PREGNANCY AND TUBERCULOSIS*

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TUBERCULOSIS appears not to be diminishing as rapidly among girls and young women as it is in other age and sex groups, therefore the combination of tuberculosis and pregnancy continues to be an important problem in preventive medicine.

It has been stated that during the past thirty years the sale of Christmas seals has made it possible for the tuberculosis agencies throughout the United States, under the leadership of the National Tuberculosis Association, to save the lives of 2,500,000 people. An unbelievable task, but, what about the tuberculous women in this very large group who have become pregnant? What has been done to save them from the deleterious effects of pregnancy superimposed on their tuberculosis?

Tuberculosis still takes some 75,000 lives in the United States each year. It is the leading cause of death between the ages of fifteen and forty-five years and of the 40,000 odd deaths between these ages, approximately 20,000 are amongst women. Just what proportion of these have become pregnant and have aborted or given birth at or near term we do not know. We do know however, that as a general rule, the gravida who has tuberculosis does not receive adequate care during pregnancy, labor and the puerperium. Furthermore she does not receive adequate medical supervision for a sufficient length of time following the lying-in period. In substantiation of these statements, Alice M. Hill has called attention to the appalling fact that only 87 or 21 per cent of 413 sanatoria in the United States, (there are a total of 463 tuberculosis sanatoria in the United States), admit or retain pregnant tuberculous women and keep them through delivery.

Of these institutions 43 are general hospitals, thus leaving only 44 tuberculosis sanatoria or 10.6 per cent of the total (413) that admit or retain pregnant women and take care of them through delivery; 247 or 60 per cent of the 413 sanatoria admit pregnant women but transfer them to general or special hospitals or to their homes for the delivery. Furthermore we find that 24 per cent of the private sanatoria do not admit pregnant women at all, and only 17 per cent of them keep the patient through delivery. Of the state sanatoria only 10 per cent keep their pregnant patients through delivery, while 71 per cent admit them before time for the delivery. Of the County sanatoria 22 per cent keep them through delivery, and 65 per cent transfer them for delivery.

In this report by Dr. Hill, nothing was said about the adequacy of the care these patients receive. Nevertheless, from the standpoint of their tuberculosis, there can be little doubt as to the adequacy of the treatment; from the standpoint of the pregnancy, labor and puerperium there is grave doubt. This is a natural supposition for no one would expect an expert obstetrician interested in tuberculosis to be associated with a tuberculosis sanatorium, except perhaps those situated in or near the larger cities. Of the 87 sanatoria reporting facilities for the care of pregnant tuberculous women, only a very few, probably not over 10 to 12, actually carried out the proper management of pregnancy, labor and the puerperium while the vast

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majority did the best they could with the facilities they possessed, realizing full well their inadequacies. The greater city of New York is in no better position for there are only 1 or 2 institutions in the city where the tuberculous woman who is pregnant can be adequately cared for through delivery and beyond the lying-in period.

What then is to be done to insure adequate care, both medical and obstetrical, for the pregnant tuberculous woman? I offer the following:

1. The ideal set-up for a tuberculosis and pregnancy clinic would be a special institution devoted exclusively to the care and treatment of pregnant tuberculous women. Here would be working in close harmonious cooperation a specialist in tuberculosis; an expert obstetrician interested in tuberculosis; a pediatrician also interested in tuberculosis; a roentgenologist; and the whole group supported by good pathological and bacteriological laboratories. In such an institution the tuberculosis, the pregnancy, labor and puerperium and the baby immediately after birth, could be adequately handled, and the "follow-up" of mother and baby could be ascertained with accuracy. Furthermore research in pathology and bacteriology of tuberculosis, including congenital tuberculosis, could be pursued to the end that something definite and constructive might supplant the confusion and chaos now existing.

2. In lieu of this ideal set-up the following is proposed: viz.; that each hospital group interested be allocated a certain number of beds for pregnant women with tuberculosis and that these patients be under the direct supervision of a tuberculosis specialist in cooperation with an obstetric specialist who is interested in tuberculosis. After the seventh month of the pregnancy the obstetrician should assume first control of the patient with the tuberculosis specialist cooperating. The obstetrician is to continue in charge until after the postpartum period (two or three weeks or longer) following which the tuberculosis specialist again assumes charge and manages the case as he would any other case of tuberculosis.

