ANTENATAL PULMONARY EMBOLISM

A REPORT OF THREE CASES

BY

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Pulmonary embolism is well recognized as a complication of the puerperium, but its occurrence in the antenatal period is apparently rare. In a recent comprehensive review of the literature Ullery (1954) was able to find only 23 cases since 1922, and added two cases of his own.

Three cases of antenatal pulmonary embolism were treated in the Professorial Unit of Obstetrics, Bristol, in 1954, and the details of these cases are recorded below.

Case 1

This patient was a 7-gravida aged 38 years. All her previous pregnancies had been uneventful and the children were alive and well.

She was admitted to hospital on August 14, 1954, at the 38th week of pregnancy because her blood was found to be rhesus-negative and contained immune antibodies. Her pregnancy had been uneventful apart from superficial thrombophlebitis of the left leg and slight swelling of both ankles five weeks earlier. Examination on admission confirmed the presence of varicose veins of both legs with some ankle oedema. The blood pressure was 120/80 mm. Hg and the fundus of the uterus corresponded to a 38-weeks gestation. The presentation was unstable but could readily be turned to a vertex. The foetal heart was heard.

On the 16th, at 3.30 a.m., the patient awoke with severe pain in the chest behind the sternum, and a feeling of tightness. She was shocked and pale. The blood pressure was 80/60 mm. Hg and the pulse rate 100/min. No abnormal physical signs were detected in the chest and there was no change in the condition of the uterus or foetus.

Morphine, ¼ gr. (16 mg.), and oxygen by nasal catheter, were given, with gradual improvement in the patient's condition. It was felt that the diagnosis lay between a cardiac infarct and a pulmonary embolism. During the next day her condition improved slightly and an electrocardiograph excluded cardiac infarction.

At 6 a.m. on the 18th the patient had a further embolus, with similar symptoms. During the next few days she remained slightly cyanosed, and developed an irritating cough, with pain in the right side of her chest. Dullness was found over the right lower zone and a few crepitations were heard. Her pulse rate varied from 100 to 120 and respirations between 26 and 30 per minute.

On August 20 at 4 a.m. uterine contractions began, but labour did not become established until another 24 hours, during which time the foetal heart sounds disappeared. The first stage lasted 5 hours 20 minutes. A stillborn infant was delivered by forceps, after a pudendal block with 0.5% xylocaine. The third stage lasted three minutes and the total blood loss was 6 oz. (170 ml.). During labour the patient's colour was very poor and continuous oxygen was given. The pulse rate remained about 108–112/min. and the blood pressure 110/80 mm. Hg.

By 6 p.m. on August 21, six hours after delivery, the patient's condition was deteriorating. Her pulse rate was about 130/min. and the blood pressure had fallen to 60/? mm. Hg. The respirations were rapid and the neck veins were congested and pulsating. At times the pulse became imperceptible. Digoxin, 0.5 mg., and aminophylline, 0.24 g., were given intravenously, as was also an infusion of 5% dextrose containing noradrenaline 8 μg. to the pint (570 ml.). This was allowed to run at 15 drops per minute.

There followed a slight improvement in the pulse rate, which fell to 108–112 per minute, and the blood pressure rose to 85/70 mm. Hg. The noradrenaline drip was continued during the night, the blood pressure remaining at about 100/80 mm. Hg. Digoxin, 0.25 mg., was given six-hourly. The noradrenaline drip was discontinued at 2.30 a.m. on August 23, having run for 32 hours.

The patient then continued to make slow but steady progress. The blood pressure remained at about 110/80 mm. Hg and the pulse rate slowly fell to below 100/min. The respiration rate also dropped to 20 per minute at rest, but there was dyspnoea on slight exertion. Digoxin was stopped on August 28.

Subsequent progress was slow but satisfactory. A right pleural effusion developed and there were persistent rales at the left base. Mersalyl, 2 ml. intramuscularly, was given on alternate days for three days. Aspiration of the right pleural effusion failed. The physical signs in the chest gradually cleared, and the patient was discharged home on October 11, 1954. She was advised to have her varicose veins treated as soon as possible.

