

RELATION OF TUBERCULOSIS TO OBSTETRICS

HARVEY B. MATTHEWS, M.D., F.A.C.S.

Clinical Professor of Obstetrics and Gynecology, Long Island College of Medicine

BROOKLYN, NEW YORK

SINCE tuberculosis is conceded to be a serious problem among girls and young women and since its incidence in this group is not diminishing as rapidly as in other age and sex groups of the general population, the association of tuberculosis and childbirth continues to be an important problem in preventive medicine. Edna E. Nicholson of the National Tuberculosis Association, in her study of tuberculosis among young women, states: "We know this phenomenon [i.e., the relative high death rate among girls and young women] has existed in the United States at least since 1900, and in view of the fact that mortality figures of England, Wales and Ireland show the same deviation as far back as 1860, it seems reasonable to suppose that for one reason or another, young women have always been more prone to die of tuberculosis than have their young brothers or older sisters."

Notwithstanding the tremendous amount of very excellent educational and preventive work accomplished during the past thirty years, tuberculosis is still responsible for some 60,000 deaths annually in the United States. Of this number about 29,000 are females and approximately 18,000 of these are between the ages of 15 and 45 years. Just what proportion of this latter group became pregnant and aborted or had premature labor or gave birth at term is not known. There are no available statistics with which to answer this question. We do know however that, as a general rule, the gravida who has tuberculosis does not receive adequate care during pregnancy, labor, the puerperium and for a sufficient period of time following these events properly to "cure" active tuberculosis or keep quiescent tuberculosis "arrested."

Neither does she always receive adequate obstetric attention. We know also that one of the main reasons for this state of affairs has been the woeful lack of coöperation between accoucheur and phthisiologist, stimulated by the almost complete absence of proper hospital and sanatorium facilities. Thus we may well account for much of the confusion that exists as to the effect of pregnancy, parturition and the puerperium and their end-results upon tuberculosis.

For the past few years, however, this gap has been slowly "closing in" because medicine has gotten to a stage in its evolution where no sane physician believes himself competent to practice medicine without help from his colleagues who, although they may not be classed as specialists, have superior knowledge in one field or another. No modern obstetrician or physician doing obstetrics therefore should attempt to handle a case of pregnancy associated with tuberculosis without the diagnosis, advice and full coöperation of an internist with knowledge of tuberculosis, or better still a phthisiologist or tuberculosis specialist. Furthermore, in view of the more recent improvements in case finding technique, in diagnosis and treatment of tuberculosis and in the management of pregnancy (prenatal care), labor, delivery and the puerperium, we should "now and here" cease quoting the statements and statistics put out by perfectly sincere authors of ten to twenty years ago. Such statistics are obsolete and are a detriment to an up to date understanding of this most important problem.

In still further substantiation of these statements, regarding lack of interest, coöperation and facilities among interested

groups, Alice M. Hill* called attention to the appalling fact that only eighty-seven, or 21 per cent, of 413 out of a total of 463 (413) that admit or retain pregnant women and take care of them through delivery; 247 or 60 per cent of the 413 sanatoria

