

PULMONARY COMPLICATIONS IN PREGNANCY*

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PULMONARY complications in pregnancy have always caused considerable concern, and a great deal has been written on this subject. As early as 1862, Gassner¹ observed that although pregnancy exerted a favourable influence in the early months, this was only temporary, and after the fifth or sixth month rapid retrogression of the tuberculous lesion was the rule. In 1876, Ortega² reported on 132 pregnancies in the tuberculous, of which 95 went to term, 28 terminated prematurely, and 9 were aborted. He believed that pregnancy exerted a deleterious influence on tuberculosis. For the purposes of this paper it is proposed to deal with a few fairly common pulmonary complications in pregnancy, other than tuberculous, and later to deal at greater length with what is perhaps the most important pulmonary complication, namely, tuberculosis in its different forms and types.

ASTHMA

Women who are subject to asthmatic attacks are very likely to have these attacks increased, both in frequency and severity, during pregnancy. Moreover, some women will suffer from asthma during pregnancy who have never before been troubled with it. The treatment of

asthma complicating pregnancy is the same as that in the non-pregnant state. A change to a clear, dry atmosphere usually gives the patient relief.

SYPHILIS OF THE LUNGS

A large number of syphilitic women are sterile. If pregnancy, however, does occur, the effect of the syphilis upon it depends largely upon the stage of the disease. If the woman is already syphilitic, or is infected at the time of impregnation, abortion or premature labour usually results. Intra-pulmonary moisture, due to a syphilitic lesion of the lung, clears remarkably quickly with anti-luetic treatment. We have seen intra-pulmonary moisture over an area of half the lung subside in a few days after a single dose of "606".

PULMONARY EMBOLISM

Pulmonary embolism is a rare complication of pregnancy, fortunately. Barnes³ reports a few cases of sudden death from this accident. Pulmonary embolism complicating labour, and especially the puerperium, is, unfortunately, much more common. Its suddenness, often when the patient is apparently convalescing smoothly, is a great shock both to the family and the obstetrician when it does occur.

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EMPHYSEMA

Patients suffering from emphysema prior to pregnancy usually have their symptoms much aggravated by this condition. This aggravation may arise both from the mechanical interference with a normal action of the diaphragm and from the neurotic tendencies which pregnancy so often brings out. Emphysema, from interference with the normal oxygenation of the fetal blood and the resulting accumulation of carbon dioxide, occasionally stimulates the uterus to contract, causing a premature expulsion of the ovum or fetus. On the other hand, the symptoms sometimes become so distressing that in the interests of the mother it is necessary to interrupt the pregnancy.

DYSPNŒA

In the later months of pregnancy, as the uterus enlarges and occupies a large part of the abdomen, the descent of the diaphragm, and therefore the expansion of the lungs, is interfered with, and on exercise the patient experiences more or less dyspnœa.

PNEUMONIA

Of the non-tuberculous complications perhaps pneumonia is the most important. Pneumonia during pregnancy is a serious complication, viewed from the standpoint of either the pneumonia or the pregnancy, as each handicaps the other. The mechanical interference with full lung expansion in pregnancy, especially during the later months, greatly adds to the dyspnœa of the pneumonia patients, and the consolidation of a portion of one or both lungs interferes with the normal oxygenation of both mother and fetus. Interruption of the pregnancy is a common result of this insufficient oxygenation. Cragin⁴ reports that pneumonia interrupts the pregnancy in about 40 per cent of the cases during the first half, and 60 per cent during the second half. The maternal mortality in pneumonia with pregnancy is high. In Ricau's²⁰ series of 43 cases 12 died, a mortality of 28 per cent.

TUBERCULOSIS

Of all the pulmonary complications in pregnancy tuberculosis undoubtedly is the most important; most important because thousands of tuberculous women become pregnant, and thou-

sands of women of child-bearing age die of tuberculosis each year. We all have observed the frequency with which pregnancy occurs in tuberculosis. Many observers have concluded that persons with tuberculosis are unusually fruitful and the sexual desire is increased. In 1913 Bacon⁵ stated that 32,000 tuberculous women became pregnant annually in the United States, and that between 44,000 and 48,000 women of child-bearing age die of tuberculosis each year. Norris⁶ believes that 33 per cent of pregnant tuberculous women die in less than one year following labour. Tuberculous lesions may remain latent for years, but pregnancy too often is instrumental in converting the latent lesion into an active one. Many date the onset of their illness to pregnancy. The danger is, perhaps, greatest in the first pregnancy. If the patient possesses sufficient resistance to withstand one or two pregnancies, everything else being equal, she probably will withstand another, but not always, as the tuberculous lesion may easily have extended.

