

A 6-hour-old boy is in the newborn nursery with respiratory distress. He was born at 39 weeks gestation by uncomplicated vaginal delivery. The pregnancy was complicated by pre-eclampsia during the 3rd trimester. The mother had an elevated 1-hour glucose tolerance screening, but her 3-hour glucose tolerance test was normal. The infant weighs 1.9 kg (4 lb 4 oz) (<3rd percentile). He has not been able to feed due to tachypnea. Temperature is 37.2 C (99 F), blood pressure is 60/34 mm Hg, pulse is 144/min, and respirations are 68/min. Pulse oximetry shows 96% saturation on room air. On examination, the infant's skin is plethoric and he has mild cyanosis of his lips and tongue. No cardiac murmur is heard. He has a normal Moro reflex and normal tone. Examination is otherwise normal. Chest radiograph shows clear lung fields with a normal cardiac silhouette. Initial laboratory results are as follows:

Complete blood count

Hemoglobin	22.8 g/dL
Hematocrit	69%
Platelets	200,000/ μ L
Leukocytes	5,500/ μ L
Neutrophils	56%
Lymphocytes	33%
Glucose	50 mg/dL

Which of the following is the most likely cause of this patient's respiratory distress?

- ☐ A. Cyanotic heart disease
- ☐ B. Dehydration
- ☐ C. Hyperinsulinism
- ☐ D. Polycythemia
- ☐ E. Transient tachypnea of the newborn

Submit

A 6-hour-old boy is in the newborn nursery with respiratory distress. He was born at 39 weeks gestation by uncomplicated vaginal delivery. The pregnancy was complicated by pre-eclampsia during the 3rd trimester. The mother had an elevated 1-hour glucose tolerance screening, but her 3-hour glucose tolerance test was normal. The infant weighs 1.9 kg (4 lb 4 oz) (<3rd percentile). He has not been able to feed due to tachypnea. Temperature is 37.2 C (99 F), blood pressure is 60/34 mm Hg, pulse is 144/min, and respirations are 68/min. Pulse oximetry shows 96% saturation on room air. On examination, the infant's skin is plethoric and he has mild cyanosis of his lips and tongue. No cardiac murmur is heard. He has a normal Moro reflex and normal tone. Examination is otherwise normal. Chest radiograph shows clear lung fields with a normal cardiac silhouette. Initial laboratory results are as follows:

Complete blood count

Hemoglobin	22.8 g/dL
Hematocrit	69%
Platelets	200,000/ μ L
Leukocytes	5,500/ μ L
Neutrophils	56%
Lymphocytes	33%
Glucose	50 mg/dL

Which of the following is the most likely cause of this patient's respiratory distress?

- ☐ A. Cyanotic heart disease [6%]
- ☐ B. Dehydration [5%]
- ☐ C. Hyperinsulinism [12%]
- ☒ D. Polycythemia [55%]
- ☐ E. Transient tachypnea of the newborn [22%]

Proceed to Next Item

Explanation:

User Id: [REDACTED]

Neonatal polycythemia	
Definition	Hematocrit >65% in term infants
Causes	<p>Increased erythropoiesis from intrauterine hypoxia</p> <ul style="list-style-type: none">• Maternal diabetes• Maternal hypertension• Smoking• Intrauterine growth restriction <p>Erythrocyte transfusion</p> <ul style="list-style-type: none">• Delayed cord clamping• Twin-twin transfusion
Clinical presentation	<ul style="list-style-type: none">• Ruddy skin• Hypoglycemia• Respiratory distress• Cyanosis• Apnea, irritability, jitteriness• Abdominal distension
Treatment	Partial exchange transfusion (remove blood, infuse normal saline)

©UWorld

Polycythemia is defined as a **hematocrit >65%** in term neonates. A common cause of neonatal polycythemia is delayed clamping of the umbilical cord, resulting in excess transfer of placental blood. Other predisposing conditions include **in-utero hypoxia** (eg, maternal hypertension, smoking) or **poor placental gas exchange** (ie, maternal diabetes). In this patient, maternal pre-eclampsia has led to poor placental function, which in turn has caused intrauterine growth restriction and neonatal polycythemia.

