

Emergency Obstetrics

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Objectives

1. Deliver a baby
2. Disimpact a shoulder
3. Keep her from bleeding.

Conflicts/Disclosures:

None

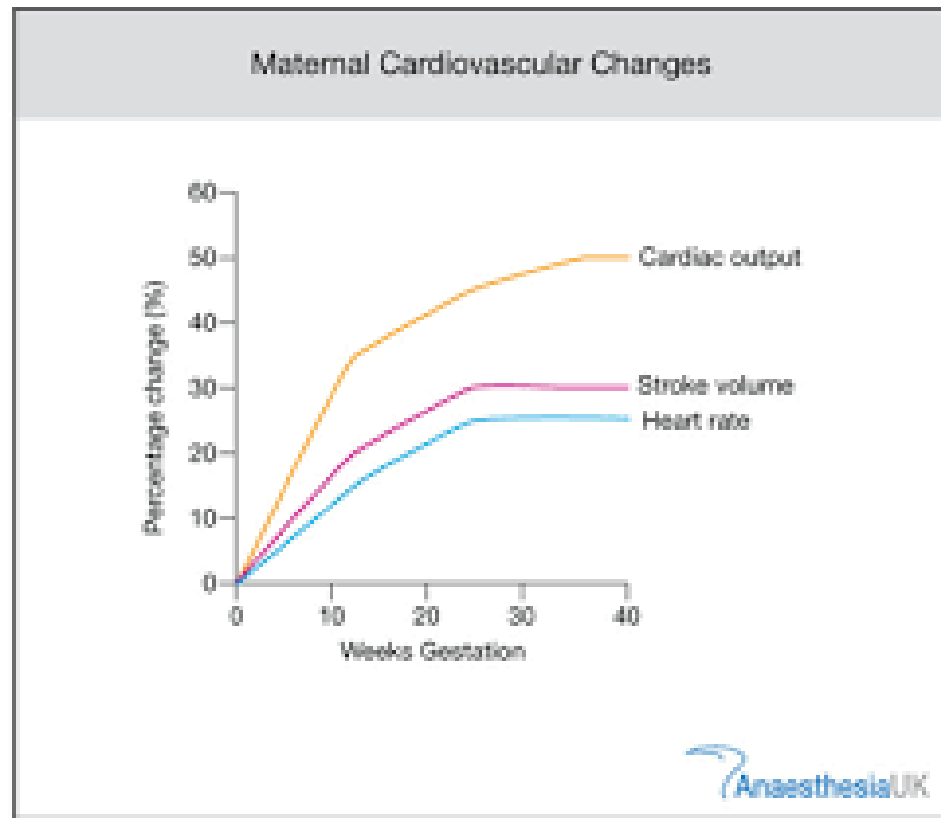
Pregnancy: It's a condition, not a disease!

▶ Physiologic Change:

▶ Hemodynamics changes

- ▶ Cardiac Output increases
- ▶ Strom volume rises
- ▶ HR Increased
- ▶ Vascular resistance decreases
- ▶ Blood volume increases: the renin-angiotensin-aldosterone system causes necessary expansion of the blood volume
 - ▶ Increased total extra cellular volume (15%)
 - ▶ Decreased Plasma Osmolality

Maternal Physiology: Cardiovascular



Physiologic changes of pregnancy:

▶ Blood pressure:

- ▶ Slight drop in BP during the second trimester with gradual increase to baseline near term
- ▶ Supine hypotension
 - ▶ Due to utero-fetal compression of the vena cava
 - ▶ Occurs after the uterus is palpable above the bifurcation of the Vena Cava (at the umbilicus)
 - ▶ By 20 wks gestation
 - ▶ Most not symptomatic until third trimester.

Pregnancy: Respiratory Physiology

- ▶ Tidal Volume Increases
- ▶ Expiratory Reserve and Residual Volume decrease
- ▶ Respiratory rate STAYS the SAME----BUT the diaphragm becomes elevated as the pregnancy progresses and results in DYSPNEA
- ▶ This is all driven by PROGESTERONE.

Pregnancy: Hematologic Changes

- ▶ Red Cell Mass Increase (by 20-30%)
- ▶ Iron level falls BUT gut absorption and iron binding capacity Rises.
- ▶ Mild "relative " Anemia due increase in plasma volume
 - ▶ If HGB >10.5 at term, you are probably pretty good.
 - ▶ If HGB is <10.5 at 28 wk lab, then we supplement.

Pregnancy: Physiologic Changes

- ▶ WBCs: Increases!
 - ▶ Increase in Polymorphonuclear Leukocytes
 - ▶ Neutrophil numbers rise and peak at 33 wks
 - ▶ WBC=13k (but if greater than 14 with a significant left shift, do not discount this as related to pregnancy.)

Pregnancy: Hematologic Changes

- ▶ Coagulation: Predominately Pro-hemostatic changes!
 - ▶ Pregnant women can bleed
 - ▶ 500 cc/min blood flow to the uterus at term
 - ▶ Maternal compensation for blood loss is good, until it isn't!
 - ▶ Fibrinogen:
 - ▶ If level is <200 mg/dl, you are already behind.

COAGULATION CHANGES

Parameter	Changes
Fibrinogen	Increased from 2.5g/l to 5g/l
Factor 2	Slightly Increased
Factor 5	Slightly Increased
Factor 7	Increased 10 folds
Factor 8	Increased 2 folds
Factor 9 and 10	Increased
Factor 11	Decreased by 70%
Factor 12	Increased by 40%
Factor 13	Decreased by 40%

Bleeding time, PT, PTT is unchanged.
Pregnancy is a hypercoagulable state.
There is increased risk of thromboembolic episode.

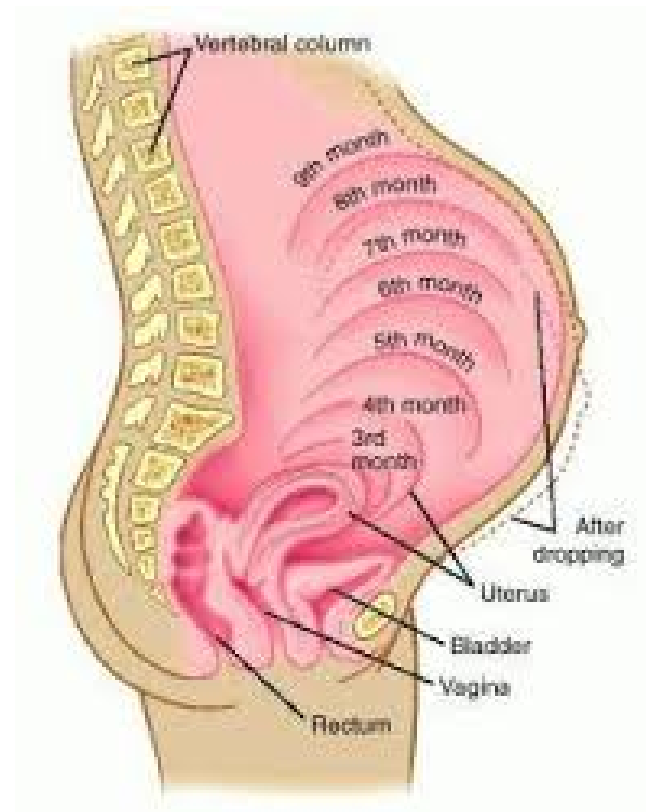
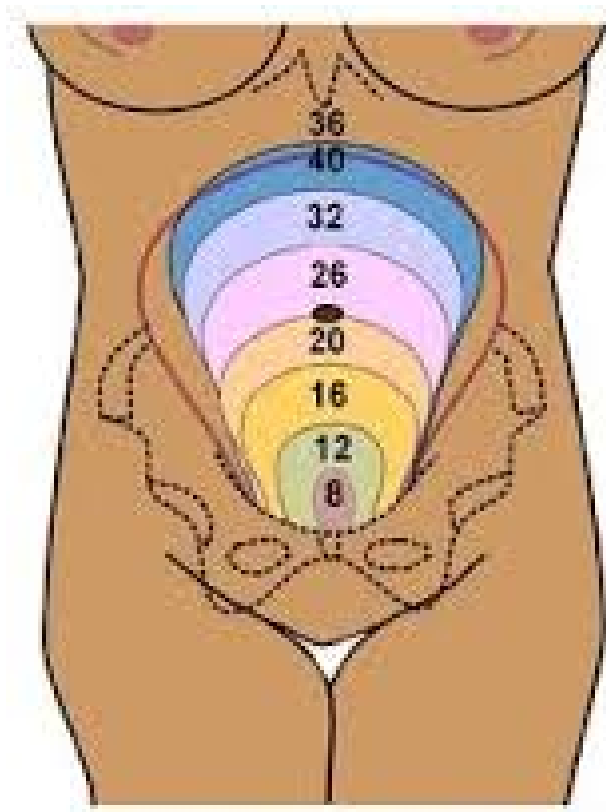


Source: Tintinalli JE, Stapczynski JS, Ma GJ, Cline DM, Cydulka RK, Medler GD:
Tintinalli's *Emergency Medicine: A Comprehensive Study Guide*, 7th Edition;
<http://www.accessmedicine.com>
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SHE IS IN LABOR!!

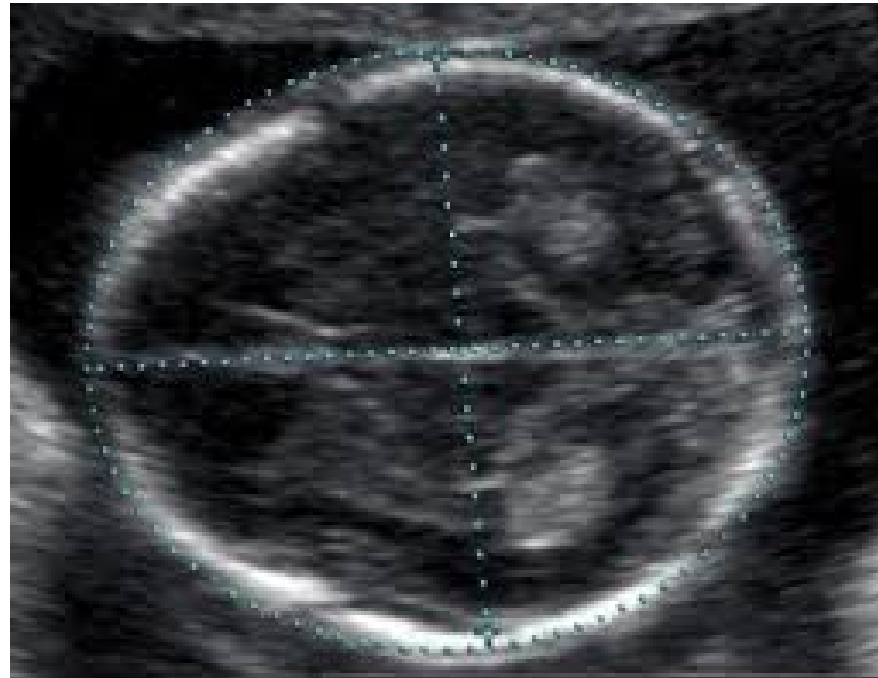
(but how do I really know?)

Rapid Assessment: Check a fundal Height



Rapid Assessment: Grab the ultrasound!

- ▶ Tech may not be in house
BUT you can always look for the head.
 - ▶ First: look at the level of the pubic bone and aim the transducer down.
 - ▶ Second: Scan for the vertex in the 4 quadrants of the uterus to find location.
 - ▶ RUQ or LUQ=Likely Breech



Stages of Labor:

▶ Stage 1:

▶ Latent:

- ▶ Regular contractions
- ▶ Patient can talk or use their cell phone
- ▶ Cervix is dilated 0-5 cm

▶ Active Phase:

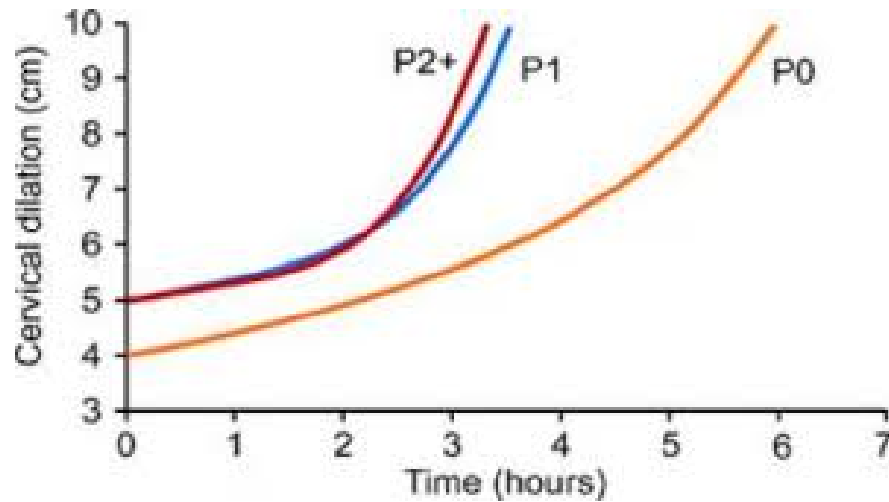
- ▶ Regular contractions
- ▶ Difficult to talk or walk
- ▶ Cervix is 6-10 cm
 - ▶ Transition: 7-10 cm Patient working hard. Usually has difficulty standing, talking, will verbalize wanting to push.

▶ Stage 2:

▶ Pushing!

- ▶ Primips can push up to 2 hours without an epidural and it can be normal
- ▶ Multips usually go fast!
 - ▶ Dependent on fetal position in the pelvis
 - ▶ Dependent on the size of the baby.
- ▶ ***Moms who are pushing are usually pretty obvious.
- ▶ BEWARE: the quiet patient with her eyes closed who is sitting sideways in the wheel chair.

What is normal Labor?

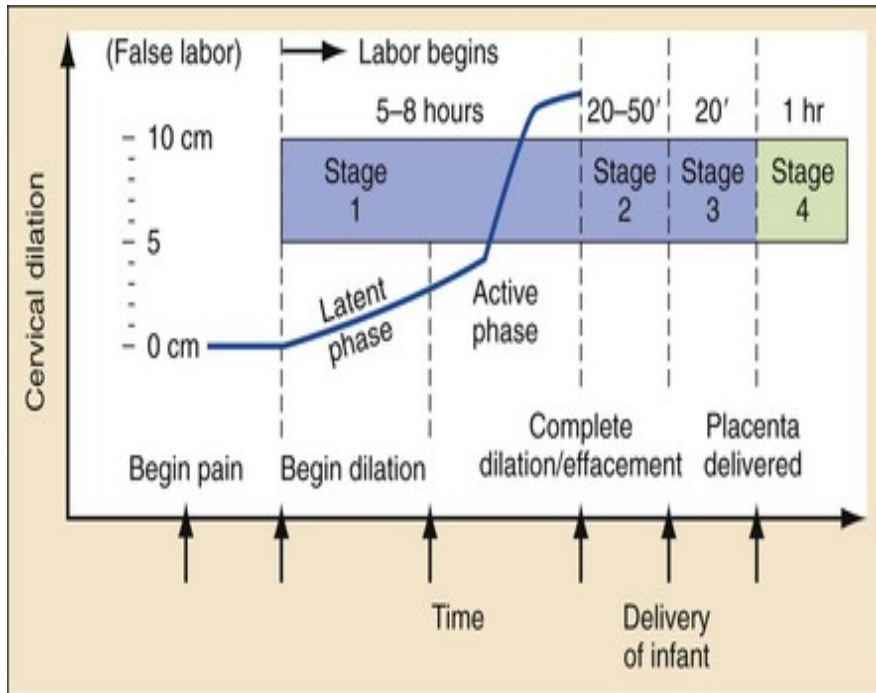


► Patient assessment includes:

► History of previous deliveries

- How long did it take to go from 4cm to delivery?
 - (you may have time to transport)
- How long was the second stage?
 - How long did she push?
- Did you bleed afterward?
 - PPH risk??

Freidman's Curve:



► Stage 1:

- Duration can be long
- General rule:
 - Primips change about 1cm/hr once they reach 4 cm
 - Multips change about 1.5 cm/hr once they reach 4 cm.

► Stage 2:

- Primips=pushing up to 2 hours unblocked can be normal
- Multips=pushing up to one hour can be normal

Stages of Labor:

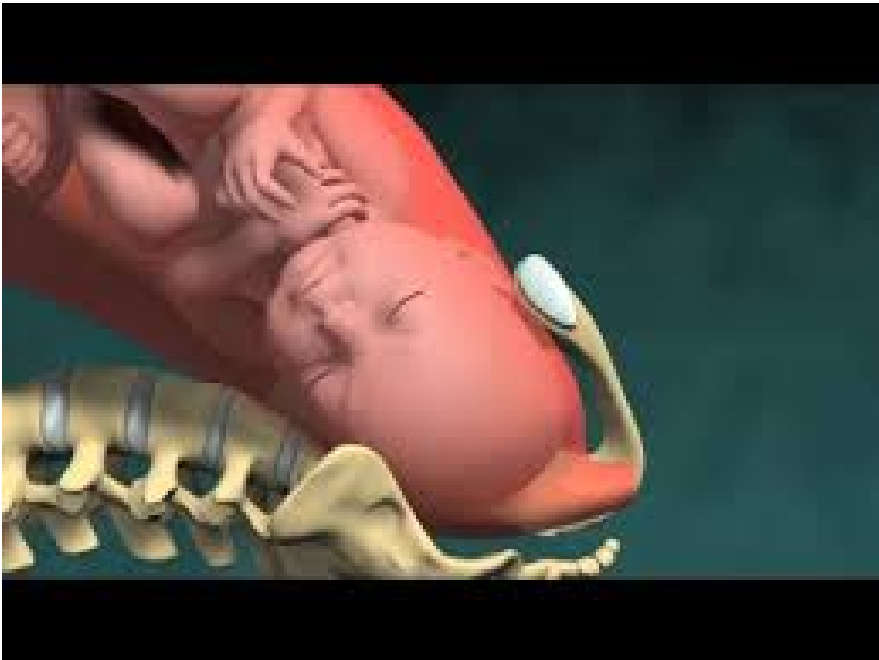
▶ Stage 3

- ▶ Delivery of the placenta
 - ▶ GENTLE downward traction on the cord
 - ▶ DO NOT pull too hard.
 - ▶ VIGOUROUS fundal massage.
 - ▶ AMTSL
 - ▶ (we don't wait for the placenta anymore).

▶ ACTIVE MANAGEMENT OF THE THIRD STAGE OF LABOR (AMTSL)

- ▶ Oxytocin!
 - ▶ 30 U in 1L crystalloid
 - ▶ Infuse 250-500 cc/hr
 - ▶ Increase rate if bleeding is heavy.
 - ▶ 10 U IM X 1
- ▶ IF not available, consider Rectal or Buccal misoprostol 600-800 mcg

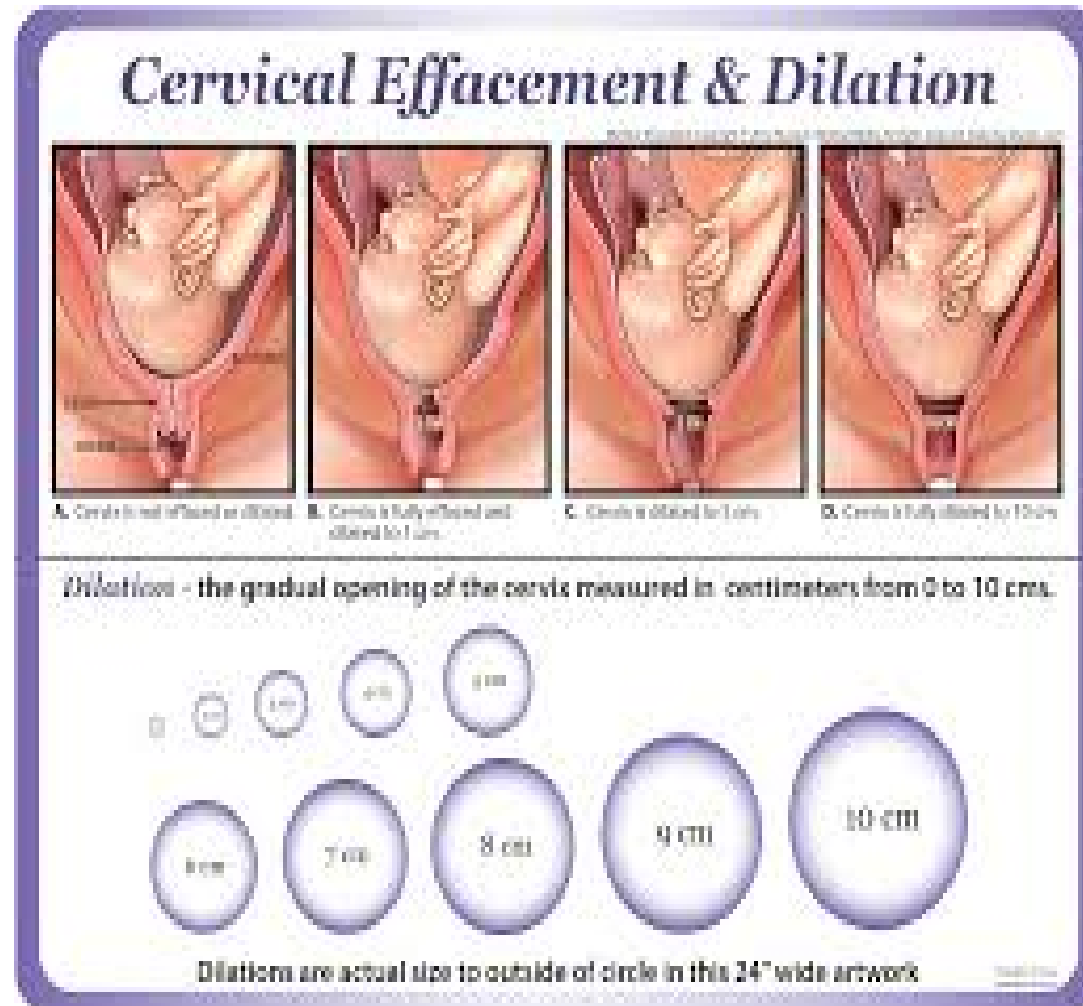
Assessing Cervical dilation: (can I transport?)



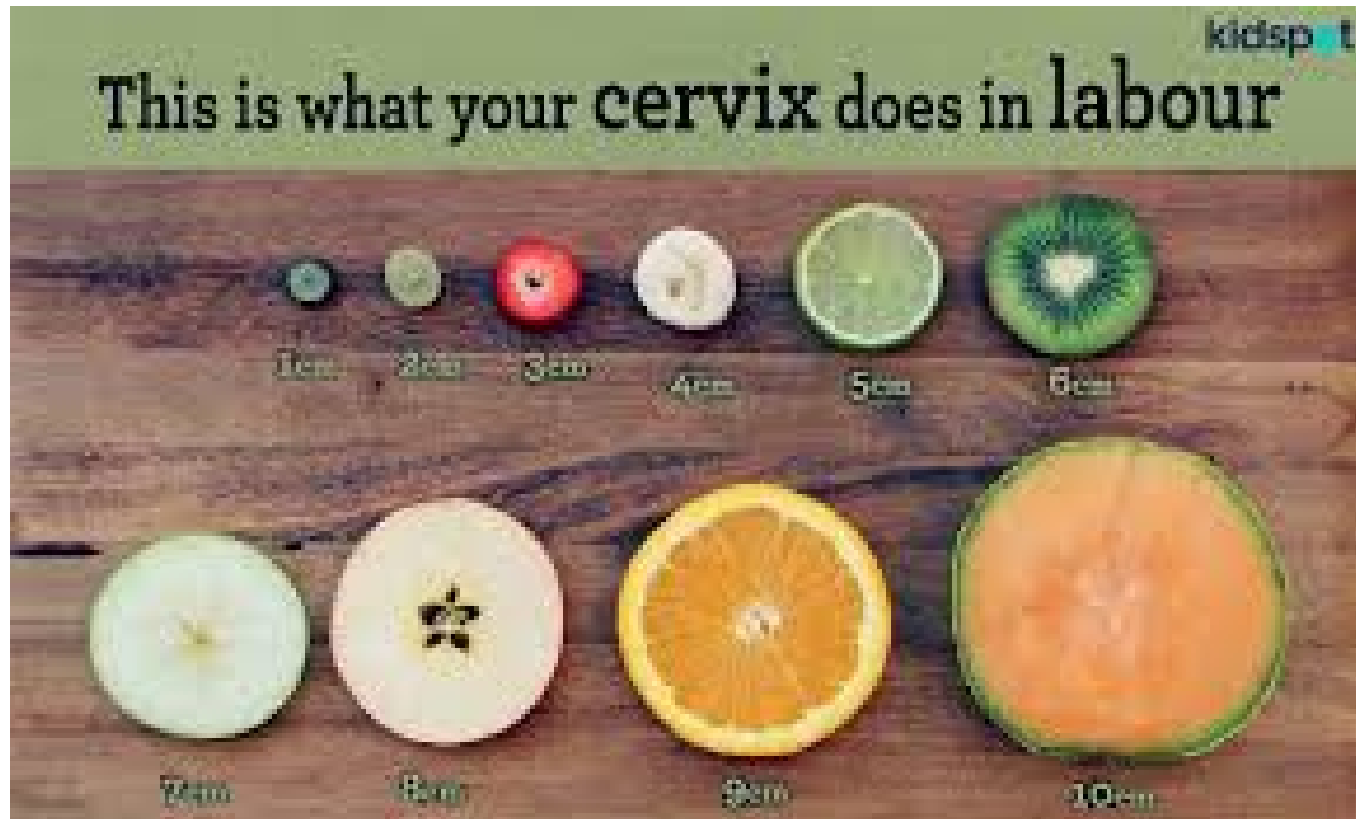
► Exam: Keys to success

- What was her last exam?
- Frog leg position while lying fairly flat
- Subtle pressure above the pubic bone to apply pressure of the vertex to the cervix can sometime bring it into reach.
- Aim along the sacrum and reach around the presenting part.
- ***Bulging bags are easily ruptured—wait until you know the presentation

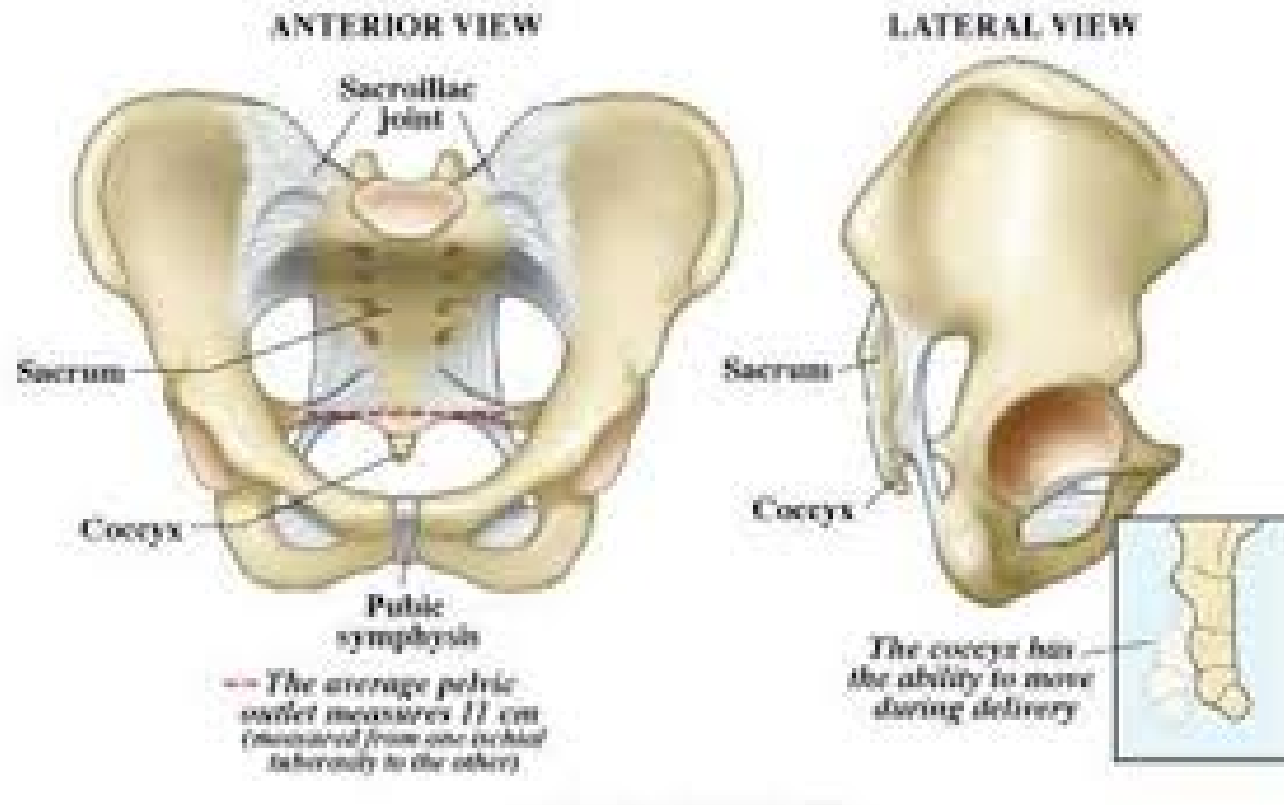
Rapid assessment: Knowing Cervical Dilation can allow you to Transport!



Rapid Assessment: Cervical Exam



Anatomy



Cardinal Movements of Labor:

This is a continuous process:

1. Engagement: Biparietal diameter enters the pelvic inlet
2. Descent: Occiput is at the level of the ischial spines
3. Flexion: Occurs during descent and achieves the smallest diameter of the baby's head
4. Internal rotation: Vertex is negotiating the narrowest part of the pelvis (pelvic outlet).
 1. Occiput Anterior most common
5. Extension: Delivery of the vertex
6. External rotation: Following delivery of the head
 1. Baby's face will reconstitute either left or right
 2. Then you can apply gentle downward traction to deliver the anterior shoulder.
7. Expulsion

Extension



Restitution



Expulsion: Gentle downward traction



Putting it all together



Routine adjuncts to Labor and Delivery: Should I or Shouldn't I?

- ▶ Amniotomy:
 - ▶ Not unless you know presentation
 - ▶ Not unless patient is pushing and you know the head will shortly follow
- ▶ Episiotomy:
 - ▶ No
- ▶ Manual Evacuation of the uterus (following delivery of the placenta)
 - ▶ Yes—If bleeding is brisk
- ▶ Fundal massage:
 - ▶ Yes
- ▶ Cesarean Section:
 - ▶ No

Shoulder Dystocia

- ▶ Impaction of the fetal shoulder behind the pubic bone:
 - ▶ Head recoils against the perineum
 - ▶ TURTLE SIGN
 - ▶ Spontaneous restitution does not occur
 - ▶ Failure to deliver the baby with expulsive effort and usual downward traction



Shoulder Dystocia: Risk Factors—50% occur when there is no risk factor!

Risk Factors associated with Shoulder dystocia:

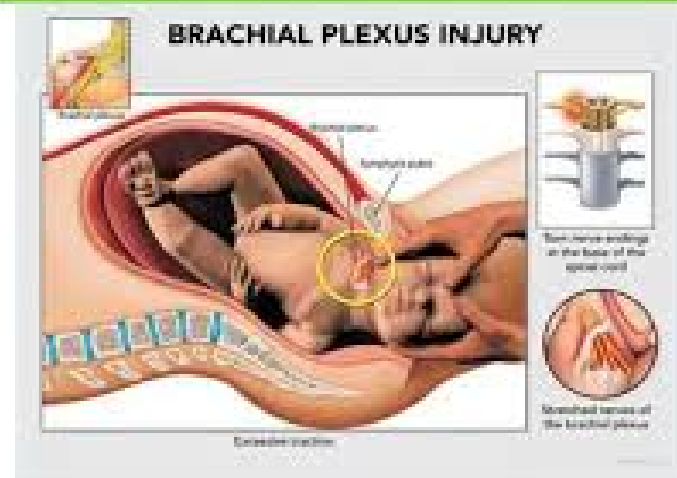
Maternal	Fetal	Labor Related
Abnormal pelvic anatomy	Suspected macrosomia	Operative vaginal delivery
Gestational or Pre-Gestational Diabetes		Protracted active phase
Post-term pregnancy		Prolonged second stage
Previous shoulder dystocia		Precipitous delivery
Short stature (less than 5feet tall)		
Obesity (>200lbs)		
Previous large infant (>4000grams)		
Excessive weight gain		

Shoulder Dystocia: Why does it matter?

► Neonatal injury

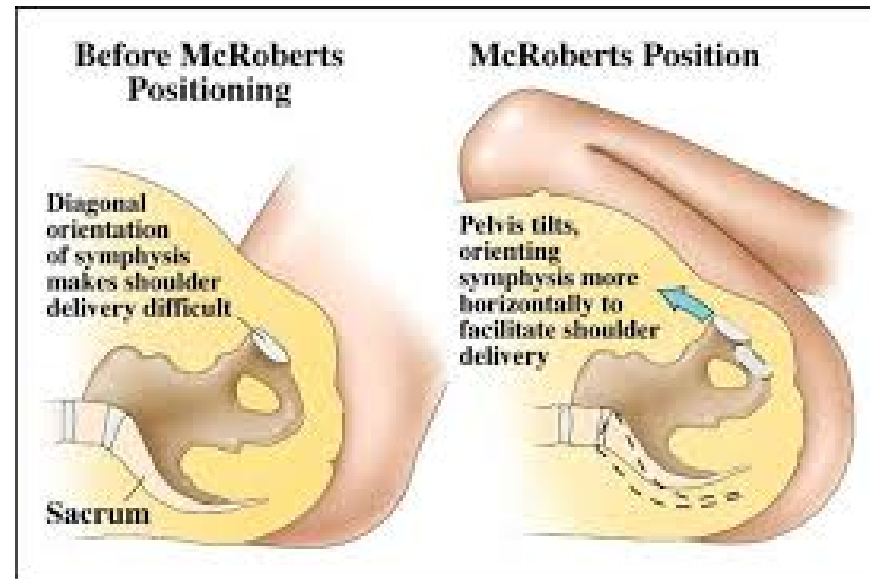
- Brachial plexus injury
 - 2-5% are permanent
- Humeral or Clavicle Fracture
 - Usually no big deal
 - Heals quickly and well with minimal intervention
- Hypoxic Ischemic Encephalopathy
- Fetal Death

Brachial plexus injury



Shoulder Dystocia: Now What

- ▶ Mainstay of helping resolve
 - ▶ Combined McRobert's Maneuver and Suprapubic Pressure
 - ▶ These are the ONLY 2 maneuvers performed while the patient is pushing
- ▶ No Maneuver is Superior
- ▶ ER TIP:
 - ▶ Use Call-Outs and Check-Backs with your team to announce maneuver
 - ▶ Be sure to have patient stop pushing when attempting other maneuvers.

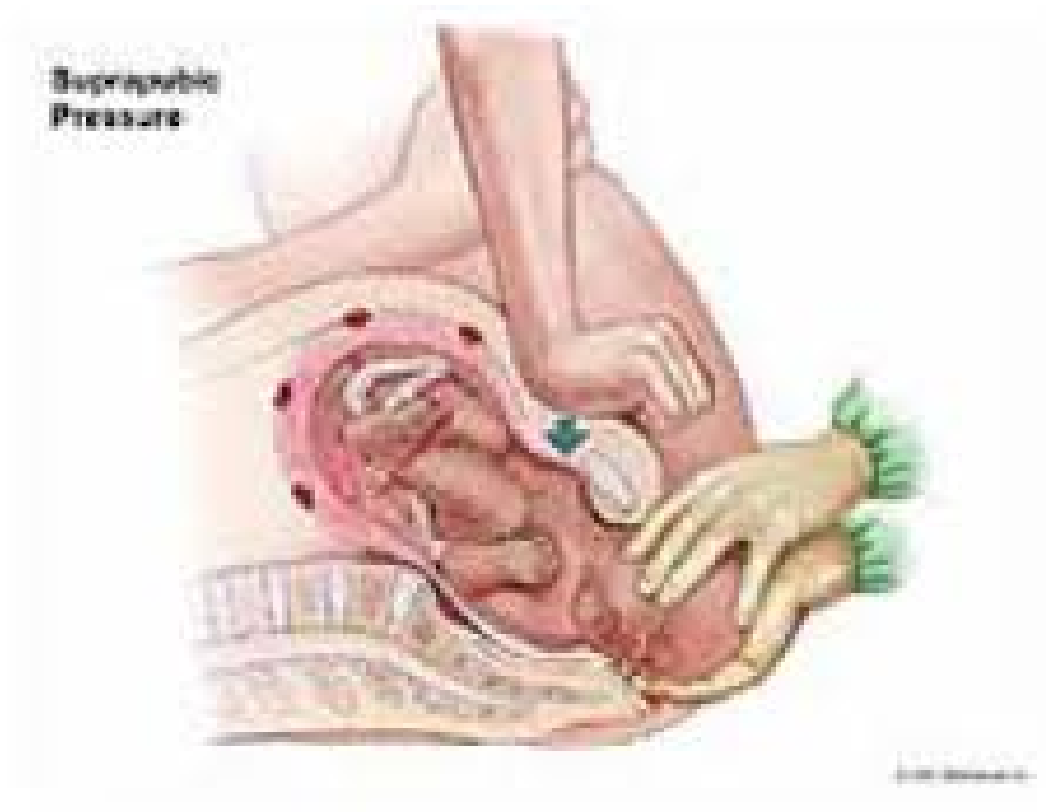


Shoulder Dystocia: Suprapubic Pressure

- ▶ Suprapubic pressure
 - ▶ Goal: “ease” the shoulder under the pubic bone
 - ▶ Assistant should apply this in the direction of the baby’s nose.
 - ▶ Direction is dependent on restitution of the vertex
 - ▶ Applied from the side of the baby’s occiput
 - ▶ Will need leverage, so stand on a stool
 - ▶ Delivering provider applies downward traction



Shoulder Dystocia: Suprapubic Pressure



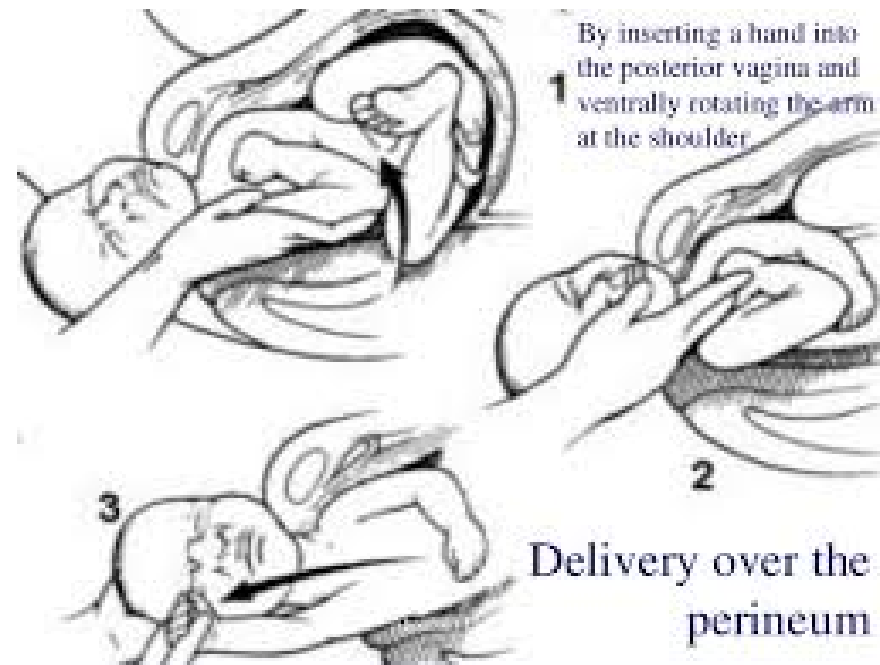
Shoulder Dystocia: Delivery of the Posterior Arm/Shoulder

- ▶ Other maneuvers to consider, BUT should be employed first as this is the most likely to resolve the dystocia
- ▶ Delivering provider reaches into the vagina along the posterior arm and tries to find the elbow or hand
 - ▶ Move the elbow/hand to the front of the baby's chest
 - ▶ Sweep along the chest and extend the arm out of the vagina and in front of the baby's face
 - ▶ Will then allow you to deliver the anterior shoulder



Shoulder Dystocia: Delivery of the Posterior Arm/Shoulder

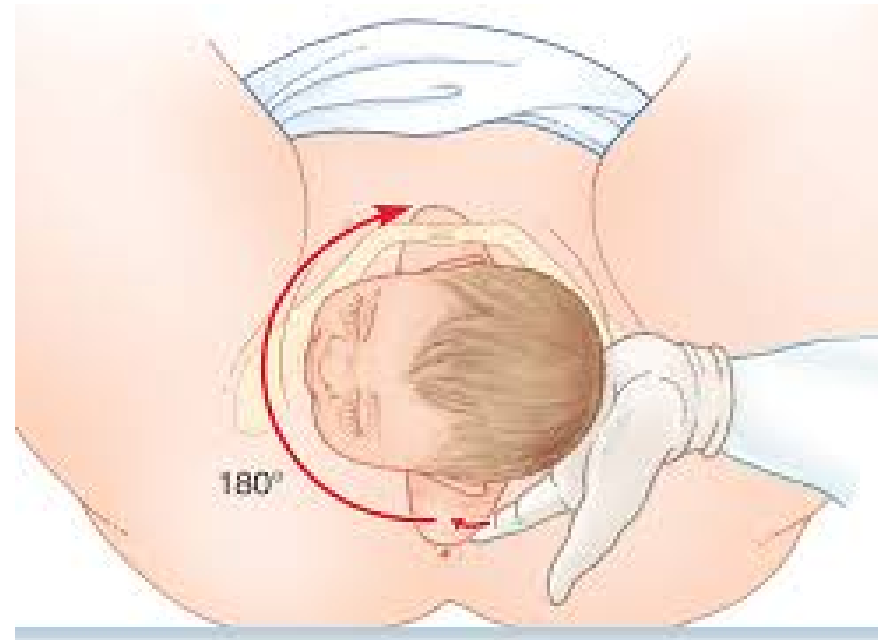
- ▶ Quick tips:
 - ▶ You cannot reach into the vagina too far.
 - ▶ If you aren't finding the arm or hand, reach in farther.
 - ▶ Maternal pushing efforts and continued suprapubic pressure by your assistants will prevent proper employment of this maneuver.



Shoulder Dystocia: Rotational Maneuvers



Source: Reckman (E): Emergency Medical Procedures,
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Shoulder Dystocia: OTHER

Characteristics	Cases (N = 111) N (%)
Maneuvers of shoulder dystocia *	
LSCS	1 (1)
Routine traction	57 (51)
McRobert's	33 (30)
Suprapubic + McRoberts	10 (9)
Posterior shoulder delivery	8 (7)
All maneuvers	1 (1)
Complications due to dystocia	
Erb's palsy	17 (16)
Birth asphyxia	2 (1)
Stillbirth	3 (3)
Recovery of Erb's palsy	
Resolved	15 (14)
Not resolved	2 (2)
GDM among cases with Erb's palsy	8 (47)

Shoulder Dystocia: HELPERR

HELPERR
for Shoulder Dystocia

H Call for Help

E Evaluate for Episiotomy

L Legs – McRoberts Maneuver

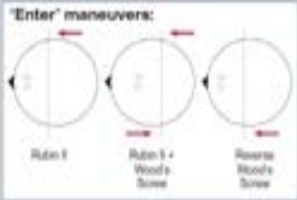
P Suprapubic Pressure

E Enter: rotational maneuvers

R Remove the posterior arm

R Roll the patient to her hands and knees

"Enter" maneuvers:



Rubin II Rubin I + Wood's Screw Reverse Woods Screw

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Postpartum Hemorrhage:

Major source of maternal morbidity and mortality.

Complicates 3-5% of all births.

Has risen steadily since the 90s.

Vital signs are VITAL.

Remember that maternal compensati

Small changes in bp, O2Sat, and pulse

Postpartum Hemorrhage

- Blood loss in excess of 500-1000 cc
- Stage 1: 500-1000 cc
- Stage 2: 1000-1500 cc
- Stage 3: 1500cc +

PPH: Definition of unstable VS

HR > 110

BP < 85/45

Unstable VS

O2 Sat < 95%

VS >15% change

PPH Treatment

Key Concepts

- Reduce delay.
- Follow a plan.
- Move steadily through an algorithm.

Prenatal Assessment & Planning

- ☐ Identify and prepare for patients with special considerations: Placenta Previa/Accreta, Bleeding Disorder, or those who Decline Blood Products
- ☐ Screen and aggressively treat severe anemia: if oral iron fails, initiate IV Iron Sucrose Protocol to reach desired Hgb/Hct, especially for at risk mothers.

Admission Assessment & Planning

- Verify Type & Antibody Screen from prenatal record
If not available,
☐ Order Type & Screen (lab will notify if 2nd clot needed for confirmation)
If prenatal or current antibody screen positive (if not low level anti-D from Rho-GAM),
☐ Type & Crossmatch 2 units PRBCs
All other patients,
☐ Send Clot to blood bank

- