Abortion

The place of therapeutic abortion in the treatment of the tuberculous woman is difficult to define. It is the method of choice where the clinical condition is at the moment satisfactory but the state of the lungs is such as to justify a reasonable anticipation of danger after a full-time delivery. The procedure is thus fully justified in the case of an undesirable pregnancy in a woman who has recently passed through a gestation ending in a turbulent puerperium. There can be little doubt that in the less severe grades of the disease termination of pregnancy in the early months is an obstetrical procedure associated with less risk than delivery at the later months. It is now generally agreed that to give the maximum of protection the abortion should be performed within the first three months, and that the earlier in pregnancy the interference is carried out the better. Some observers maintain that after the third month the operation is futile, and that in all cases seen after that date it is safer to allow the pregnancy to continue. It is difficult on obstetrical grounds to justify this extreme view and more supporting data than are at present available are required before it can meet with complete acceptance. In the present state of our knowledge there is no adequate reason for doubting that abortion at, say, the fourth or even the fifth month may in suitably selected cases give an increased protection.

The technique adopted is within certain recognized limits of as great importance as the selection of the time for its performance. It has to be noted that the emptying of the uterus during the early months, unless carried out with care and skill, may seriously imperil the patient's chances. The choice of the anaesthetic is important and, in this connexion, it is imperative to avoid inhalant drugs that tend to pulmonary irritation, such as ether. In the selection of the anaesthetic regard must also be had to the risks of post-operative nausea and sickness. In the next place, the operation should be carried out with as little risk of shock and blood-loss as possible. Further, it is important to safeguard the patient as far as is attainable against pelvic sepsis, which is especially prone to prejudice the outlook of the tuberculous subject. Evacuation of the uterus by abdominal hysterotomy is a quick and safe procedure and, when carried out under spinal anaesthesia, it is relatively bloodless. It is, also, associated with less risk of sepsis than evacuation through the vaginal route. It has the further advantage that sterilization can be effected at the same time. Where evacuation by the lower route is decided upon the two-session method should be adopted. At the first session it is my practice to introduce two or three laminaria tents after cervical dilatation and, twenty-four hours later, to carry out the evacuation. Avertin given rectally as a basal anaesthetic in a dosage of 0.1 gram per kilo of body weight, reinforced, if necessary, by a carefully administered gas-oxygen mixture, is safe and suitable.

Management of Later Months

For those cases unsuited because of the severity of the pulmonary lesions for therapeutic abortion in the early months, and for all cases first seen in the latter months of pregnancy, the gestation should be allowed to continue. The treatment is directed to the building up of the patient's health and to the employment of those local measures, such as artificial pneumothorax in unilateral lesions, which are calculated to help the pulmonary condition. It is further of the utmost importance that for the delivery and the puerperium the environment should be selected with a view to its suitability for the management of such cases. During the delivery the patient should be protected against the risks of haemorrhage, shock, and sepsis. Here, again, the

anaesthetic should be carefully selected. We have previously referred to the dangers inherent in a system which tends to divorce the care of the patient during the obstetrical period from that during the ante-natal phase.

The phthisical woman is unfitted for nursing. The damaging effects of lactation on the pulmonary lesions are notorious. Further, the risk of the transmission of the disease to the infant is considerable. The interests of the child are best served if it can be completely removed from the home until the active phase in the mother has been arrested.

I wish to acknowledge my great indebtedness to Dr. H. Nockolds, Medical Superintendent of Lewisham Hospital, for placing at my disposal the records of 44 cases, and to Dr. A. Middleton Hewat, Senior Medical Officer to the London County Council, for providing me with the notes on the subsequent progress of the cases studied.

PULMONARY TUBERCULOSIS AND PREGNANCY*

BY

HENRY COHEN, M.D., F.R.C.P.