Case 2

A primigravida aged 27. This patient had had no previous illnesses apart from an appendicectomy in 1953. She attended the consultant clinic two days before admission with a history of pain in the calves for five weeks. She had been treated with bed rest and kaolin poultices. On examination no abnormal physical signs were detected, and she was advised to continue resting at home.

She was admitted to hospital at 12 noon on October 24, 1954, when 36 weeks pregnant, with a history of having collapsed that morning while eating her breakfast. The patient thought she fainted, and her relatives remarked that she looked grey at the time.

On examination she was found to be cold, cyanosed, and shocked. Her pulse rate was 140/min. and the blood pressure 90/60 mm. Hg. The respiration rate was 24 per minute. There were no abnormal physical signs in the heart or lungs, but there was very slight engorgement of the neck veins. The fundus of the uterus corresponded with a gestation of 36 weeks. The foetus was presenting as a vertex with the head engaged, and the foetal heart was regular. There was no oedema or tenderness of the legs or thighs.

A diagnosis of massive pulmonary embolism was made, and the patient was treated with oxygen through a B.L.B. mask. Pethidine, 100 mg., and atropine, 1/100 gr. (0.65 mg.), were given as required. Her condition remained unchanged until 8.30 p.m., when labour started. The blood pressure varied from 110/70 to 90/60 mm. Hg and the pulse rate rose slowly to 160/min.

At midnight ouabaine 0.125 mg. in 10 ml. saline was given intravenously, and the pulse rate slowed to 120 per minute. The foetal heart ceased to be heard at 1.45 a.m. Pethidine, 100 mg., was repeated as required to ease the labour, and the condition remained unchanged till 5.30 a.m. on October 25. Suddenly the patient became intensely cyanosed and grey, the pulse rate was uncountable, and the blood pressure could not be recorded. Oxygen was given by B.L.B. mask, but the respirations slowed and the patient died undelivered at 5.50 a.m.

Necropsy revealed massive pulmonary emboli involving both pulmonary arteries and showed that the emboli had arisen in the right leg veins.

Case 3

This patient was a 2-gravida aged 23. Her past history contained nothing relevant, and her previous pregnancy was uneventful.

Her last menstrual period was on April 5, 1954, making the expected date of delivery January 12, 1955. On October 22, 1954, when she was 28 weeks pregnant, she had an acute

attack of pain in the left side of the chest which lasted 24 hours and was relieved only by morphine. A provisional diagnosis of pulmonary embolism was made and the patient was admitted to a local cottage hospital, where her condition gradually improved until October 27, when she had a further attack of pain, this time in the right side of the chest. After the attack she was cyanosed; the pulse rate was 130/min., and the blood pressure 100/60 mm. Hg. With oxygen her colour improved, and the next morning there were crepitations over the right lower lobe. In view of the second embolus she was transferred to the maternity unit at Bristol.

On examination the patient was slightly dyspnoeic at rest but not cyanosed. The pulse rate was 120/min. and the blood pressure 110/90 mm. Hg. The heart sounds were normal, but there was diminished air entry at the right base, with crepitations in the right axilla and upper part of the chest posteriorly. The fundus of the uterus was the size of a 30-weeks gestation; no tenderness was felt. There was no oedema of the ankles or varicose veins.

The patient's condition improved slightly, but she developed severe pleuritic pain in the right side. On October 31 her left leg began to swell, and later in the day the right leg also became oedematous and Homans's sign was positive in both legs. Her haemoglobin was 135% and the red cell count 7.5 millions. The chest pain was relieved by methadone hydrochloride, 10 mg. six-hourly.

On November 2 the haemoglobin was 150%, the bleeding-time 4.15 minutes, and the clotting-time three minutes. During the next few days both legs became less oedematous and the tenderness over the deep veins gradually decreased. No further emboli occurred, and the chest condition gradually improved. Active movements of both legs were started on November 20, when there was no residual oedema, and the patient was allowed up on December 3.

Thrombosis of the deep veins of the left calf recurred on December 21 and was again treated with rest in bed; resolution occurred within a week. The patient was able to get up again on January 1, 1955. The haemoglobin was still 120% and the red cells numbered 7.3 millions. A chest *x*-ray film on January 4 showed the lesion in the right lower lobe to be resolving normally.

As labour had not begun by January 19 surgical induction by puncture of the forewaters was performed. After 48 hours, when labour had still not started, an oxytocin intravenous drip was commenced and contractions began at 7.15 p.m. on January 21. A living female infant weighing 4 lb. 1 oz. (1,840 g.) was delivered at 7.50 p.m. Ergometrine, 0.25 unit, was given intravenously and 0.25 unit intramuscularly as the child was delivered, and the placenta and membranes were delivered complete five minutes later with a post-partum haemorrhage of 48 oz. (1,360 ml.). The loss ceased spontaneously as the uterus contracted. It did not recur. As the patient's condition was satisfactory (pulse rate 88/min., blood pressure 115/85 mm. Hg.) and she was known to have a polycythaemia, a blood transfusion was not given, but the oxytocin drip, which was not stopped until the third stage was completed, was replaced by 5% dextrose-saline and one further pint (570 ml.) was given slowly.

After delivery the patient proceeded to make an uninterrupted recovery. The haemoglobin level remained at 100%.

Discussion

In Ullery's review 25 cases of embolism occurred in a total of 135 cases of antenatal thrombosis, giving an incidence of 18.5%, with a mortality rate of 60%. It can be appreciated, then, that when antenatal thrombosis occurs there is considerable risk of embolism, which often proves fatal.

As shown by these figures, antenatal thrombophlebitis is not a common occurrence, but with such a high mortality rate these cases require the closest supervision and care. The incidence is possibly higher than these figures suggest, as many cases may not be admitted to hopital. Even so, the mortality rate must still be fairly high, and all cases of thrombophlebitis occurring antenatally should be admitted to hospital.

It is very unusual for embolism to arise antenatally without a history of thrombophlebitis, and it can only be assumed that in Case 3 thrombosis was taking place "silently" before the occurrence of embolism. The diagnosis of pulmonary embolism does not usually present much difficulty, and was obvious even in the case where thrombophlebitis was not evident, although electrocardiography may be necessary to exclude the possibility of cardiac infarction.

The treatment of such cases presents great difficulty, particularly in regard to the use of anticoagulants. The number of cases quoted by Ullery is too small to be convincing, and it is noteworthy that embolism occurred in the same number of cases, whether on anticoagulant therapy or not. However, no fatalities occurred in the patients who were given anticoagulant therapy. In our one fatal case, death occurred in such a comparatively short time that it is very questionable whether anticoagulants would have had any effect at all. Moreover, it must be remembered that anticoagulants themselves are not without risk. Sachs and Labate (1949) reported a patient who had three pulmonary emboli while on anticoagulant therapy, and they considered that these were due to fluctuations of the prothrombin level. This patient had dicoumarol for 53 days prior to foetal death, which at necropsy was found to be due to multiple haemorrhages. In view of this and on the advice of medical colleagues, anticoagulants were not given. The considerable vacillation which exists among obstetricians regarding the use of anticoagulants indicates that they are not yet of proved value, and it is the policy of the professorial unit at Bristol not to use them at present.

In consultation with surgical colleagues it was decided that ligation of the inferior vena cava was contraindicated both from the point of view of poor end-results and from the immediate risk of further embolism while the uterus was being emptied to give access to the vena cava.

One conservative measure which seems to be of value is elevation of the foot of the bed to promote more rapid venous flow, while allowing the patient to move her legs. Noradrenaline was found to be very effective in the treatment of the medical shock in these cases.

Summary

Three cases of antenatal pulmonary embolism are reported, with one maternal death. One infant survived.

This condition is rare and has a high mortality rate.

In view of this high mortality all cases of thrombophlebitis occurring antenatally should be treated in hospital.

There is still controversy in the treatment of thrombophlebitis and pulmonary embolism, particularly in regard to anticoagulants and ligation of veins.

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References

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The British Council in association with the medical group of the British Publishers' Association is sending an exhibition of about 480 medical books to tour Canadian universities from November to April. Although this will be the fourth exhibition of university textbooks sent by the Council to Canada, it is the first time that the exhibition has consisted entirely of medical works. The books deal with both pre-clinical and clinical subjects.