3. The management of the baby should be put under the direct supervision of a pediatrician interested in tuberculosis as soon as the umbilical cord is ligated. Decision as to the extent of mother-baby association, if any, can thus be made before contact-infection of the baby takes place. This arrangement is of the utmost importance, particularly where the mother's sputum is positive for tubercle bacilli. The pediatrician, of course, should follow the child through the adolescent period and see to it that a good internist takes charge when he shall have finished his job.

By this arrangement, research could be carried on by the various individuals concerned in the management of these cases and, with the cooperating team work of the various laboratories, reliable end-results could be ascertained. Moreover, under such a plan, diagnosis, classification and management would become much more standardized and systemized than has hitherto been possible. Naturally no plan will be successful unless the cooperating physicians, tuberculosis specialist, obstetrician, pediatrician, roentgenologist, pathologist and bacteriologist, are vitally interested in this type of work. Cooperation means success; lack of it spells failure.

The effect of pregnancy upon pulmonary tuberculosis is variable. As a matter of fact this same state of affairs is true in the non-tuberculous woman. It is a well known fact that in apparently normal women there are those to whom pregnancy is a benefit and who improve and thrive during this state. On the other hand, there are those in whom, almost from the outset, pregnancy causes a pathological condition, often fraught with grave danger to the mother. If we take such examples and add to them tuberculosis, it is reasonable to expect parallel results. To quote Allen Krause, "May it not be that pregnancy exerts a harmful effect on tuberculosis in those women, who without tuberculosis

would naturally tolerate pregnancy poorly, and a harmless, or even a beneficial, effect on those tuberculous women who, without tuberculosis, would stand pregnancy well, or even have their bodily economy improved by pregnancy?"

There have been well authenticated reports that claim active tuberculosis is benefited by pregnancy. In certain individuals with a given type of lesion this might well be true. Contrariwise certain other types in other individuals are undoubtedly made worse by pregnancy or labor or the puerperium, one or any combination of these three stages of childbearing. We must never forget that pregnancy or parturition or the puerperium may independently of one another, as well as in combination, produce ill effects upon tuberculosis. The modus operandi of just how parturition and involution stimulates activity in pulmonary tuberculosis is not clear, however, the foreign proteins thrown into the blood stream during the process of involution may be the activating cause. At any rate it is during the puerperium that the "flare up" of the tuberculosis is most likely to occur. Statistics vary, but from 10 to 85 per cent of patients are adversely influenced by childbearing.

Matthews and Bryant found that in 317 "graduates" of Trudeau Sanatorium at Saranac Lake, New York, 33 per cent dated the onset or relapse of their tuberculosis during pregnancy or after delivery. Furthermore if these 317 patients are classified into minimal, moderately advanced and far advanced types we find that 25 per cent, 33 per cent and 50 per cent respectively were made worse by pregnancy, parturition or the puerperium. Fishberg, in a series of 286 tuberculous women, found that 37.4 per cent developed symptoms of tuberculosis following childbirth. Ornstein and Kovnat found that of 85 tuberculous women who had borne children 36 per cent died, 18 per cent were unimproved or progressed and 46 per cent were improved. C. C. Norris from the Phipps Institute reported 166 cases in which 38 per cent were made worse, 37 per cent showed no change and 18 per cent were improved following childbirth. E. Rist of Paris, reporting on 52 cases of tuberculosis and pregnancy found that 84.6 per cent were made worse and 15.3 per cent were unchanged; 36.5 per cent died after one year and 50 per cent after the second year. Thus the list of statistics "goes on and on" without consistant end-results. Much confusion and many discrepancies continue to permeate most of the published reports because of the lack of accurate diagnosis, uniform standardization of classification and treatment of the tuberculosis. Futhermore from the obstetrical standpoint inadequate supervision is the rule, largely because the obstetrician does not understand the management of tuberculosis and does not cooperate with the tuberculosis specialist.

"When all is said and done," there has been sufficient evidence adduced to warrant the statement that pregnancy does exert a deleterious effect upon tuberculosis in a certain proportion of all cases but it also exerts a beneficial effect on certain other cases, while in still others there is no demonstrable effects. The satisfactory answer has not yet been advanced.