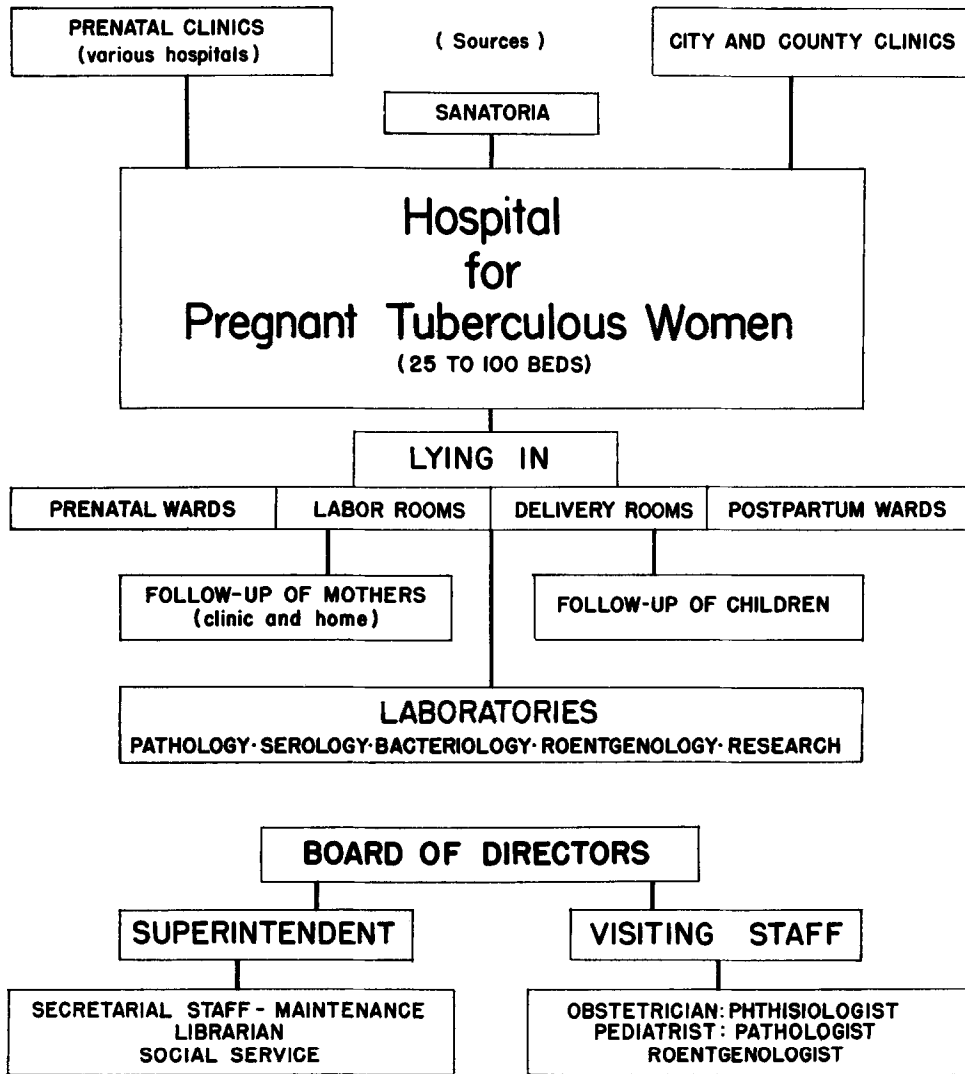


FIG. 1. Set-up of institution devoted entirely to care of pregnant tuberculous women. The ideal arrangement.

sanatoria in the United States, admit and retain pregnant tuberculous women and keep them through delivery. Of these institutions forty-three are general hospitals, thus leaving only forty-four tuberculosis sanatoria, or 10.6 per cent of the total

* While these figures were published in 1927 there is no reason to believe that conditions are materially different today. This is the unanimous opinion of two internationally known tuberculosis statisticians, who prefer to remain anonymous.

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.

city of New York is not in much better position for there are only two or three institutions in the city where the tubercu-

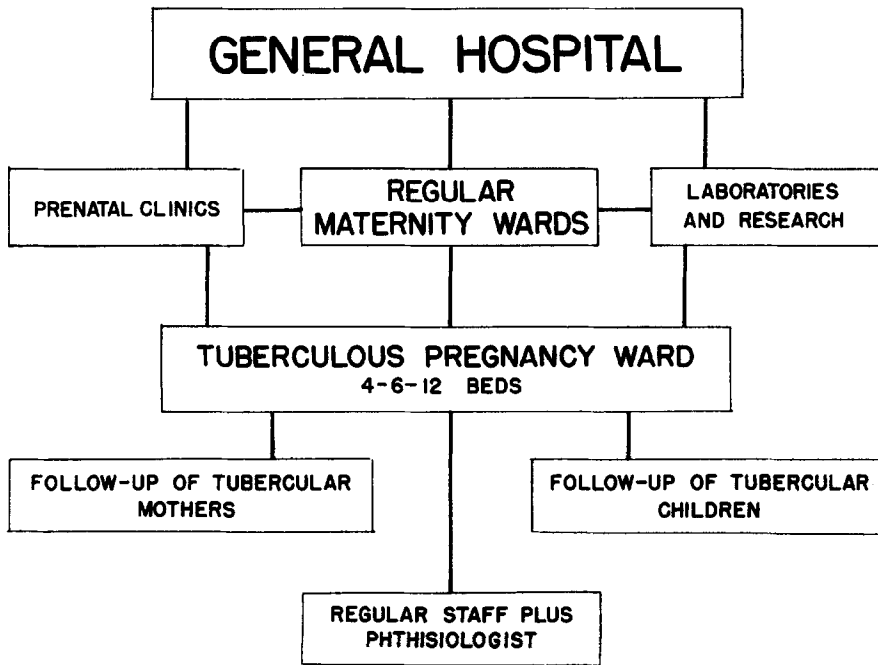


FIG. 2. Alternative arrangement of wards for pregnant tuberculous women in a general hospital.

