

Maternal Fetal Hemorrhage

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Introduction

- Complicates 1 in 2800 deliveries and a majority of the time are idiopathic
- Suspected in at many as 80% deliveries with an average of 0.19mL
- Massive fetomaternal hemorrhage is greater than 20% of fetal blood volume lost and/or middle cerebral artery peak is 1.5 multiple of the median
- Risk factors: trauma, placenta previa, vasa previa, placental abruption, placental chorioangiomas (Most common benign non-trophoblastic tumor of the placenta)
- Diagnosed with kleihauer-Betke test or cytology

Case Presentation

Patient is a 33 year old G4P3003 (3 prior vaginal deliveries at term) admitted at 39 weeks 4 days in latent labor with persistent category 2 fetal heart tracing (FHT). She was contracting every 5 minutes. Fetal heart rate was 160s with moderate variability, with recurrent variable decelerations and occasional late decelerations. Sterile vaginal exam revealed 3cm dilated with 70% effaced and -2 station. Admit with plan to augment labor. Pt blood type is AB positive. Prenatal labs normal. GBS negative.

After admission, patient spontaneously ruptured with thin meconium stained fluid. Intrauterine pressure catheter was placed and amnioinfusion started. Fetal scalp electrode placed. For a short period of time, the variable decelerations resolved. FHT continued to have moderate variability. Converted back to Cat 2 tracing that was unresponsive to therapy. Decided she needed an urgent cesarean section for fetal well being remote from delivery.

C-section was uncomplicated with a QBL of 820. Placenta was sent to pathology. No abruption noted on gross inspection. Cord was clamped and cut without loss of blood. Cord gases: pH of 7.21 (nl 7.35-7.45) and base excess -15.8 (nl -2 to 2). Following c-section, pt bled 300mL clots afterwards and given a dose of Methergine. No other complications and she was discharged on POD3.

APGAR were 6 and 7 at 1 and 5 minutes. Neonate weighed 2980g (9 percentile). Infant was placed on BiPap following delivery. Diagnosed with respiratory distress with severe anemia and hypovolemic shock. Kleihauer-Betke test was positive with estimated fetal blood loss of 376mL. This is the amount of estimated blood loss of the fetus in the maternal system. Neonate's initial Hgb 3.8 (nl 14-24), Hct 12.3 (nl 32 to 41). (See Table 1 for further labs). BUN, Cr, Cranial US normal. Neonate received a blood transfusion. Recovered well and was discharged on day 5 of life.

Discussion

- Acute Vs. Chronic
 - More severe in acute
 - Chronic can have massive but also less likely to be lethal
- Presentation:
 - Decreased or absent fetal movement
 - Unexplained neonatal anemia
 - Unexpected fetal demise
 - Nonimmune hydrops
 - Sinusoidal FHR pattern
- For this case, likely acute FMH due to how quickly the fetus recovered and lack of fetal hydrops
- Calculation:
 - Fetal blood=(maternal blood volume * maternal hct * % fetal cells in kb test)/ newborn hct
 - Most labs use 5L for maternal blood volume
- Flow cytometry uses monoclonal antibodies to hgb F
 - More accurate but requires specialized equipment
- Mainly used for rhogam dosage (not needed for this as she was rh positive)
 - $300\mu\text{g} = \text{volume of fetal blood} / 30\text{mL}$
- Recommend delivery via c-section as not to stress fetus
- Ensure neonatology is notified (if known ahead of time)
- Have blood on hold
- Placenta to be sent to pathology
- French study revealed death rate of 25% with fetal loss of 40 to 80mL/kg. 66% for greater than 80mL/kg. Morbidity occurred in 23 fetuses that had bled greater than 20mL/kg and included preterm birth, NICU admission, and neonatal transfusion
- Another French study 42 fetuses were complicated by greater than 20mL FMH. Five out of nine with a FMH of 20-40mL/kg had adverse outcomes. Five out of eight in FMH of 40-80mL/kg and all six in the greater than 80mL/kg
- Pooled data showed greater than 150mL lost had a perinatal death rate of 37%
- Long term not well researched. However concerns for short and long term neurologic issues. Dependent on the amount of blood loss and the

Labs

	Sep 23, 21 05:00	Sep 22, 21 05:10	Sep 21, 21 13:47	Sep 21, 21 05:54
WBC	20.6 D	26.9 D H		53.4 *H
RBC	3.35 D L	3.00 D L		1.05 *L
Hgb	10.6 L	9.7 L	9.5 D L	3.8 *L
Hct	30.2 D L	26.9 *L	27.8 D*L	12.3 *L
MCV	90 L	90 D L		117 H
MCH	31.6 L	32.3 D L		36.2
MCHC	35.1 H	36.1 D H		30.9 L
RDW	20.2 D H	18.5 H		18.1 H
Plt Count	162 D	137		161

	Sep 25, 21 05:00	Sep 23, 21 05:11	Sep 23, 21 05:00	Sep 22, 21 17:00
Sodium	138		137	134 L
Potassium	4.1		4.3	4.0 L
Chloride	112 H		109 H	106
Carbon Dioxide	21 L		19 L	20 L
Urea Gap	9 L		13 L	12 H
BUN	14 #		37 H	36 DH
Creatinine	0.70 #		2.00 H	2.10 H
Glucose	93		71 D	93 DH
POC Glucose		78		
Calcium	9.2		8.7 D	7.5 L
Phosphorus			4.3 D	
Total Bilirubin	8.4			6.3
AST	54 H			285 H
ALT	197 #H			272 H
Total ALP Phosphatase	194 H			94
Total Protein	< 2.0 L			4.8 L
Albumin	3.1 L			2.7 L

Blood Product Summary | Blood Bank Tests | Transfusion History

	Sep 21, 21 02:40	Sep 21, 21 02:40
Blood Type		AB POS
Antibody Screen		NEGATIVE
Fetal Screen	376.00	
KB Fetal Hemoglobin	See Hx	
KB Fetal Cells Counted	158 2100 0.0752	
Clerical Work Check		See Hx

References

1. Cunningham, F. Gary., Kenneth J. Leveno, Steven L. Bloom, Catherine Y. Spong, Jodi S. Dashe, Barbara L. Hoffman, Brian M. Casey, and Jeanne S. Sheffield. Williams Obstetrics. 25th edition. New York: McGraw-Hill Education, 2018.
2. Moise, Kenneth, Jr. (2022). Spontaneous Massive Fetomaternal Hemorrhage. Vanessa A Barss (ed.), UpToDate. Retrieved February 1, 2022, from <https://www.uptodate.com/contents/spontaneous-massive-fetomaternal-hemorrhage>