PROFESSOR OF MEDICINE, UNIVERSITY OF LIVERPOOL; HONORARY PHYSICIAN, LIVERPOOL ROYAL INFIRMARY

I approach the problem of tuberculosis and pregnancy as a general physician, expert in neither of the special subjects professed by the Sections which have combined in this meeting. I decline on this account, however, to offer an apology to those who would question your choice in asking me to open this discussion and condemn my judgement in accepting your invitation. The conductor of an orchestra aims at interpreting a musical composition according to his conception of it as a whole; his job is to integrate into a harmonic unity the work of the individual instrumentalists under his baton. He cannot play the violin as well as his leading violinist; indeed his performance on any instrument may be worse than that of the meanest member of his orchestra. But the finished performance is *his* conception, and he alone must decide what contribution to this end shall be made by the separate members of his orchestra.

Now the general physician is like unto the conductor of an orchestra. He views the problem which a patient presents as a whole; he recognizes, and should hasten to take advantage of, the more detailed knowledge and particularly the greater technical skill of his specialist colleagues, be they surgeons, obstetricians, aurists, orthopaedists, and the like. But he must remain the overseer, the integrator of the many phases of the problem presented by his patient, and he will, also, remain the judge in his wider and deeper wisdom of how far general conclusions to which his specialist colleagues have come are applicable to the individual patient under his care.

This discussion limits itself to pulmonary tuberculosis, but considers its effects on all phases of child-bearing. I shall omit the consideration of historical *obiter dicta* on this subject which have been forthcoming since the time of Hippocrates, for though they are of consuming interest and fascination to the historian of medicine, their slender foundation and their mutual contradiction deny them a place in a scientific discussion.

What are the questions to which it is desirable that accurate answers based on unimpeachable statistics should be forthcoming? Clearly the most significant is, "Does child-bearing lessen the mother's resistance to the tuberculous infection?" This might be considered under three subheadings: (1) Does child-bearing activate (a) a latent,

* Read in opening a discussion at a joint meeting of the Sections of Tuberculosis and Obstetrics and Gynaecology at the Annual Meeting of the British Medical Association, Oxford, 1936.

or (b) an arrested (quiescent) lesion, and if so, in what degree? (2) Does child-bearing accelerate the rate of progress in active pulmonary tuberculosis and precipitate a fatal issue? (3) Is child-bearing beneficial to the mother suffering from pulmonary tuberculosis? This last question arises only if our answers to those which precede it are in the negative.

The Terms "Latent" and "Arrested"

Before we attempt to answer these questions we must not shirk, as so many authors have done, the difficulty of defining our terms, for this omission has led in the past to much confusion of thought and statement. "Latent tuberculosis" is an unfortunate phrase with implications almost as numerous and variable as the authors who use it. Did not Osler believe that 90 per cent. of mankind had "latent tuberculosis"? I regard the term as one essentially clinical. It is of practical value in considering the management of a patient, but, in my view, valueless for statistical analysis. A patient who is losing weight, who is suffering from a slight cough, and who gives a past history of pleurisy and a bad family history of tuberculosis is justifiably regarded from a practical standpoint, even if bacteriological and radiological evidence be negative, as a tuberculous patient if adequate investigation fails to reveal any other cause for the symptoms. This is the purely negative method of diagnosis by elimination, but if the patient is suffering from pulmonary tuberculosis we have adopted the treatment adequate to the condition; if we fail to treat these suspicious symptoms as tuberculous in origin we may lose the opportunity for cure. But clearly the loopholes in this method of diagnosis are numerous, and any statistics based on such variable and unstable criteria must be disregarded.

Leyland Robinson, acknowledging this difficulty, seeks to define four clinical types of latent tuberculosis:

1. A patient with a simple but suspicious catarrh, a family history of tuberculosis, and a negative sputum, who becomes sputum-positive during pregnancy.
2. A weakly but apparently healthy woman who for no adequate reason, such as special exposure to infection, develops tuberculosis during pregnancy or the puerperium.
3. A patient who develops tuberculous lesions during or after successive pregnancies and remains free from active disease in the interval between each reproductive epoch.
4. Those individuals who, coming from families with a special tendency towards tuberculosis, possess a lowered resistance to this infection and are therefore specially prone to develop the disease under conditions of stress.