It was once considered that pregnancy in tuberculosis was of good import, based upon the fact that there is so often a temporary improvement, due perhaps to the gain in weight and general nutrition, during the latter half of pregnancy. Abundant experience has shown, however, that tuberculosis as a complication of pregnancy is highly undesirable. The symptoms of tuberculosis do not differ materially from those that accompany the disease in the non-pregnant condition. During the early months of gestation the anæmia and general malnutrition are usually pronounced, but in the later months there is often considerable improvement. Too often, however, this is followed by a rapid decline after delivery.

Varying with the site and type of the tuberculous lesion present, most observers are agreed that the effect of pregnancy upon tuberculosis is a deleterious one. This harmful effect is least pronounced in the chronic process (fibroid phthisis), and most pronounced, perhaps, where there is a laryngeal complication. Patients with a latent lesion often have a lighting up of this process, resulting in an active lesion as the pregnancy develops, the puerperium being the time of greatest danger. The reason for this is because of the reduced vitality of the woman, resulting from the increased demand upon her

blood and the augmented tax upon her different organs due to pregnancy.

Tuberculous women who are pregnant should be subject to a rigid hygienic and dietary treatment, whether or not it becomes necessary to interrupt the pregnancy. Perhaps a course of treatment in a well conducted sanatorium is best. In the early months of pregnancy, with a rapidly advancing pulmonary lesion, induction of labour is definitely indicated. In the late months, even though the disease be active and progressive, there is little to be gained by the induction of premature labour. Norris considers the line of demarcation to be the fifth month. He also believes that in the presence of an extensive lesion, even in a quiescent state, or a small active lesion, the uterus should be emptied at once, much more imperatively when there is a development of secondary tuberculous lesions in parts of the body other than the lungs, and particularly in laryngeal tuberculosis. Excessive vomiting, renal insufficiency and other complications of pregnancy, may in a normal woman constitute indications for emptying the uterus; even more so is this the case when there is tuberculosis present, as a tuberculous woman has less resisting power, therefore intervention should be resorted to earlier.

Pradella⁸ reported his series regardless of their degree of pregnancy to their pulmonary lesion. He found that in the first stage of tuberculosis emptying the uterus had a beneficial effect in 89 per cent of the cases, in the second stage in 83 per cent, and in the third stage in 25 per cent. In the first stage of tuberculosis, and in the case of those less than one month pregnant, he found that the inducement of abortion was beneficial in 91 per cent of his cases. Norris reports 347 cases in which abortion was performed in patients with active lesions, and of these 56.7 per cent were benefited. Generally speaking, little is to be gained by inducing premature labour after the fifth month. The puerperium, which is the most dangerous period, must be coped with in any event, and the patient might better be placed on a strict hygienic and dietary regime, preferably in a well conducted sanatorium. Norris reports that a series of advanced cases, first seen in the later months of pregnancy, withstood well the perilous period of labour and puerperium, and when seen nine

months after delivery showed no extension of the tuberculous lesion.

Cragin⁴ believes that in the early months of pregnancy in active tuberculosis the pregnancy should be interrupted. The patient needs every ounce of her vitality to combat her tuberculosis. A continuance of her pregnancy is almost certain to stimulate the development and spread of the tuberculous process, to lower her vitality and greatly lessen her chances of recovery. Couvelaire⁹ is of the opinion that in fibroid tuberculosis the influence of gestation is nil. Winter¹⁰ observed 138 tuberculous women. Ninety-three, or 67 per cent, showed unmistakable aggravation of the lesion, with latent or healed tuberculous activation in only one-fifth of the cases, while in patients with an active lesion the process was uninfluenced by pregnancy in only 14 per cent. He claims that therapeutic abortion is contra-indicated in healed tuberculosis, and in active tuberculosis is indicated up to seven months. Pankow¹¹ believes that therapeutic abortion offers the most help when carried out in early pregnancy. Gross¹² reports that the influence of gestation upon pulmonary tuberculosis is unfavourable, but therapeutic abortion is justified only when sanatorium treatment has proved unsuccessful.

Norris, over a period of nine years, examined all patients of this group who applied at the Henry Phipps Institute in Philadelphia, and was impressed with the unfavourable influence exerted by pregnancy in the course of pulmonary tuberculosis. He observed that occasionally women with advanced tuberculosis withstood the test of pregnancy well. He, however, is of the opinion that tuberculous women should not become pregnant unless the pulmonary lesion is in the first stage and has been quiescent for at least two years. He advises that prior to the fifth month the uterus should be emptied if the disease manifests evidence of becoming active, if the lesions are extensive, or if a laryngeal involvement occurs. Bridgman and Norwood¹³ stress the importance of intensively treating the tuberculosis, preferably in a sanatorium, and disregarding the pregnancy. Hill¹⁴ concludes, from a series of 160 cases, that pregnancy has no appreciable bearing upon the progress of the tuberculous lesion. Fishberg¹⁵ considers that women with chronic forms of tuberculosis bear maternity well. He finds that

only 20 per cent of these cases have aggravation, but also points out that about the same percentage have aggravation who are not pregnant. Rist¹⁶ believes that pregnancy in a tuberculous woman leads to an aggravation. Of his 117 patients, 60 died of tuberculosis after two years; 43 were still living but failing; in 14 the disease was temporarily arrested.

It is safe to say that pregnancy exerts an unfavourable influence upon tuberculosis usually, and many women apparently contract the disease during pregnancy, particularly wives of tuberculous men. Many cases which are apparently contracted during pregnancy are really exacerbations of previously unknown or undetected cases. Lactation in women below par, as most of the tuberculous are, is a great strain, and in itself may be sufficient to reactivate a latent lesion. Fishberg found that of 286 married tuberculous women, 107, or 37.4 per cent, first noticed their pulmonary lesion after one or more pregnancies had occurred. Jacob and Panniovitz,¹⁷ in tuberculous women, found that 25 per cent traced the origin of the exacerbation of their condition to pregnancy. Turban¹⁸ found that 29 per cent of tuberculous women who had borne children attributed the onset of their tuberculosis to pregnancy. Funk,¹⁹ in a series of 200 women suffering from tuberculosis, found that 30 per cent first noticed symptoms during or shortly following pregnancy. Norris combines several series and reports that of 963 cases, 42 per cent noticed pulmonary symptoms during pregnancy or lactation.

It appears, then, that there is considerable diversity of opinion on the question of the influence of the reproductive process upon pulmonary tuberculosis. The clinical observers would seem to fall into three groups: (1) Those favouring the viewpoint that there is a flaring up of the latent tuberculosis; (2) those favouring the viewpoint that fibroid lesions remain stationary; (3) the largest group, those holding the viewpoint that the effect generally is unfavourable, but that sometimes there is a temporary improvement during gestation.

The general opinion can perhaps be summarized as follows: Where there is frank, clinically active tuberculosis, though sometimes improvement during pregnancy seems to occur, this is usually followed by a retrogression which too often goes on to mortality. If, therefore,

the disease is active, abortion should be induced before the fourth month. On the other hand, there is nothing to be said in favour of the induction of premature labour in regard to a similar case in the late months of pregnancy, as the deleterious effects are about the same following abortion at this stage as following full-time labour. If, however, the disease is quiescent, or better, it is advisable to go to full term.

At this point perhaps the recital of a few of our own reports will be of interest.

CASE 1

Admitted December, 1927, far advanced tuberculosis with complete involvement right chest, both anteriorly and posteriorly. The patient gave a history of frequent winter colds and pleurisy in December, 1926, when she was ill one month. In August, 1927, she developed a so-called "cold". There had been cough and expectoration ever since, and she had felt her strength gradually failing with marked shortness of breath. She had already had six children, five of whom were alive and well. Temperature 99° to 99.2°; pulse 120; weight 90 lbs.