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 few situated in or near the larger cities. Conversely, it would not be expected that the phthisiologists of these institutions would be good obstetricians. Of the eighty-seven sanatoria reporting facilities for the care of pregnant tuberculous women, only a very few, probably not over ten to twelve, actually carried out the proper management of the pregnancy, the labor and the puerperium. The vast majority did the best they could with the facilities they possessed, realizing full well their inadequacies. The greater

lous woman who is pregnant can be adequately cared for through delivery and beyond the lying-in period for as long as is necessary to render her safe to return home.

What then is to be done to insure adequate care, both medical and obstetric, for the pregnant tuberculous woman? The following plan is suggested:

1. The ideal set-up for the adequate management of tuberculosis and pregnancy would be a special institution devoted exclusively to the care and treatment of pregnant tuberculous women. Here would be working in close harmonious coöperation 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 pathologic, serologic and bacteriologic laboratories. In such an institution the tuberculosis, the pregnancy, the labor and the 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, serology 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 coöperation 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 coöperating, the obstetrician 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.

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 interested in tuberculosis takes charge when he shall have finished his job.

With either of these arrangements (of course the first is the most ideal) research could be carried on by the various individuals concerned in the management of these cases and, with the coöperative teamwork of the various laboratories, reliable end-results could be ascertained. Moreover, classification, typing, diagnosis and management of the tuberculosis would become

much more standardized than has hitherto been possible. Naturally, no plan will be successful unless the coöperating physicians—tuberculosis specialist, obstetrician, pediatrician, roentgenologist, pathologist, serologist and bacteriologist—are vitally interested in this type of work. For smaller communities where such complete coöperation is not possible, every effort should be made to obtain the services of one who knows tuberculosis. This is one situation where the various State Departments of Health or, in those states unable to coöperate, the United States Public Health Service, could render a valuable consultation service without in any way encroaching upon the rights and privileges of the private physician. Since the President has proposed a plan for government constructed hospitals in communities where there is need but not the finances, some of this construction could be carried out to provide improved facilities for the care of pregnant women who have tuberculosis. No better way of spending public funds, it seems to me, could possibly be found.

EFFECTS OF PREGNANCY ON TUBERCULOSIS

At the outset of any discussion of the effects of pregnancy upon tuberculosis we should have clear in the "mind's eye" that it is not pregnancy alone that is meant but the entire cycle of events implicated in childbirth—gestation, labor, delivery and the puerperium.

It should be constantly kept in mind that the type or character of the tuberculous lesion is far more important than the extent of the disease. Merely the designation of whether a given lesion is minimal, moderately advanced, or far advanced is not nearly so important, although, of course, it is quite necessary, as the pathologic character of the lesion. Experience, during the past decade has impressed upon the phthisiologist the fact that in the exudative or pneumonic types of the disease the prognosis is not nearly so favorable as in the productive or fibrous types. This knowledge becomes of more value in

relation to tuberculosis and pregnancy when we bear in mind that the more destructive and fatal types of tuberculosis (exudative or pneumonic) occur more frequently in the younger age and sex groups, particularly in young females, whereas the less destructive types (productive or fibrous) occur more frequently in those past middle life. In other words, during the most prolific reproductive period of a woman's life, she is also subject to the most devastating types of tuberculosis. Is it any wonder therefore, that before the advent of a more thorough understanding of the tuberculous process and a better coöperation between the modern phthisiologist and obstetrician, the maternal mortality rate in pregnancy, parturition and the puerperium in tuberculosis remained alarmingly high? Likewise, is it any wonder that abortion was so frequently performed?

Today the picture has changed. With the newer concepts of the pathologic type or character and clinical behavior of tuberculosis, the phthisiologists have developed improved methods of case finding, of diagnosis and of treatment. Some types require more heroic treatment than others. Whereas all types require the accepted routine "cure" treatment, including pneumothorax in a large percentage of cases, others require, in addition, the more drastic procedures of phrenicotomy or thoracoplasty. Incidentally, thoracoplasty, although requiring at least two extensive surgical operations, is not looked upon today as the mutilating procedure of doubtful value that it was a decade or more ago. Its results are indeed gratifying. Surgery has come to be another important affiliate in the treatment of tuberculosis.