The effect of tuberculosis on the course of pregnancy is practically nil. Tuberculosis has no effect per se on fecundity, in many instances it increases fertility; the development of the fetus is normal; abortion or premature labor is no more frequent than in the non-tuberculous, except in those cases with severe exhausting cough, hemotysis, fever and marked general debility.

In the mild cases going to term the labor may be completed without cause for alarm. In the advanced cases labor may be tedious, prolonged and fraught with many dangers to the mother, e.g., dyspnea, cough, hemoptysis, impending cardiac failure, pulmonary edema, pneumothorax, etc.

Upon the puerperium mild inactive tuberculosis seems to have no effect per se, hemorrhage is no greater and involu-

tion is not retarded. In the more active and progressive cases there is apt to be excessive hemorrhage and involution may be tardy. These ill-effects naturally are due to the general asthenic condition of the woman at this time.

Of all the questions regarding the effects of pregnancy upon tuberculosis, nursing is one phase that should demand most careful consideration. The baby should never be allowed to nurse, except perhaps in those cases where the mother has a minimal healed lesion and it is highly desirable to give the baby a good start in life. In such cases the baby may be nursed for six to eight weeks. All others should absolutely *not be nursed.* The objections to nursing are, of course, the danger of infecting the child and the added drain upon the mother's strength. A "breakdown" in the mother may be due to child rearing just as with childbearing. Nowadays pediatricians are not so fearful of unsuccessfully feeding the newborn infant and hence this problem is much less troublesome than it was in former years.

While congenital tuberculosis is possible, as shown by Whitman and Green who have collected from the literature 47 authentic cases, it is relatively rare. I have never seen a case but believe if systematic study was made on every baby and placenta born of a tuberculous mother, particularly the more advanced cases, there would be many more cases of congenital tuberculosis than has hitherto been discovered. Futhermore "Sitzenfrey has demonstrated in women dying of tuberculosis the presence of bacilli in the interior of ova while still within the graffian follicles" (Williams). This could lead, although impossible to prove, to congenital tuberculosis.

Pregnancy complicating laryngeal tuberculosis is very bad. The mortality is said to be from 85 to 100 per cent. I have seen 2 such patients both of whom died within a few weeks of childbirth. Both babies survived and are in good health; there had never been any contact between mother and child.

The active treatment of pregnancy complicated by pulmonary tuberculosis naturally divides itself into (1) the general and (2) the obstetrical.

The general treatment is identical with that for any non-pregnant patient.

The obstetrical management includes (1) the question of the interruption of the pregnancy; (2) the method by which interruption is best accomplished; and (3) the best method of delivery at or near full term.

As to the question of the interruption of the pregnancy there are two very valid indications: (1), the vital indication, where it is necessary to save the life of the gravida who is in immediate danger of dying; and (2), the prophylactic indication, where abortion is done to prevent the progressive development of the disease which may be expected to occur from gestation and labor. Practically all therapeutic abortions will be done for the prophylactic indication.

During the first twelve to sixteen weeks of pregnancy therapeutic abortion is indicated in all proved active cases of pulmonary tuberculosis. This holds true for any stage of pulmonary tuberculosis, early or late. Activity and type of infection are more significant than the degree of involvment. The earlier the intervention the better the prognosis in all cases. Early interruption of the pregnancy with adequate sanatorium treatment usually means recovery and "arrest" of the tuberculosis. An "arrested" moderately advanced lesion, after two, three or four years of quiescence, is almost sure to remain inactive if pregnancy ensues. It is reasonably safe therefore to allow such a patient to proceed with pregnancy, provided strict prenatal supervision is carried out. If activity should become apparent during the first sixteen weeks of pregnancy, abortion must be performed immediately; whereas if the gestation is further advanced, from the twentieth to the twenty-eighth week, interruption of the pregnancy is contraindicated, except in rare instances where the mother is des-

perately sick and something must be done to save her life. Even here the shock incident to the evacuation of the uterine contents is distinctly bad. An inactive or healed early or moderately advanced pulmonary lesion is no indication for interference, provided the patient is in good or fairly good general health.

