

Poliomyelitis in Pregnancy

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SUMMARY

Acute poliomyelitis occurs in all trimesters of pregnancy. At one time there were six women in the poliomyelitis ward at Children's Hospital, five of whom were either pregnant or recently delivered. Poliomyelitis is an important entity in the differential diagnosis of diseases complicating pregnancy. Once diagnosed, treatment is directed primarily toward the symptoms of poliomyelitis, secondarily toward pregnancy. Effort should be made to maintain adequately high oxygen tension in the maternal blood stream to protect the fetus. The prognosis of the disease when it occurs during pregnancy may be less predictable, but it is generally good for both mother and infant. Although the incidence of abortion is relatively high, if the pregnancy goes to term parturition is expected to be normal. The number of cases reported is not sufficient to establish the significance of the suspected selective occurrence of poliomyelitis in pregnancy.

EIGHTEEN women with acute anterior poliomyelitis complicating pregnancy have been treated in the communicable disease department of Children's Hospital in the past several years, during a period when approximately 500 patients with poliomyelitis have been admitted. The ages of these pregnant women varied between 17 and 33 years, and the duration of gestation at the time of onset of poliomyelitis was between six weeks and 36 weeks. Determination of the length of gestation was based on history, physical examination, biologic assays and, in the cases of abortion, on the tissue expelled from the uterus. Diagnosis of the acute anterior poliomyelitis was based on history, physical examination and on examinations of the spinal fluid. Spinal punctures were done routinely except in a few cases in which paralysis was progressing rapidly or when the patient was convalescent on admission.

Seven of these women were admitted with acute poliomyelitis during the first trimester. Of this group a total of three patients aborted spontaneously and three carried their babies to term. The seventh patient, who was admitted to the hospital practically convalescent, had intermittent bleeding from the fifth month on and was delivered in the eighth month of

a premature infant which died. Labor was complicated by hemorrhage due to placenta previa. No fetal anomalies were noted. One patient with non-paralytic acute poliomyelitis, whose neck stiffness was mild and associated with low grade fever and a positive spinal fluid characteristic of poliomyelitis, aborted in the third week of illness, which was the twelfth week of pregnancy. No virus was isolated from the fetus. Four of the patients were discharged with diagnoses of acute paralytic anterior poliomyelitis. Two carried their babies to term and delivered normal infants uneventfully. One patient whose involvement was both bulbar and spinal had no apparent difficulty with her pregnancy. None of these patients was delivered during the period of hospitalization. All the patients who aborted in the acute phase of poliomyelitis showed accelerated recovery after the abortions occurred, but the outcome was good in the other three cases. Only one has residual palsies which are incapacitating.

There were seven patients admitted during the second trimester of pregnancy and diagnosed as having acute anterior poliomyelitis. One of these was non-paralytic, four showed paralyzes of spinal origin and two had both spinal and bulbar involvement. An unusual complication occurred in one of these women in the fifth week of illness, when phlebotrombosis developed in the left leg. It was treated by ligation of the femoral vein and removal of the thrombus. Five of these women had full term babies delivered either spontaneously or with elective low forceps after easy, effective and relatively short labor. One delivery was complicated by acute gastric dilatation during the second stage. The stomach was decompressed while the patient was still in the delivery room and dilatation did not recur. This same patient also had a subinvolved uterus six weeks postpartum and was treated successfully with a short course of ergotrate. The sixth patient delivered normal twins in the eighth month. Labor was uncomplicated and short and the deliveries were spontaneous. She was dismissed from the hospital when the babies were two months old and was able to care for them after one year.

The patient in whom poliomyelitis occurred earliest in the second trimester and in whom the involvement was extensive was transferred to our hospital, after termination of the pregnancy, with extensive paralysis of four extremities, the trunk and muscles of respiration. Abortion had been done in the fourth week of illness, while the patient was still in the respirator, by the insertion of an intra-uterine catheter. This caused such profuse hemorrhage that two transfusions of blood were necessary. Although the

patient progressed slowly, and without appreciable acceleration after the abortion, recovery was almost complete at the end of one year, except for residual effects in one arm. This group of patients as a whole had more paralysis, slower recovery and more numerous residual effects than did the women affected in the first trimester.

Four women contracted acute poliomyelitis in the third trimester. One died. She had acquired acute paralytic poliomyelitis at the beginning of the seventh month and had extensive involvement of the cranial nerves, the muscles of respiration, back and upper extremities. The course was complicated by pneumonia and pyelonephritis and she died on the twenty-third hospital day. A postmortem cesarean section was done, but the infant was stillborn. Autopsy findings showed acute anterior poliomyelitis and pyelonephritis in the mother, but no significant pathologic changes were found in the baby. Of the other three patients admitted during the last trimester of pregnancy, two had non-paralytic acute poliomyelitis, recovered rapidly and delivered normal infants. The third was in the prodromal stage of poliomyelitis at the time of labor and delivery, neither of which was unusual. The diagnosis was made on the third postpartum day and was confirmed by spinal fluid examination and appearance of typical and extensive paralysis. The baby did not thrive, showed equivocal neurological signs, and the spinal fluid cell count was nine. Improvement followed a transfusion with whole blood and the baby was discharged from the hospital well, with a discharge diagnosis of possible acute poliomyelitis.

All the women had fairly characteristic preparalytic symptoms, although these were often mild. Influenza was a confusing differential diagnosis in this stage. The early symptoms in two cases led to a diagnosis of hyperemesis gravidarum and the early myalgias were attributed in several instances to the polyneuridites so often seen in pregnancy. Frequently, then, the first neurological signs, such as stiff neck and back, were not detected and the diagnosis of acute poliomyelitis was delayed until typical paralysis developed. Ten of these women had pyuria, difficulty in voiding, and required catheterization either in the preparalytic or paralytic stage. In three cases bladder symptoms preceded any others.

MANAGEMENT

There is no specific treatment of acute poliomyelitis. Human pooled serum or other blood products, although of questionable value, were often given at the early stage. The infection was treated first, the pregnancy considered second. Kenny packs were started immediately and physical therapy employed to the extent permitted by pain and spasm. Chemotherapy was used prophylactically when repeated catheterization was necessary and for treatment of urinary tract infections. Threatened or concurrent pneumonia was treated with penicillin. Supplemental protein, carbohydrate, electrolytes, vitamins and

minerals were given orally or intravenously in quantities sufficient to care for the increased demands of pregnancy. Artificial interruption of pregnancy was not carried out in our hospital, for we believe it is contraindicated since the blood loss and sudden change in metabolism decrease the resistance of the patient.⁷ Two reports were found in the literature in which the authors expressed belief that early termination was indicated for their patients, in one instance to relieve respiratory embarrassment which was increased by the presence of the near term infant, and in the second in a case of severe cystitis in which recovery was prevented by mechanical obstruction.¹¹ Excessive blood loss after incomplete abortion was prevented by prompt curettage. Oxygen, by nasal catheter or respirator, was provided generously in cases of respiratory embarrassment. Because of the increased demands of pregnancy, and to insure adequately oxygenated blood for the fetus, this was often resorted to when there was little evidence of maternal anoxia. In one instance fetal well-being was considered primarily.

Our series indicates that the acute anterior poliomyelitis has little effect on pregnancy and that normal labor and normal offspring may be anticipated if abortion does not occur during the first trimester. In our 18 cases, 15 babies were delivered to 14 women. Thirteen of the infants, nine males and four females, survived. One premature female expired and one male was stillborn. The findings in our small series do not further the postulation once submitted by Aycock that all mothers who contracted poliomyelitis in the first trimester delivered boys, those who acquired it in the last trimester, girls. Successful outcome of the pregnancy after the first trimester was also the clinical experience of Kleinberg,¹⁰ Aycock,² Miller,¹² and others, but in all reported series, totalling about one hundred cases, the incidence of abortion is relatively high, being about 35 per cent. In our series, it was 27.8 per cent.