Now let us ask the question—What changes, if any, in the treatment of the tuberculosis are indicated during pregnancy, labor and the puerperium? Formerly this was a much debated question; today it is certain that the pregnant woman should have identically the same treatment as her nonpregnant sister who has tuberculosis. In more recent years, collapse

therapy has been practiced extensively during pregnancy with gratifying results for the tuberculosis and apparently with no ill effects on the gestation, the labor, or the delivery. There are several reports in the recent literature on this phase of the subject. For example, Seely, Siddall and Balzer of Detroit, report in detail a study of fifty-four cases of tuberculosis and pregnancy treated with collapse therapy before and during the pregnancy, immediately after labor and during the puerperium, with uniformly good results. They had nineteen cases in which treatment was begun *before* pregnancy and 90 per cent of these were arrested or improved. In thirty-five cases treated during pregnancy, 77 per cent showed arrest or improvement, while 23 per cent were made worse and of this latter group fourteen per cent died within one year after confinement.

In a more recent report the same authors cite ten cases of pregnancy and parturition following thoracoplasty for advanced tuberculosis from the Herman Keifer Hospital of Detroit. They were also able to find twenty-one cases in the literature, making a total of thirty-one such cases for study. In this group, interestingly enough, four successful thoracoplasties were done during pregnancy. These thirty-one women gave birth to thirty-four babies, five prematurely. "One mother died and five others had serious exacerbation of the tuberculosis during pregnancy or within one year after delivery." Thus 19.3 per cent of these mothers had a reactivation of their tuberculosis, one to the extent that she died, while 80.7 per cent were not affected or at least not made worse.

Another report by Ornstein and Epstein from Sea View Hospital in New York, cites a group of eighty-two pregnant women with tuberculosis whom they delivered, in which 24.3 per cent were made worse. Of these 12.2 per cent died, thus leaving 75.7 per cent in the "stationary" or improved group. In this series there were twelve women upon whom thoracoplasty had been performed and who later became pregnant,

delivered their babies (one of these women had two children) and "not a single one of them had any appreciable reactivation of tuberculosis." Thus two geographically widely separated groups of tuberculous pregnant women, under almost ideal supervision, show comparable excellent results. When it is recalled that patients on whom thoracoplasty has been performed are far advanced cases with cavitation these reports appear little short of witchcraft to those who maintained that no woman with far advanced active or inactive tuberculosis, regardless of the type of lesion, should have a baby. Those familiar with the statistics on tuberculosis and pregnancy will see at a glance that the modern figures quoted above and obtained by coöperative teamwork, with adequate facilities, are many times better than those of ten and twenty years ago. Thus again we reiterate that the older statistics are obsolete.

It seems evident from a review of the recent literature coupled with a limited experience, that while collapse therapy is the greatest advance in treatment for the pregnant tuberculous woman to date, it does not entirely solve the problem. It still cannot be said with propriety, as some recent observers have stated, that pregnancy *has no effect* on tuberculosis. We can say, with certainty, that it does, but that with the more heroic methods in the treatment of the tuberculosis, coupled with improvement in obstetric care, and closer and more harmonious coöperation between the patient, the accoucheur and the phthisiologist, the entire problem is certainly less difficult at the present time than it has been in the past.

EFFECT OF TUBERCULOSIS ON PREGNANCY

The effect of tuberculosis *per se* on the course of gestation is negligible. It has no effect on fecundity; in fact in many instances where the tuberculosis is not debilitating and the "cure" is conscientiously taken, fertility seems to increase as the general health improves. The develop-

ment of the fetus is normal. Abortion or premature labor is somewhat more frequent than in the nontuberculous patient, particularly, in those cases with exhausting cough, hemoptysis, fever and marked general debility.

In the less advanced cases going to term or near term the labor may be completed without cause for alarm. In the far advanced cases labor may be tedious, prolonged and fraught with many dangers to the mother, as for example in the presence of dyspnea, cough, hemoptysis, impending cardiac failure, pulmonary edema or spontaneous pneumothorax.

Upon the puerperium, minimal or moderately advanced tuberculosis seems to have no effect; the incidence of postpartum hemorrhage is no greater and involution is generally not retarded. In the more active, extensive and progressive cases there is apt to be excessive hemorrhage and involution may be tardy.

From the accumulated evidence to date, it may be concluded that whatever deleterious influences tuberculosis has on pregnancy, parturition and the puerperium are not due to the tuberculosis *per se* but are entirely dependent upon the general status of the woman, i.e., whether she was debilitated or in good physical condition before conception, during gestation and following parturition.