Advanced active or inactive cases should be aborted early and sterilized. Abdominal hysterotomy with removal of the uterine contents and ligation of the Fallopian tubes, using local, spinal or sacral anesthesia, is the method of choice. Hysterectomy or fundectomy, preserving menstrual function, may be done in selected cases. In the desperate cases we do a simple dilatation and currettage, or an anterior vaginal hysterotomy with removal of the pregnancy followed at a later date; when the general condition has improved, by radium or *x*-ray therapy in sufficient amounts to produce sterilization. The age of the patient, the activity of the infection, the type and extent of the lesion, and the patient's own choice in the matter, should be taken into consideration when deciding which method of sterilization is preferable in a given case.

From the sixteenth to the twenty-eighth week, artificial interruption should very rarely be undertaken, except in the active cases where the patient is growing worse very rapidly. If intervention is decided upon, sufficient radium introduced under local or sacral anesthesia, or *x*-ray irradiation to cause abortion or vaginal hysterotomy, with later sterilization by radium or *x*-ray irradiation are the procedures of choice. In young women where it is not deemed advisable to castrate, the oviducts can be ligated per vagina at the time of the hysterotomy or if, as some operators prefer, abdominal hysterotomy is performed, the tubes can be ligated very easily.

Should every case aborted be sterilized? No, certainly not; for with proper medical care, it might well be possible for the patient to become "arrested" and again become pregnant, say in two or three or four or more years, and carry to term with safety.

From the twenty-eighth to the fortieth week nothing can be done that will improve the condition. "Watchful waiting" may seem cowardly, but operative interference is almost sure to terminate fatally. However, here as elsewhere in medicine and surgery, individualization counts for a great deal. Under certain extenuating circumstances almost any established form of treatment may be altered, and oftentimes with fairly good success.

The method of interrupting the pregnancy and conducting the labor at or near term constitutes a very important phase of the treatment of pregnancy complicated by pulmonary tuberculosis. First of all, the best method of interruption of the pregnancy, whether early or late, is that method which will cause the least trauma and shock to the mother. Interruption during the first eight or ten weeks can oftentimes be done by the use of the cervical and vaginal pack, followed by currettage under local or gas-oxygen anesthesia, or in suitable cases, without anesthesia.

If the cervix is long, hard, and tightly closed, anterior hysterotomy under local, spinal, or sacral anesthesia is the operation of choice. From the twelfth to the sixteenth weeks anterior hysterotomy, under local, spinal or sacral anesthesia, is the best operation.

In certain multiparous patients, where the cervix is very soft and dilatable, cervical and vaginal pack followed by light currettage may be the procedure of choice.

Generally speaking, anterior hysterotomy (vaginal cesarean section) from the twelfth to the twenty-eighth week is the operation of choice. Beyond the twenty-eighth week vaginal cesarean section should not, except under very unusual circumstances, be done. Local, spinal, or sacral anesthesia is certainly to be preferred to any inhalation anesthetic. If for any reason an inhalation anesthetic must be given, gas-oxygen or cyclopropane is the safest.

If the pregnancy has been carried to or near full term the labor should be made as easy and short as possible. When labor pains are at regular and frequent intervals and the cervix is dilated to the size of "a twenty-five cent piece," (2 to 3 cm.) morphine scopolamine analgesia, or some one of the many other effective and well known methods of securing obstetric analgesia, should be employed to a degree sufficient for the relief of the stress and strain of the labor. As soon as the cervix is fully dilated rupture of the membranes, if these have not previously ruptured, episiotomy with the application of forceps and immediate delivery, using gas-oxygen or cyclopropane or local anesthesia during the active delivery, is the procedure of choice.

If the breech is presenting, follow the same routine, except deliver the breech as soon as possible. Full cervical dilatation should be had before any method of delivery is carried out. In the presence of a normal pelvis and baby, with fully dilated cervix and ruptured membranes, pituitrin, ¼ to ½ c.c., may be given. This with episiotomy and gas-oxygen anesthesia, will accomplish delivery in the shortest possible time and with the least shock to the mother.

If there is disproportion between the child and the pelvis or other cause for apprehension on the part of the obstetrician as to the outcome of the labor, cesarean section, under local or gas-oxygen or cyclopropane anesthesia, should be done. We use local in the form of abdominal "block" and find it highly satisfactory. Vaginal cesarean section should not be done after the seventh month of gestation, as even in expert hands the trauma and blood loss associated with this operation is considerable. This makes for more and often very severe shock which in turn is distinctly injurious to the tuberculous patient.

SUMMARY

Motherhood is the cherished hope of every woman. She should therefore not be deprived of this hope unless there is no alternative. Sweeping statements cannot, with sincerity and honesty, be made regarding pregnancy in tuberculous women. We have no right to say "no woman with tuberculosis can safely bear children" nor can we please Mussolini and say "tuberculosis doesn't matter; let her go ahead and have children, the country needs them for soldiers."

There is, however, "a middle of the road" attitude that we can assume and with a reasonably thorough understanding of the two associated conditions—i.e., the tuberculosis and the pregnancy—we may look forward to a successful outcome in a goodly proportion of cases. Success will largely depend upon the type and extent of the lesion and the degree of cooperation between the tuberculosis specialist, the expert obstetrician, the good pediatrician, the competent roentgenologist, and the loyal pathologist and bacteriologist.

If tuberculous women who wish to become pregnant or who are already pregnant have "taken the cure" and have learned how to live so as to conserve strength and health, and have the character and determination to carry out a rigid regime, there is no good reason for them not to procreate. On the other hand, pregnancy in the active tuberculous patient, no matter how little tuberculosis is present, is dangerous, in some cases very dangerous. Therapeutic abortion, therefore, should be performed. But if such patients will take the "cure" and will wait two to three or more years following "arrest," pregnancy may be undertaken with comparative safety.

In the moderately advanced active cases pregnancy is very dangerous. However, if three or four or more years is allowed to elapse following "arrest," during which time the general health has remained satisfactory, pregnancy may be undertaken with comparative safety even in these cases.

In advanced cases, especially with cavitation, it goes without argument, that pregnancy is absolutely contraindicated.

Nursing the baby should, as a rule, never be allowed. On the other hand, there are special instances where nursing may be allowed in order to give the baby a better start in life. The mother's reaction to labor and the early puerperium, of course, will largely determine the length of time the baby should nurse, but never longer than a few weeks. Since the modern pediatrician can feed the newborn infant so much more successfully now than formerly, nursing is not the serious problem from the baby's standpoint that it was in years past. It still remains, however, a most important problem from the standpoint of the mother's future health. "Do not nurse the baby" is a good working maxim.

The question of sterilization is most important. Every woman's mental attitude is plagued by the absence of the menses. It seems strange but when women menstruate, no matter what else may torment them, they seem more contented with their lot in life; therefore we are against permanent sterilization by means of *x*-ray or radium irradiation, except in those whom menstruation is "slowing up" the recovery of their tuberculosis to an unreasonable degree. In a certain number of young women where the "slowing up" process has been pronounced, I have advised temporary sterilization by radium or *x*-ray irradiation and have no cause to regret such advice. One such case became pregnant a few years later, carried to term, was delivered of a normal baby, and was apparently "no worse for the wear." Where simple tubal ligation is performed to prevent conception there is not the same disturbing element, for naturally menstruation continues as before ligation. Contraceptives, of course, are used and with fair success. But fear of pregnancy on the one hand and the difficulty of getting multiple abortions performed on the other, make this form of prevention unpopular with the average tuberculous patient.

Volumes have been written on this subject, but little has been done for the unfortunate gravida who has pulmonary tuberculosis. Sanatoria, clinics, floating hospitals and "rest homes" have been provided for "all ages and conditions" of patients, but no special provision has been made for pregnant women. Intelligent guidance through pregnancy, scientific supervision of the labor and puerperium, with proper care of the child and sanatorium treatment for the mother, should be the management for all such cases. However, under existing conditions, this can only be done for the "favored few." Surely it is not humane for us to continue to treat tuberculous pregnant women in the haphazard inadequate manner that we have so frequently done in the past. What we need is (1) a better understanding by the entire profession of the subject of pregnancy in tuberculous women; and (2) a larger number of properly equipped sanatoria and hospitals to adequately care for such cases.

Finally, the whole problem is very complicated; statistics are incomplete and often unreliable; experiences differ, largely due to the lack of standardized classification and procedure; there are diverse opinions. To pursue the proper course, doing justice to the mother, to the child, and to all concerned, demands our most careful thought and the exercise of the keenest judgement.

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