

# Varicella Pneumonia During Pregnancy

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Varicella pneumonia during pregnancy may be relatively mild or rapidly fatal. Diagnosis is based on the usual criteria for varicella in association with signs and symptoms of respiratory distress: dyspnea, tachypnea, cough, chest pain, and hemoptysis, with characteristic x-ray findings. Treatment should be directed toward maintaining blood oxygen saturation at as near normal as possible (monitored by serial blood gas determinations). The occurrence of congenital varicella is unpredictable, but an infant born within four days of the mother's development of the varicella skin rash is at high risk, with the outcome being fatal in five percent of cases.

Varicella pneumonia in adults may be severe and rapidly fatal,<sup>1,2</sup> but sometimes it is relatively mild<sup>3,4</sup> and recognized only in retrospect by chest x-ray abnormalities.<sup>5</sup> Varicella pneumonia during pregnancy is rare, but its high mortality rate both for mother and infant<sup>2,6</sup> makes it prudent for the family physician to be familiar with this entity.

## Case Report

The patient was a 17-year-old white woman, gravida 2, ab 1, who was in the 27th week of her pregnancy when on January 27, 1977, she presented with an eruption of chickenpox. She had little discomfort at that time. She was unmarried and lived with her mother and two siblings. The siblings, aged 12 and 13, had had chickenpox three weeks previously with an uneventful course and recovery.<sup>7</sup> On January 31, her skin lesions were more numerous and widespread, her temperature had increased to 101 F, her respirations were labored, and she complained of left flank pain,

especially with coughing. At this time she was uncooperative, anxious, refused to eat or drink, and was hospitalized. The pregnancy presented here had been followed in the Family Practice Center; and during her prenatal care, problems of urinary tract infection, anemia of pregnancy, marked dental caries, and poor nutrition were identified. Her past medical history was unremarkable, except for an operation at age 12 years stated to have been for a duodenal obstruction.

The admission physical examination revealed an oral temperature of 101 F, respirations were regular at 28 per minute, pulse rate was 100 beats per minute and regular. The blood pressure was 136/84 mmHg, her height was 5 ft 7 in, and her weight was 105 lb. Her skin was covered with unilocular, nonumbilicated papules and vesicles with some crusting. These lesions were typically varicelliform in all stages of development and were so numerous that only a few millimeters of uninvolved skin separated the lesions. Sparsely distributed vesicles were noted on the tongue and buccal mucosa, along with plaques on the buccal mucosa which yielded *Candida albicans* on culture. Auscultation of the lungs revealed fine rales over both bases and some moist rhonchi in both lung fields. The heart sounds were normal. Examination of the abdomen revealed a gravid uterus with a fundus height of 24 cm and good fetal heart

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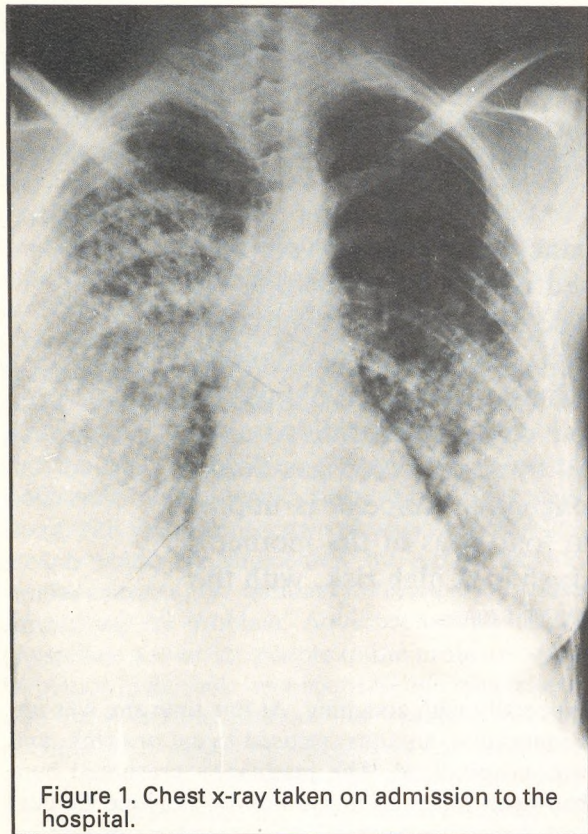


Figure 1. Chest x-ray taken on admission to the hospital.

tones. The patient had no uterine contractions, vaginal discharge, or abdominal pain. A chest x-ray on admission to the hospital showed diffuse, patchy consolidation over both lung fields with acinar pattern in many areas of confluence in the right middle lobe (Figure 1).