To this author, in the limits defined, the first appearance of active tuberculosis during pregnancy indicates a previously latent lesion.

Arrested (quiescent) lesions are those which once presented positive evidence—radiological, bacteriological, and constitutional—of active disease but are now free from all evidence of activity.

If we are to answer accurately the questions we have posed, adequate information must be forthcoming on the following specific points: (1) Does pulmonary tuberculosis first appear with greater or less frequency in a group of pregnant women than in an exactly similar group of non-pregnant women? The answer to this question would prove the deleterious or beneficial effect of pregnancy in the so-called "latent" tuberculosis. (2) Do relapses occur with greater or less frequency in arrested or quiescent cases if the patient becomes pregnant? (3) Does a pregnant woman with active tuberculosis improve or more rapidly decline than a non-pregnant victim of the same age, social circumstances, stage, and type of disease, etc.?

It must be confessed that an exhaustive search of the literature fails lamentably to provide the necessary data

from which accurate answers to these three fundamental questions can be given. It is perhaps not surprising, however, that the difficulties which confront us in collecting such data should be almost insurmountable. The relative rarity of the association of pulmonary tuberculosis and pregnancy (probably not greater than 1 to 2 per cent. of the total number of births) leads to the number of cases under the direct supervision of one group of observers being comparatively small. It is therefore necessary to pool results if a sufficiently large number of cases is to be statistically analysed. But this pooling is most unsatisfactory because the variables in the separately published groups of cases are enormous. Not enough consideration is given to the type of infection, the stage of the disease, the stage of the pregnancy, the number of previous pregnancies, the social, economic, and climatic conditions of the patient's life, the past and family histories, and the mental attitude towards pregnancy; to the availability of expert obstetrical service in a sanatorium, or the provision of adequate sanatorium treatment in a maternity hospital; to the cases which are lost sight of in the early months following pregnancy, and so forth. Leyland Robinson has attempted to circumvent this difficulty by seeking the views of 200 experts from all parts of the world on the problems presented, and analysing their replies. But this is statistically a fallacious approach. If individual opinions are based on inadequate data the sum of those opinions is no more trustworthy. And in many cases there can be little doubt from the internal evidence that these observers have followed the precepts of their teachers without subjecting them to the close scrutiny of personal experience. Witness Carnac Rivett who, in discussing the question of suckling the infant, says "I have always been taught 'for the tuberculous mother—no suckling,' and I have always carried this out, so I cannot say whether it is right or wrong"—an honest if ingenuous confession.

Some Statistics from the Literature

If, then, we cannot secure the type of information we desire, are there any available statistics from which conclusions of practical value can with fair certainty be drawn? Let me refer first to an illuminating paper of Bridgeman and Norwood, based on the notes of 14,000 maternity cases in Baltimore, U.S.A., of which 134—that is, less than 1 per cent.—were grouped as pulmonary tuberculosis in various forms. It is of interest to note that this incidence corresponds roughly to the morbidity rate for pulmonary tuberculosis in the whole city of Baltimore, suggesting that there is no gross increase in the incidence of pulmonary tuberculosis during the period of gestation, though here again reference to specific age and sex groups would be necessary before the contention could be held valid. Three of their groups of cases are of special interest:

1. *Pregnancy with Questionable Tuberculosis.*—In this group there were 50 cases and no deaths. Forty-five healthy babies were born (average weight 7.6 lb.), and the subsequent history did not suggest that any of these children developed tuberculosis. There were 4 spontaneous abortions or premature births, and 1 death during delivery. If we compare these figures with 100 consecutive normal deliveries under the same conditions we find that 89 were healthy (average weight 7.3 lb.), there were 4 abortions or premature births, and 7 babies were stillborn or died in the first two weeks of the puerperium. Whatever might have been their criteria for "questionable tuberculosis," it is clear that this dubious lesion had no observable effect on the course of pregnancy; nor did pregnancy affect it.