Pregnancy complicating laryngeal tuberculosis is distinctly bad. According to Myerson, the incidence in females in the age group 15 to 40 years runs about parallel with that for pulmonary tuberculosis in this age group. Age is a definite influencing factor in tuberculosis of the larynx. The older the patient the less likelihood of her developing laryngeal tuberculosis. Again, therefore, we see the young woman a possible victim of a grave complicating tuberculous lesion, superimposed upon her already far advanced pulmonary tuberculosis, in the presence of pregnancy and confronted with the possible deleterious effects of labor and the puerperium. Truly a gloomy picture! We can readily agree

with Myerson and others, that pregnancy should not be contemplated in the presence of laryngeal tuberculosis.

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

MANAGEMENT OF PREGNANCY AND TUBERCULOSIS

The active management of pregnancy complicated by tuberculosis naturally divides itself into (1) the general and (2) the obstetric.

The general treatment of the tuberculosis is, as stated above, identical with that for the nonpregnant patient. With, however, the added "load" of pregnancy, causing an increase in metabolism, oxidation, and innervation, which in turn throws extra work upon the circulation and elimination, more intensified attention to fresh air, diet, rest and exercise must be given. Otherwise the phthisiologist, in full coöperation with the obstetrician, manages the case as he would any other patient with tuberculosis. Likewise, the obstetrician manages the pregnancy, the labor and the puerperium just as he would an obstetric patient who had any serious systemic disease. Adequate prenatal care*—never omitting a single item that the most meticulous authorities have laid down as adequate—must be

*The reader is referred to any standard text for details on prenatal care.

given the gravida who has tuberculosis. If "a watchful eye can save a life when diligently and constantly focused on the object of its stare" in obstetrics or tuberculosis alone, think how very much more indispensable this becomes in the combination of pregnancy, parturition, the puerperium and tuberculosis. Intelligent, friendly and full coöperation between patient, phthisiologist and accoucheur is required if the best results are to be obtained.

The obstetric 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 valid indications: (1) the vital indication, where it is necessary to save the life of the gravida with far advanced tuberculosis who in the opinion of the phthisiologist is in immediate danger of dying; and (2) the prophylactic indication, where abortion is done after all therapeutic measures have failed to retard the progressive extension of the disease, which may be expected to be still further activated from pregnancy, labor and the puerperium. The vital indication is rarely, if ever, indicated. Today such a patient would not be allowed to become pregnant, and if by chance pregnancy did take place, interruption of the gestation would probably *not be recommended*. Abortion would be equally, if not more, hazardous than labor at or near full term, and in addition would provide no handicap to the offspring. The prophylactic indication is definitely on the wane. With the newer concepts of the pathologic and clinical behavior of the various types of lung tuberculosis and the more heroic methods in their treatment, as outlined above, therapeutic abortion is not practiced to the extent that it was in former years. This is as it should be, for as in heart disease, thyrotoxicosis, diabetes and affections of the kidneys, etc., the more accurate our knowledge has become the better we understand these serious systemic diseases

and the better we are able to cope with them in the presence of pregnancy and parturition. What was formerly an indication for therapeutic abortion is not an indication today. This is particularly true of tuberculosis and pregnancy. Consequently therapeutic abortion is not considered necessary except where the tuberculosis cannot, for various reasons, be properly managed; when the tuberculous lesion is so far advanced as to preclude successful "arrest" when first seen by the obstetrician; or in the very fulminating malignant types of caseous pneumonic tuberculosis with cavitation that do not yield to collapse therapy, including thoracoplasty.

The method of choice in interrupting the pregnancy and the conduct of labor at or near term constitutes a very important phase in a pregnancy complicated by pulmonary tuberculosis. First of all, the best method whether early or late, is that method which will cause the *least trauma and shock* to the mother. Interruption during the first six to ten weeks can oftentimes be done by the use of the cervical and vaginal pack, particularly in the multiparous patient, followed by curettage under local, cyclopropane or gas-oxygen anesthesia, or in suitable cases, under obstetric analgesia without anesthesia. If the cervix is long, firm, and tightly closed, anterior vaginal hysterotomy under local, spinal, sacral, or cyclopropane or gas-oxygen anesthesia is the operation of choice. We usually induce obstetric analgesia by some one of the many methods—morphine-scopolamine, nembutal, sodium amytal, paraldehyde, etc.—before administration of the anesthesia (local or general). This proves very satisfactory for both patient and operator. We *never* use ether anesthesia unless there is no other way out. From the twelfth to sixteenth weeks, anterior hysterotomy following the above technique is the best procedure, except in those cases where the cervix is short, soft and patulous. Then rupture of the membranes, insertion of a vaginal or cervico-vaginal pack or a Voorhees bag, or both,