On admission to the hospital, the patient was put in isolation and given oxygen, 2 liters/min by nasal catheter, and meperidine hydrochloride, 50 mg every eight hours, for relief of left flank pain. For itching the patient was given diphenhydramine, 25 mg four times daily, and calamine lotion was used topically as needed. She was given a full liquid diet and ampicillin, 250 mg four times a day, because of her previous episodes of cystitis and presumed early recurrence of this problem based on her admission urinalysis. The patient's first night in the hospital was uncomfortable, with complaints of left lower quadrant abdominal pain,

chest pain, backache, and dry, unproductive cough. During her first hospital day, her temperature regressed to 99.8 F, but her respiratory rate increased to 48 per minute.  $PO_2$  was measured at 45.9 mmHg in an arterial blood sample secured before oxygen was administered. Nasal oxygen at 2 liters/min raised the arterial  $PO_2$  to 48.0 mmHg. With the flow rate increased to five liters per minute, arterial  $PO_2$  rose to 58.5 mmHg and the patient's pulse rate dropped from 100 to 88 beats per minute, but her respiratory rate remained elevated at an average of 40 respirations per minute. New vesicles continued to appear on the skin through the second day of hospitalization. By the fourth day of hospitalization, auscultation of the lungs revealed only minimum rales at the bases, and breath sounds were normal in all other areas. Her cough had stopped, but she complained of chest pain intermittently. Temperature, pulse rate, and blood pressure were normal, but respirations remained above normal. On the fifth hospital day, arterial  $PO_2$  was 76.4 mmHg with the patient breathing room air, and the respiratory rate was normal. Clinical improvement continued until her discharge on the eighth day, when arterial  $PO_2$  was 92.1 mmHg. A chest x-ray done on the fifth day revealed moderate clearing of the lungs with considerably less consolidation and coalescence. Chest x-ray prior to discharge on the eighth hospital day revealed further improvement in the bilateral pneumonia, with a clear left costophrenic angle and some residual interstitial infiltrates bilaterally (Figure 2).

The remaining course of the pregnancy was normal; the mother delivered on April 12, 1977, 11 weeks after the onset of chickenpox. Fetal age during labor was estimated at 38 to 39 weeks by the presence of ossification of the distal femoral epiphysis on the x-ray pelvimetry. The female infant's birth weight was 2,470 gm and length was 48 cm. Her Apgar scores were seven and nine, at one and five minutes, respectively. Physical examination of the baby revealed an active newborn, small for gestational age, with no congenital malformations nor stigma of varicella on the skin or mucous membranes. On follow-up examination at four months of age, the infant's height and weight were both above the 50th percentile on the Iowa Child Development Scale. The physical examination at eight months revealed normal height and weight for age, and development was assessed as normal

with no apparent adverse effects from the mother's episode of varicella pneumonia.

Varicella complement fixation tests on the infant's cord blood taken at delivery were reported at greater than 1:128. On the sample of the mother's blood drawn immediately after delivery, the complement fixation titer was 1:32. The mother's complement fixation titer seven days after the appearance of her varicella eruption had been 1:32; and during convalescence, 21 days after the eruption, her titer was 1:128. At delivery and at eight months postpartum, her titer was 1:32.

The baby's varicella complement fixation titer at four months of age was equal to 1:8 and at eight months was less than 1:8, as reported by the Iowa State Hygienic Laboratory. With the test used, a value of less than 1:8 is not measured and represents no significant immunity, demonstrating the passive nature of the immunity with decreasing titers in the early months of life, as expected.

This case corresponds well to the classical descriptions of chickenpox pneumonia in the literature.<sup>2,4</sup> The patient had begun to show chickenpox eruption after a confirmed contact three weeks previously and was relatively well during the first four days of the illness. The pneumonia was heralded by dyspnea and pleuritic pain. Auscultatory findings were minimal and did not correlate with the severity of the roentgenologic and blood gas analysis findings. Maximum skin eruption of vesicles was found at approximately the same time as the maximum x-ray signs and was seen on the first and second days after admission to the hospital. Lactic dehydrogenase (LDH) levels correlated well with the severity of the x-ray findings. The white blood count, usually no greater than 10,000/cu mm and often associated with a percentage of polymorphonuclear cells above 70 percent,<sup>4</sup> was found in this case at close to 14,000/cu mm. A concurrent urinary tract infection possibly played a role in this increase.