2. *Pregnancy with "Definite but Inactive" Pulmonary Tuberculosis.*—In this group there were 17 cases—10 unilateral and 7 bilateral. Ten of these patients had follow-up notes for six to twelve years and were well; the remaining 7 were in excellent condition six months to five years after the delivery. All were in poor financial circumstances and 15 of the 17 had normal full-term babies. From these figures one can justly conclude that healed tuberculosis is unaffected by pregnancy, even in the adverse social circumstances of these patients.

3. *Pregnancy Associated with Active Pulmonary Tuberculosis.*—In this group there were 31 patients. A year after delivery 10 were dead, 8 were unimproved, and 2 were improved. The remaining 11 had histories of too short duration from which to draw definite conclusions, but I have attempted from the abstracts which are given of all the cases in this paper to detail these 11 cases, and I find that they are as follows:—

Case 1.—Eight months later general condition fair but definite activity. Working regularly.

Case 2.—Discharged in good condition.

Case 3.—Discharged in poor condition two months after delivery.

Case 4.—Discharged in poor condition.

Case 5.—Discharged in good condition one month after delivery.

Case 6.—Discharged in worse condition three weeks after delivery.

Case 7.—Discharged in fair condition (but said to have tuberculous ulceration of the larynx!) two weeks after delivery.

Case 8.—Discharged in very poor condition three months after delivery.

Case 9.—Discharged in poor condition three weeks after delivery.

Case 10.—Discharged in fair condition three weeks after delivery.

Case 11.—Discharged in very poor condition six weeks after delivery.

I think it fair to assume that 6 to 8 of these patients would certainly have been dead within the year. Thus we might say that out of the 31, 16 at least (50 per cent.) would have died within a year of delivery. But is this mortality figure greater than that found in non-pregnant actively tuberculous women in a similar age series of approximately the same stage of the disease? The authors quote 72 cases of non-pregnant actively tuberculous women of whom at the end of a year 23 (32 per cent.) were dead, 24 (33 per cent.) had not improved, and 25 (35 per cent.) were improved. These figures suggest strongly that pregnancy diminished the chances of recovery for the actively tuberculous patient.

It is of interest to compare these statistics with those of Forssner, who found that at the end of a year 37 per cent. of 396 non-pregnant women with an advanced tuberculosis were dead as compared with 46 per cent. of 203 pregnant women. And in Rist's earlier series of 117 cases in which tuberculosis began either during pregnancy or shortly afterwards, 60 of the women (51.2 per cent.) were dead after a period of two years.

Importance of Type and Extent of the Disease

That the type of disease is of paramount importance is suggested by Ornstein and Kovnat. They classify pulmonary tuberculosis into: (1) exudative of (a) resolving or (b) non-resolving (caseous-pneumonic type); and (2) productive or bronchopneumonic type. The exact definitions of these terms need not detain us, but it is significant that in 85 cases which they collected from their records over a period of ten years there were 31 deaths, and all these were in the 51 cases comprising the caseous-pneumonic

group. Out of 51 non-pregnant females suffering from a similar type of lung lesion, 23 were dead after the same period of observation.

The available statistical evidence suggests that in active pulmonary tuberculosis pregnancy aggravates the disease and accelerates its fatal termination. There is no direct evidence that in the so-called arrested or healed cases pregnancy exerts a deleterious effect, though on general principles this might have been anticipated.

We know that pregnancy makes excessive demands on certain phases of metabolism. The call for calcium, iron, and iodine is increased; the basal metabolic rate is raised; renal adequacy declines especially in the later weeks; there is some encroachment on the cardiac reserve; and the respiratory rate is increased. These additional burdens must play their part in determining the rate of progress of a tuberculous lesion, but the evidence suggests that these factors are less important than the type and extent of the disease and the treatment which is available for the patient. The strain of labour with compression and decompression of the lung doubtless interferes with healing of the affected lung tissue, and in the puerperium not only the strain of lactation but the anxieties associated with the management of the child may play an important part.