On sanatorium treatment this patient rapidly increased in weight to 120 lbs. She became afebrile and her cough and sputum decreased. Her general condition improved. She was confined in May and remained comparatively well until January, 1929, when she developed a so-called "cold", and the cough and sputum became worse. She spat up blood on several occasions.

Re-admitted in March, 1929. The temperature was 99° to 100°; pulse 100. General improvement followed. She was confined in October, 1929, again, and continued fairly well and is now doing her own work.

It will be noticed in this case that with the aid of sanatorium treatment this patient showed definite improvement in general condition and at the same time carrying her pregnancy on two occasions.

CASE 2

This patient was first seen in August, 1926, a far advanced case of pulmonary tuberculosis. Physical examination revealed intrapulmonary moisture throughout the left chest, both anteriorly and posteriorly, and in the lower half of the right chest anteriorly. X-ray examination revealed moderately dense mottling throughout both lungs, denser in the bases. The sputum was positive for tubercle bacilli. The woman was five months pregnant at this time.

She gave a history of having had seven children previously, six of which are alive and well, one having died of influenza. She had had definite pulmonary hæmorrhages 13 years ago, one or two hæmorrhages a day for about two weeks at this time. After these hæmorrhages she seemed to enjoy good health until the birth of last child, nine months before, since which time there had been an occasional night sweat and an occasional hæmorrhage amounting to half a cupful, also considerable cough and sputum. Temperature 99° to 100°, pulse 96 to 100. With rest the elevation of temperature subsided, there were no more hæmorrhages, and the general condition improved. The baby was born in December. The mother kept in bed for three months and seemed non-toxic again—up and about as well as before.

This case is cited to show what prolonged rest can do even in advanced cases which are more or less chronic.

CASE 3

This patient was first seen in January, 1928. She gave a history of undue tiredness, with some cough and expectoration, since September. In November she spat up blood and again in December. There were occasional night sweats in January, 1928.

Physical examination revealed definite tuberculous moisture in the upper right chest, both anteriorly and posteriorly—a moderately advanced case of pulmonary tuberculosis with positive sputum. There was a pregnancy, which probably had its inception about the middle of August, 1928. The afternoon temperature was 99° with an occasional 99.2° to 99.4°. She was put to bed. The cough gradually cleared, and the sputum decreased from one ounce to practically none. In March, 1928, physical examination revealed slight decrease in the tuberculous moisture in the right chest. An x-ray picture taken in March showed some lessening in density of the right upper lung shadows.

Following childbirth, May 29, 1928, the temperature remained persistently elevated between 100° and 103.4°. The pulse was 124 for some little time. The weight dropped from 118 lb. to 95½ lb. There were much shortness of breath and palpitation of heart. Examination of the chest showed very little change on June 21, 1928. About this time the temperature began to subside and general improvement followed. X-ray examination then showed some evidence of lessening in the disease in the third and fourth intercostal spaces on right side. X-ray examination in August, 1928, showed further resolution of the parenchymatous process over the right upper lobe.

The points of interest in this case were: (1) The patient's first knowledge of symptoms that would be referable to tuberculous lesion appeared shortly after the beginning of pregnancy. (2) She seemed to improve during the latter five months of her pregnancy, but had an exacerbation following childbirth which subsided and improvement followed.

CASE 4

This woman, aged 24, came under observation as a chest case in February, 1929, complaining of slight cough with scanty expectoration, occasionally streaked with blood. She had a very poor family history. The father had had pulmonary tuberculosis, one sister died of pulmonary tuberculosis, one sister has at present pulmonary tuberculosis; two children alive and well. The temperature at this time was persistently 99.2° to 99.4° each day for some time. Her weight was 109 lbs. Physical examination revealed at this time minimal tuberculosis at both apices. The sputum was positive for tubercle bacilli. For the last two months the patient seemed much better, with less cough and expectoration, less elevation of temperature. Her weight in April was 120 lb., as against 109 lb. in February. Radiographically, there were less shadows in October, 1929, than in February, 1929. At present the patient is still improving so far as the chest is concerned. She will probably be confined in about one week's time.

This case is reported because of apparent improvement on sanatorium routine, but the lesion was quite active when outside and the patient was toxic.

CASE 5

This woman, aged 30, came to us on April 23, 1930, a far advanced case of pulmonary tuberculosis with complete involvement of left chest, both anteriorly and posteriorly, and the upper half of right chest. X-ray examination showed consolidation to the third anterior rib, minimal opacities more distally in the right lung, and moderately dense mottling through the left lung. The sputum was strongly positive for tubercle bacilli, and the temperature was persistently 101° to 103° daily, with laryngeal complication.

She gave a history of four pregnancies, the children being aged 11, 7, 5 years, and 5 months. She had no knowledge of previous illnesses outside of frequent "colds" during the past two winters, when there would be some cough and expectoration. The appetite remained good and likewise her strength throughout the recent pregnancy which terminated at full term on November 18, 1929. The patient says that she felt quite well, doing all her own housework. She got up ten days after birth of child, felt a little tired, but otherwise was quite well, doing her own housework and nursing the baby. Two months after labour she noticed she was losing weight with increased fatigue and, because of lack of sufficient food, the baby was weaned. Shortly after this she began to cough and have expectoration. In the early part of January she had a severe attack of pleurisy, and the cough and sputum became progressively worse until present time. She began losing weight quite rapidly, with chills and night sweats. The picture now is one of retrogression and the ultimate prognosis is indeed unfavourable, practically a terminal case at present.

It is of interest to note that the patient apparently stood well the three previous pregnancies. The tuberculosis and laryngeal complication seemed to date from the last pregnancy. The prognosis is so often much more unfavourable where there is a laryngeal complication.

CASE 6

This patient was first seen in November, 1927. There had been a rather acute onset of chest symptoms, dating back to about the time of conception, about three months. Physical examination revealed complete involvement of left chest, both anteriorly and posteriorly. Temperature 100° to 102°; pulse 90 to 120.

Her chest condition retrogressed rather fast and she was obviously rapidly becoming a terminal case. Therapeutic abortion was performed but, unfortunately did not change the picture. The patient died three months later.

CASE 7

This woman was first seen in January, 1923, a moderately advanced case of pulmonary tuberculosis. Moist intrapulmonary râles were present in the right upper chest anteriorly and right apex posteriorly. The temperature was 101° to 102°; pulse, 96 to 120. There was no history of chest symptoms prior to three months before, about the time patient became pregnant. Cough, sputum, malaise, and loss of weight were very progressive the last three months. We considered that the lesion was very active and the prognosis probably unfavourable. Therapeutic abortion was thought advisable, as it would, perhaps, give her her only chance, and this rather poor. Following this interference, for a period of about six weeks, the patient was if anything more toxic. Artificial pneumothorax was instituted and soon the elevated temperature started to subside and gradual progress followed. Refills were carried on for a little over a year and were discontinued. The patient was seen last in March, 1925, and there was no evidence of active tuberculosis.

CONCLUSIONS

In conclusion I would therefore say, first of all, that tuberculous women should be advised against marriage, unless the disease has been quiescent for two years; that married tuberculous women should be given detailed instructions on the proper methods of prevention of conception. If, however, they become pregnant, the induction of abortion during the early months of pregnancy is indicated and justified if the lesion is active, and particularly where there is laryngeal involvement. When full time pregnancy is necessary or desirable, prophylactic treatment is most important, since it offers the best chance of success. The physician should never omit a complete general examination, including heart and lungs, early in pregnancy, and every cough or loss of weight should be carefully investigated.

No tuberculous mother should be allowed to nurse the child, as not only would the strain be too much for the mother but the child would certainly be infected.

The most unfavourable prognosis should be given in cases showing marked constitutional symptoms which are out of all proportion to the findings on physical examination, and especially where there are laryngeal symptoms.

Lastly, we cannot escape the fact that it is impossible to formulate a fixed rule that will

apply to all cases, but each case must be considered individually, basing our ultimate decision upon:— (1) virulence of infection; (2) stage of the disease; (3) resistance of the patient; (4) environment; (5) intelligence, and ability to submit to treatment; (6) advancement of the pregnancy.

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