serves to start uterine contractions, to promote cervical dilatation and hasten uterine evacuation. Bleeding, should it occur, must be promptly controlled and shock vigorously combated. Remember that these patients are apt to be quite ill and debilitated, and hence succumb more quickly to trauma, hemorrhage, shock and sepsis than the average obstetric patient. Prevent trauma, conserve blood (De Lee) and prevent or promptly combat shock should be the motto of every obstetrician and gynecologist.

From the sixteenth to twenty-eighth week of gestation, artificial interruption should very rarely be undertaken, except in the very desperate cases where, in spite of proper treatment, the patient is rapidly growing worse. If intervention is decided upon, sufficient Roentgen ray (2000–3000 R) to cause abortion is given, or radium is inserted in doses of from 1200 to 1500 mg. hours within the pregnant uterus, using local or cyclopropane anesthesia. These doses of x-irradiation are not usually sufficient for the production of permanent castration, but do bring on an amenorrhea of from a few months to two or more years. Vaginal hysterotomy is a very efficient, quick, and easy method of evacuation of the uterus and the method we prefer unless the patient is extremely ill. In the latter case x-ray is preferable. Following the vaginal hysterotomy, when the patient has improved, sterilization, if advisable, can be accomplished by x-ray or radium. In young women where it is not deemed advisable to use x-irradiation, the oviducts can be ligated per vaginam if the patient's condition warrants at the time hysterotomy is performed, or if, as some operators prefer, abdominal hysterotomy is performed, the Fallopian tubes can be ligated very easily. Should every patient aborted be sterilized? Certainly not, for with proper medical care, it might well be possible for the tuberculosis to become "arrested" and after two or three years or more the patient could again become pregnant and, under proper care, carry to or near full term with safety.

From the twenty-eighth to fortieth week, nothing can be done that will improve conditions. The phthisiologist having gone the limit in treating the tuberculosis, 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, oftentimes with fairly good success.

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 fifty-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 and the application of forceps and immediate delivery, using *local*, gas-oxygen or cyclopropane anesthesia during the active delivery, is the procedure of choice.

If the breech is presenting, follow the same routine, except complete the delivery of the breech as soon as possible. *Full cervical dilatation* should be present 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, $\frac{1}{4}$ to $\frac{1}{2}$ 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. Piper forceps applied to the after-coming head in these breech deliveries often saves time and trauma, both to baby and mother.

Version and breech extraction should not be performed in the presence of advanced tuberculosis, except on strictest indications, because of the deep anesthesia required, the extra trauma that is necessarily

produced and the greater chances of infection. This is particularly true in the collapse therapy cases. The obstetrician must plan the method of delivery, having obtained accurate pelvic measurements (by x-ray if possible) and estimated the size of the baby, so that version and extraction or other "shocking" operative procedures will not, as a last resort, have to be undertaken. We believe, when there is any doubt, either of the ability of the pulmonary lesion to withstand the strain of labor in a given case or where the bony pelvis and/or the child shows evidence of possibly causing dystocia, elective cesarean section or cesarean section after a short test of labor without progress is indicated.

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, elective cesarean section, at or near term, 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. We do not use spinal in these patients. In cases where collapse therapy has been practiced, particularly thoracoplasty, we believe cesarean section, using *local* block anesthesia, should be more frequently employed. Certainly in the primipara this procedure would obviate the relatively long first stage and prevent the respiratory embarrassment that comes with strong second stage pains in the patient who has only one, or perhaps less than one useful lung. Furthermore, cesarean section is the method of choice when cardiac or nephritic lesions, excluding, of course, eclampsia, complicate the pulmonary status. It goes without saying that if cesarean section is to be the method of choice it should be performed by a competent operator in a well equipped operating room. Vaginal cesarean section should *never* be done after the seventh month of gestation, because even in expert hands, the trauma and blood loss associated with this operation are considerable. This not infrequently causes an extreme degree of

shock which in turn is distinctly injurious to the tuberculous patient, especially in the advanced exudative and pneumonic forms of the disease.