There is a recurring suggestion in the literature that pregnancy exerts in some specific way a lowering effect on the resistance of the patient to the tuberculous infection—an observation which seems to be based essentially on the work of Nobécourt and Paraf, who stated, according to Rist, that a comparatively high proportion of pregnant women lose their capacity to give a positive skin reaction to tuberculin and recover it only some time after confinement. The mechanical effects on the lung of the enlarging uterus, though the source of much armchair speculation, have not been adequately studied. We can, then, accept the ill-effects of pregnancy in active pulmonary tuberculosis without attempting to define in greater detail the influence of the different phases of child-bearing. On general grounds it would probably be agreed that the effects of labour and the strain of the puerperium are likely to prove most severe.

Contraception and sterilization must clearly be considered and here, as in dealing with the problem of abortion, we should purge our minds of all religious, moral, and political objections and concentrate on the medical aspects of the problem. Coitus is not free from the risks of conjugal infection, and it may be that instruction in contraceptive measures will, by removing the risk of pregnancy, increase the risk of conjugal infection. Sterilization involves operative procedures which add to the patient's burden even if performed under spinal anaesthesia. But these are problems requiring special consideration for the individual.

Treatment: The Lung First

The essential problem to be considered is the treatment for a patient suffering from active pulmonary tuberculosis who has become pregnant. There are clearly two important aspects of this: first, the treatment of the lung condition; and secondly, the possibility of protecting the patient from the ordeal of parturition and the dangers of the puerperium—that is, by inducing early abortion.

It is imperative that the lung condition be treated from the first. The strictest sanatorium principles must be applied, and the question of accessory measures, particularly artificial pneumothorax, must be considered. A recent paper by Rist and Jottras is the most comprehensive on the advantages of artificial pneumothorax. These authors limit their observations to cases which have

been followed for at least two years after confinement, and exclude cases in which collapse therapy was of less than one year's duration. They treated 132 cases. Fifty-eight patients had artificial pneumothorax for proved pulmonary tuberculosis and later became pregnant. Of these 39 began their pregnancy more than a year after artificial pneumothorax treatment had been induced, and of these 39, 26 were cured (20 for three years or longer after confinement and five years or longer after artificial pneumothorax treatment was instituted, and 6 for two years or less after confinement and three years or less after artificial pneumothorax treatment was started). Of the remaining 19 who became pregnant less than a year after artificial pneumothorax treatment was begun, 12 were cured (9 for three years or longer after confinement and four years or longer after artificial pneumothorax treatment commenced, and 3 for two years or less after confinement and three years or less after artificial pneumothorax). The authors emphasize, also, that of the 15 cases which had lost all signs of activity under artificial pneumothorax therapy before conception, 13 remained uninfluenced by pregnancy—that is, 87 per cent.—while of the 43 cases with doubtful or no arrest of the disease only 25 (58 per cent.) terminated favourably—thus re-emphasizing the necessity for curing the pulmonary tuberculosis before pregnancy is permitted.

Of the 74 cases in which artificial pneumothorax was induced for the first time *during* pregnancy (taken between the years 1926 and 1932 so as to give a three-years observation period before reporting results) in only 33 (45 per cent.) were favourable results obtained. Moreover, the earlier in pregnancy the artificial pneumothorax is carried out the more favourable the ultimate result. Of 32 cases treated in the first four months there were favourable results in 17 (53 per cent.). Of 42 cases treated during the last five months of pregnancy there were favourable results in only 16 (38 per cent.). It is also of interest to note that of 38 patients in whom pregnancy supervened on a pre-existing tuberculous lesion, 19 (50 per cent.) were cured, while of 36 in whom the tuberculosis first made its appearance during pregnancy, 14 (39 per cent.) only were cured. It is likely in the latter cases, however, that the more acute type of infection was present. Because of altered conditions of intra-abdominal pressure, there must be careful regulation of the pneumothorax in the later months of pregnancy.