The assumption that labor will be normal is substantiated by physiological experiments which show that the uterus will contract and expel the products of conception after the spinal cord has been divided and after the sympathetic nerve supply has been destroyed. It is concluded, therefore, that the uterus has its own intrinsic nerve supply which stimulates contractions.^{11, 13} Clinically the labor is easy, less painful and shorter than in normal women of comparative parity. The size and shape of the pelvis, the distortions produced by paralysis, the cephalopelvic relationships and the general condition of the woman must be evaluated just as for the normal patient. The indications for operative delivery are about the same as those for non-paralytic women. "Undoubtedly more cesarean sections have been performed on paralyzed women than have been warranted. The complications prior to and following delivery are on the percentage basis almost identical with those in non-paralytic women."⁸

There seems to be no clinical or experimental evidence that the virus is transmitted to the fetus

in utero or through the breast milk.^{9, 13} Our case in which there was diagnosis of possible infection in a newborn and the few reported indicate that the contact is at the time of birth or after.⁵

EFFECT OF PREGNANCY ON POLIOMYELITIS

The effect of the pregnancy on the course of the poliomyelitis and on the extent of paralysis has not, on the other hand, been so clearly demonstrated. Some authors feel that pregnancy is a factor which definitely affects the severity and ultimate outcome, but the observers who reported the 30 cases of poliomyelitis in pregnant women during the 1946 epidemic in Minnesota expressed the belief that pregnancy does not alter the disease process.⁴ In our series, those patients who aborted in the early months seemed to progress more favorably. Although the progress seemed slower in those women who carried their babies to term, the slowness was often due to the impediment of the pregnancy on muscle reeducation and physiotherapy. All had good outcome after delivery, considering their more extensive palsies.

There seems to be an increased susceptibility of the pregnant woman to anterior poliomyelitis, and this may be related to the seemingly greater severity of the disease in pregnancy.¹¹ It is now believed that the virus of poliomyelitis is more or less uniformly disseminated. At least in epidemics the virus is more widespread than the occurrence of the disease would indicate and the likelihood of acquiring infection is probably conditioned quite as much by factors which influence whole susceptibility as by those which bring about exposure. The occurrence of poliomyelitis following operations on the nose and throat suggested that mucous membrane changes affect susceptibility. This, together with the implications that the upper respiratory mucosa may be the portal of entry, led Aycock to the premise that mucosal alterations due to estrogenic changes during pregnancy might account for the frequency of poliomyelitis during gestation.^{2, 3} He and other observers have investigated the estrogenic variations during pregnancy, in experimental animals and in women with poliomyelitis, in efforts to explain the special susceptibility, but the results have been not only equivocal but controversial.² The other hormones of pregnancy were also investigated and Jungeblat and Weaver did find that chorionic gonadotropin or some substance involved in its formation or metabolism, in experimental animals, increased the resistance of the pregnant female in the first trimester. The fact that the chorionic gonadotropin increases tremendously in the first few weeks and levels off after the first trimester, and that, experimentally and clinically, the greatest number of cases occurred in

the last two trimesters would add evidence to this assumption.¹³ There was an equal number of cases in each of the first two trimesters in our series, but the severity of the disease was less in the group involved in the first three months.

It is well known that pregnancy affects the development of other diseases either favorably or unfavorably, and it is our opinion that there are more likely to be many factors resulting from the great change in physiological processes during pregnancy which would predispose to poliomyelitis. In common with other conditions where increased fatigability and recovery time seem to figure in susceptibility to virus infection, so do they in pregnancy. Added nutritional demands, changes in mineral and vitamin balance, the great stress on all the organs of the body, especially the liver (in estrogen metabolism⁶ as in all its functions), increased blood volume and dilution, decreased hemoglobin, serum proteins and non-protein nitrogens are only a few of the physiologic variations which suggest more than endocrine changes as factors in the increased susceptibility to poliomyelitis during pregnancy.

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