Most neonates with polycythemia are asymptomatic other than appearing ruddy/plethoric. However, as the hematocrit rises, the **viscosity** of the blood increases and impairs blood flow to various organs. The most common symptoms are lethargy, irritability, and jitteriness. Other potential manifestations are respiratory distress, tachypnea, cyanosis, and poor feeding, as seen in this neonate. The increased red blood cell mass can lead to hypoglycemia and hypocalcemia due to increased cellular

Treatment

Partial exchange transfusion
(remove blood, infuse normal saline)

©UWorld

Polycythemia is defined as a **hematocrit >65%** in term neonates. A common cause of neonatal polycythemia is delayed clamping of the umbilical cord, resulting in excess transfer of placental blood. Other predisposing conditions include **in-utero hypoxia** (eg, maternal hypertension, smoking) or **poor placental gas exchange** (ie, maternal diabetes). In this patient, maternal pre-eclampsia has led to poor placental function, which in turn has caused intrauterine growth restriction and neonatal polycythemia.

Most neonates with polycythemia are asymptomatic other than appearing ruddy/plethoric. However, as the hematocrit rises, the **viscosity** of the blood increases and impairs blood flow to various organs. The most common symptoms are lethargy, irritability, and jitteriness. Other potential manifestations are respiratory distress, tachypnea, cyanosis, and poor feeding, as seen in this neonate. The increased red blood cell mass can lead to hypoglycemia and hypocalcemia due to increased cellular uptake.

Asymptomatic neonates require only **hydration** by feeding or parenteral fluids. Symptomatic neonates require partial exchange transfusion, in which blood is removed in exchange for normal saline to normalize the hematocrit.

(Choice A) Cyanotic heart disease is unlikely in this patient. The absence of a murmur or cardiomegaly is reassuring, and the neonate has oxygen saturation of >95% on room air. The cyanosis in this neonate is due to the high red blood cell mass and hyperviscosity rather than a right-to-left shunt.

(Choice B) Dehydration can cause elevated hematocrit levels. However, dehydration is very unusual in term neonates in the first 2 days of life as they are born with excess extracellular water. Although this neonate has not fed in 6 hours, it is unlikely that fluid loss could account for his symptoms.

(Choices C and E) Respiratory distress syndrome is unlikely in this term neonate. Rarely, term neonates of diabetic mothers may have surfactant deficiency, as high insulin levels block the maturation of sphingomyelin. However, this mother did not have diabetes and her newborn has a normal chest x-ray. Transient tachypnea of the newborn would be a more common cause of respiratory distress in the term neonate but should show increased pulmonary vascular markings or fluid in the fissures on chest x-ray.

Educational objective:

Polycythemia is defined as a hematocrit >65% in term neonates. Risk factors include delayed cord clamping, maternal hypertension, and maternal diabetes mellitus.

and impairs blood flow to various organs. The most common symptoms are lethargy, irritability, and jitteriness. Other potential manifestations are respiratory distress, tachypnea, cyanosis, and poor feeding, as seen in this neonate. The increased red blood cell mass can lead to hypoglycemia and hypocalcemia due to increased cellular uptake.

Asymptomatic neonates require only **hydration** by feeding or parenteral fluids. Symptomatic neonates require partial exchange transfusion, in which blood is removed in exchange for normal saline to normalize the hematocrit.

(Choice A) Cyanotic heart disease is unlikely in this patient. The absence of a murmur or cardiomegaly is reassuring, and the neonate has oxygen saturation of >95% on room air. The cyanosis in this neonate is due to the high red blood cell mass and hyperviscosity rather than a right-to-left shunt.

(Choice B) Dehydration can cause elevated hematocrit levels. However, dehydration is very unusual in term neonates in the first 2 days of life as they are born with excess extracellular water. Although this neonate has not fed in 6 hours, it is unlikely that fluid loss could account for his symptoms.

(Choices C and E) Respiratory distress syndrome is unlikely in this term neonate. Rarely, term neonates of diabetic mothers may have surfactant deficiency, as high insulin levels block the maturation of sphingomyelin. However, this mother did not have diabetes and her newborn has a normal chest x-ray. Transient tachypnea of the newborn would be a more common cause of respiratory distress in the term neonate but should show increased pulmonary vascular markings or fluid in the fissures on chest x-ray.

Educational objective:

Polycythemia is defined as a hematocrit >65% in term neonates. Risk factors include delayed cord clamping, maternal hypertension, and maternal diabetes mellitus. Symptomatic neonates generally have a combination of respiratory distress, hypoglycemia, and neurologic manifestations.

References:

1. [Restrictive management of neonatal polycythemia.](#)
2. [Partial exchange transfusion for polycythemia hyperviscosity syndrome.](#)
3. [Management of polycythemia in neonates.](#)