Other surgical procedures such as phrenicotomy and thoracoplasty must be considered in relation to the individual case, the prime consideration being to treat the lung lesion and ignore as far as possible the pregnancy.

Effect of Abortion

Statistics of the effect of abortion are difficult to evaluate, for clearly not only is the stage of pregnancy at which abortion is performed important, but the method and the associated degree of general disturbance it produces is significant. Although abortion was generally urged as a therapeutic procedure in the first two to three months of pregnancy, the available statistics throw considerable doubt on its efficacy in preventing the spread of active disease. In the article quoted by Bridgeman and Norwood statistics are given in which of 9 patients with active tuberculosis who were followed for a year and in whom the therapeutic abortion was performed during the second to third months of pregnancy, 5 were dead at the end of a year. But it is possible that with measures for inducing abortion which involve less active interference—for example, x rays—its beneficial effect might be more evident than present statistics suggest. Here again we must await further observations.

The effect of maternal tuberculosis on the offspring is well illustrated by the statistics of Armand-Delille. Of 719 children surviving birth in 175 tuberculous families, 323 were placed in the country away from their mothers, while 396 remained in contact with them. Of the former group all were alleged to have remained well, while of the latter 238 developed tuberculosis. A smaller series is that of Forssner. His figures show that of 34 children removed at birth from tuberculous mothers 82 per cent. were free from the disease after three years and 3 per cent. had died. Of 89 children reared by their mothers 52 per cent. were free from tuberculosis after three years, while 20 per cent. had died. In the first series 3 per cent. of living babies had tuberculosis, and in the second 25 per cent. had the infection after three years. Almost all the available evidence confirms the strong susceptibility to tuberculosis of offspring reared by actively tuberculous mothers.

Summary

In brief, then, this is the general impression left by a critical survey of the available literature. The risks of active pulmonary tuberculosis are increased by pregnancy; this depends to some extent on the type of lesion present. In arrested and healed cases of over two years' duration this risk is by no means prohibitive. As a practical measure, safety lies in treating the lung condition, where the suspicion of tuberculosis arises, with all available therapeutic resources. If pregnancy complicates an active lesion the patient must be treated by experts in the most favourable surroundings. The merits of early abortion still await statistical confirmation.

When we survey the vast literature which has grown round the subject of tuberculosis and pregnancy, and contemplate the paucity of established facts which can be culled therefrom, we are justly humble. Medicine is not yet free from those shackles of authority which led generations of physicians to echo the aphorism of Hippocrates that "pregnancy is the best cure for consumption." In striking contrast is R. A. Young's dictum: "If a virgin, no marriage; if married, no pregnancy; if pregnant, no confinement; for the mother, no suckling"—which admittedly has more evidence to commend it. But advance in our knowledge of the interrelationship of pregnancy and tuberculosis will come not from the *ex cathedra* pronouncements of accepted authority but from the careful collecting of apposite and adequate data and their subsequent unprejudiced analysis.

The directors of the Commonwealth Fund of New York have created a number of Commonwealth Fund Service Fellowships, tenable at American universities, not more than five of which will be offered in 1937 to persons holding appointments over-seas under the British Government, the Government of India, or the Government of a British Dominion, Colony, Protectorate, or Mandated Territory. The actual number of Service Fellows to be appointed in 1937 will be determined by the committee of award. Candidates must be of British descent, single or married, and not have attained the age of 35 on September 1st of the year of award. They must submit a definite scheme of research work or advanced study to be carried out during their residence in the United States, and must produce evidence of their capacity to pursue it with advantage. Fellowships are tenable for a minimum period of fifteen months and a maximum period of twenty-four months, which will run from the date of departure from the country in which the Fellow is engaged in Government service to the date of his arrival on return. Applications, to be submitted on the prescribed form, must reach the secretary, Commonwealth Fund Fellowships, 35, Portman Square, W.1, by February 1st, 1937.