BCG.

However, in India because of the increasing resistance in adults to INH, it has been suggested that high risk groups be given two drugs, namely isoniazid and rifampicin(17).

Breast feeding and Tuberculosis

All recommended anti-tuberculous drugs are secreted in breast milk in an amount uniformly less than one per cent of the maternal dosage. Thus the infant would receive only less than 20% of the usual therapeutic dose for infants. Also, once the therapy has been initiated, the mother is no longer infective. Considering the advantage of breast feeding in a developing country, it is recommended that breast feeding should be continued and there is no need to isolate the baby or mother(2,9,16).

BCG and the Newborn

BCG given on the first day after birth provides significant degree of protection for the noninfected neonate(18,19). Recent studies suggest a significant decrease in the overall incidence of tuberculosis in children vaccinated with BCG at birth and some decrease in the severity of the disease when it occurs. Further follow-up of the Chingleput study in South India has shown that BCG does not provide some protection when given to infants and young children(20,21).

However, BCG vaccination cannot pre-

vent the lodgement of tubercle bacilli and development of natural infection at the site of portal of entry into the lungs. But its protective value lies in preventing multiplication and hematogenous dissemination of bacilli from primary site(17,21).

The argument against BCG is that since it promotes the development of tuberculin sensitivity, it could theoretically interfere with the use of PPD skin test as a case finding device. But studies have shown that not only does not the reactivity from BCG largely disappear within one year of vaccination, but also that children with PPD reactions of greater than 10 mm could be easily identified as infected with *M. tuberculosis*(22-25).

INH resistant BCG and INH prophylaxis has been available in the U.K., but has not been widely tried. Theoretically it would provide a means of simultaneously immunizing and treating the infant.

In conclusion, the increased risk of morbidity and mortality and difficulty in clinical diagnosis of congenital tuberculosis demands emphasis on prevention of tuberculosis in pregnancy. As the prevalence of tuberculosis in India remains high, a high index of suspicion, sound clinical judgement, follow up and monitoring of baby and mother, family members and close contacts is mandatory for successful management of tuberculosis in the pregnant woman and her baby.

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