The cardinal physical findings for varicella pneumonia were the presence of the typical skin lesions, mucosal lesions, fever, dyspnea, tachypnea, and pleuritic pain (Table 1). Pruritus was moderate, hemoptysis was absent, and there was no detectable clinical evidence of liver involvement, such as jaundice, tenderness, or liver enlargement, although SGOT and alkaline phosphatase were elevated during the course of the illness.

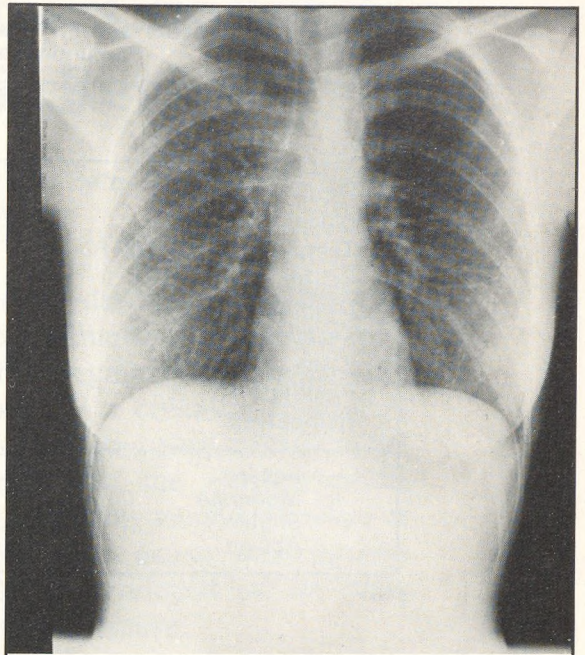


Figure 2. Chest x-ray taken eight days after admission to the hospital.

Recovery correlated well with clearing of the skin lesions, and clinical improvement antedated roentgenologic changes. Minimal x-ray changes were present at 18 days post-discharge. There were no microcalcifications on a chest x-ray done six months after the onset of the pneumonia. The presence of varicella antibodies in the baby's blood decreased with time; their presence was consistent with passively transmitted immunity, and measured less than 1:8 at age ten months.

### Comment

During the patient's hospitalization for pneumonia, the fetal heart rate and fetal movements in utero were checked regularly. These were observed to be normal throughout her hospital course. The mother inquired whether or not the baby would have chickenpox in utero. The authors had no certain answer to this question. They also questioned whether or not the disease at 27 weeks of gestation might affect the duration of pregnancy

**Table 1. Symptoms and Physical Findings of Adults with Varicella Pneumonia and in This Case**

	During Pregnancy <sup>2</sup> %	In Adults <sup>4</sup> %	This Case
Skin Rashes	100	100	+++
Mucosal Lesions	100	26	+
Temperature over 100 F	100	87	+
Cough	100	89	+
Dyspnea	100	70	++
Tachypnea	100	—	++
Cyanosis	92	42	+
Pleuritic Pain	86	21	+++
Hemoptysis	70	38	—

+++ Severe  
++ Moderate  
+ Slight  
— Absent

or be associated with any congenital anomalies or evidence of the disease at delivery.

Brunnel,<sup>3</sup> in 1967, concluded that the available data indicated it was unlikely there is an etiologic relationship between varicella during pregnancy and congenital malformation. He observed that the disease had not occurred during the first trimester in any of the cases he reported. McKendry and Bailey<sup>8</sup> reported a case of multiple defects associated with varicella occurring at the 11th week of pregnancy with premature delivery of a 2.2 kg female infant who died at 20 months of age. They cite only two other such cases previously reported. Meyers<sup>6</sup> concludes that congenital malformations are generally not associated with varicella in pregnancy, even though the disease may be very severe in the mother and pneumonia develops in as many as 50 percent of the cases. He found no relation between the day of onset of the mother's rash and the attack rate of varicella in term infants; however, there were four neonatal deaths among 13 cases in which the mother's rash developed within four days of the delivery and no fatalities among 23 infants born five or more days after the mother's rash appeared.

The physician confronted with the problem of chickenpox during pregnancy must be prepared to manage complicating pneumonia. He/she needs to

be aware that congenital malformations are very uncommon and congenital varicella seldom develops in infants born live at term. Term infants born four days or less from the time their mothers develop varicella are at greatest risk of developing congenital varicella. The ratio of neonatal deaths to maternal cases is five percent. This high-risk group can be given gamma globulin, 0.3 to 0.6 ml/lb, though it is not proved effective in either prevention or modification of congenital varicella. Zoster immune globulin has been effective in preventing varicella in normal children, but it has not been used in prophylaxis for congenital varicella.<sup>6</sup>

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