These patients must be protected against long, tedious, exhausting labors and difficult, traumatic, or operative deliveries, performed late in labor when the more conservative plan of delivery has failed. Here, as elsewhere in clinical medicine, conservatism may turn out to be radicalism when not tempered with good judgment. To make labor as comfortable and non-exhausting, and delivery as easy, short and nontraumatic as possible, is a good working rule. These facts cannot be too strongly emphasized and I dwell upon them because I believe the accoucheur—general practitioner and specialist—has had to take the blame far too frequently for the reactivation of a healed tuberculous lesion or the spread of an active one that the phthysiologist had under control. Furthermore, it must be constantly kept in mind by the accoucheur that hemorrhage and shock should be prevented as far as it is possible to do so and that when they occur, prompt and vigorous treatment is urgently indicated. Transfusion should be given without delay, or without regard for the tuberculosis, and in sufficient quantity to replace the blood loss. Shock cannot be successfully combated until the blood vessels have their fluid loss (plasma) restored. Prevention of hemorrhage and shock or shock without hemorrhage is the working axiom in this connection. Remember, in every obstetric procedure, Dr. De Lee's oft repeated slogan "conserve blood."

MANAGEMENT OF THE PUERPERIUM

The obstetric management of the tuberculous patient during the puerperium is essentially the same as for any other patient. The phthysiologist accepts full responsibility for the tuberculosis. In the milder healed lesions nothing need be done except repeated check-up of the tuberculosis and "watchful waiting" to be sure reactivation has not taken place. In cases

where collapse therapy has been practiced prior to and during pregnancy it should be carried out during the puerperium for as long as indicated. There may be cases where collapse therapy is indicated for the first time immediately after delivery. In other cases only some form of abdominal compression as obtained with the diaphragm lift which elevates and restricts the movements of the diaphragm may be necessary. We have used the Burgess Gordon type of abdominal compression binder with satisfactory results. It can be used in all cases—non-collapsed and collapsed—immediately following delivery and for as long as indicated.

Excessive postpartum bleeding is not uncommon in the tuberculous parturient. Matthews and Bryant in 317 ex-Trudeau patients reported a 13 per cent incidence of postpartum hemorrhage, whereas the incidence for the general population is 2 per cent. These data, however, were obtained from the patients, not the doctors who delivered them, and may be subject to inaccuracies. Nevertheless, other writers have reported a definitely increased incidence in postpartum hemorrhage of greater or less severity, particularly in advanced tuberculosis where the patient is in poor general condition. Consequently this accident must always be kept in mind. Prompt and appropriate treatment for the control of excess bleeding, including blood transfusion is the proper procedure. Furthermore, the accompanying shock must be promptly combated by morphine, application of heat to the entire body, hypertonic intravenous dextrose (300 c.c. of 25 per cent solution) followed by blood transfusion. Delay in these procedures may well mean the difference between life and death in the mother who has advanced tuberculosis. With the modern methods of handling the tuberculosis, the pregnancy, the labor and the delivery, the puerperium *per se* does not present the hazards that it formerly did, provided, of course, these methods are available. Furthermore, it is more generally recognized today that

proper care must be given the tuberculous mother following the postpartum period for a sufficient length of time to make it safe for her to return home. The puerperium is often a critical period for the non-tuberculous parturient and in the presence of tuberculosis the most careful supervision is definitely indicated.

LACTATION

Of the many questions relating to the effects of pregnancy and parturition on 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 or moderately advanced healed lesion with a negative sputum. If she is in good general condition and it is highly desirable to give the baby a good start in life, lactation may be permissible. In such cases the baby may be nursed from six to eight weeks *only*. 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. The possible ill effects on the recently delivered tuberculous mother of the extra work and worry of the household, particularly under strained economic conditions, are perfectly evident to the practical clinician. A "break-down" in the mother may just as well be due to child-rearing as to child-bearing. Nowadays, fortunately for these mothers, weaning the baby is not the serious problem that it was in former years. The pediatricians are more expert in feeding babies artificially, and are no longer skeptical regarding their survival, future development and longevity. Many reports substantiate this point of view. For example, Matthews and Bryant showed that out of 579 children 556 were alive fifteen years or more after birth, and 501 (86.5 per cent) of these were in good health; fifty-five (9.5 per cent) were below par in health and in only nine cases of tuberculosis were found or suspected. Barnes and Barnes state that 81 per cent of children born of

tuberculous mothers are healthy and develop normally. Blisnjanskaja found that of 23,000 children taken from their tuberculous mothers and sent to the country, only seven developed tuberculosis (Jameson).

WHEN SHALL THE TUBERCULOUS PATIENT CONTEMPLATE PREGNANCY?

Another very important question that inevitably presents itself for consideration is: How long after "arrest" of the tuberculosis should a patient wait before assuming the responsibilities of pregnancy, labor and the puerperium? This will vary, of course, because of the multiplicity of factors concerned. However, it can be said that with the average run of tuberculous patients, from two to five years should elapse before pregnancy is contemplated. Generally speaking, in minimal or moderately advanced cases with the productive or fibrous type of lesion, from one to two or more years should be allowed, whereas with the exudative or pneumonic types three to four or more years may be necessary. Naturally, in the far advanced cases still more time, four to five or more years will be required. There will be patients who should never become pregnant because of the undue risk involved, while, on the other hand, there will be patients who will have several children. In fact we have seen several such women who have experienced no appreciable harm to their tuberculosis. This question, in its final analysis, must be decided by the coöperating phthisiologist and accoucheur after a thorough consideration of the pathologic lesion in each individual case, not overlooking the temperament, desires, wishes and willingness to coöperate of the patient herself. In other words, individualization of each case based on its own merits, as elsewhere in medicine, is the best and safest criterion upon which to base prognosis.

STERILIZATION

The question of sterilization of the tuberculous woman—nullipara or multipara—is important, first from the view-

point of the mental effect on the patient herself and secondly from the standpoint of the tuberculosis. There is always present the likelihood of complete "arrest" of the tuberculosis, in which case we are fairly sure that after an interval of two or three or four or more years pregnancy and parturition can take place without undue risk. For the woman who already has her family, however, the indication is clear; we have only to decide upon the method.

It is, of course, common knowledge that when women menstruate, no matter what else may plague them, they seem more content with their lot in life. Therefore, we believe castration by means of the x-ray or radium irradiation is contraindicated except in those in whom menstruation is slowing up to an unreasonable degree the recovery from their tuberculosis. In a number of young women in whom the slowing up process has been pronounced, I have advised temporary castration (a few months to two years or longer) with x-ray or radium irradiation and with very satisfactory results. One such patient later became pregnant, carried to term, and was delivered of a normal child without any apparent effects on the tuberculosis. Where simple tubal ligation is performed to prevent conception there is not the same disturbing element, since menstruation is not interfered with.

Contraceptives, of course, are employed and with good success, depending on the physician's advice, his knowledge of technique and the ability of the patient to cooperate. However, fear of pregnancy and the difficulty of getting multiple abortions performed, makes this form of birth control unpopular with a great many tuberculous patients. Those who have far advanced tuberculous lesions and do not wish to become pregnant or have been advised not to become pregnant had best be sterilized by whatever method seems most suitable.

SUMMARY

Every woman cherishes the hope of motherhood. The desire to reproduce is

instinctive. 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 should bear children" nor can we say "pregnancy, labor and the puerperium have no influence on the course of tuberculosis." There is, however, "a middle of the road" attitude that can be assumed and with a reasonably thorough understanding of both the associated conditions we may look forward to the successful outcome in a large proportion of cases. Success, however, will very largely depend upon the status (active or inactive), the type or character and extent of the tuberculous lesion; the *economic status* and the *attitude* of the patient; the thoroughness with which the phthisiologist can control the lesion; the completeness of prenatal care and the adequacy with which the obstetrician manages the delivery and the puerperium. Without the complete cooperation of all concerned, particularly the phthisiologist who understands the pregnancy but disregards it and the obstetrician who is interested in tuberculosis, but sticks to obstetrics, the prognosis will remain uncertain. On the other hand, with full cooperation, along with the modern methods of case finding, diagnosis and treatment of tuberculosis and the improvement in obstetric care that is now generally recognized, the problem of the relation of tuberculosis to obstetrics will not be so troublesome and uncertain as in the past.

This relationship will not show satisfactory results, however, until better provision is made in every community for the proper care of the pregnant woman who has tuberculosis. Under the present set-up, case finding efforts, expert diagnosis and adequate management can only be carried out in the favored communities that possess the proper facilities and personnel. Surely it is not humane to continue to care for the pregnant tuberculous patient in the desultory and inadequate manner that

many of us have had to employ in the past. We need a keener appreciation of the facts by the general public; by those in control of hospitals and sanatoria; and, most of all, by the medical profession.

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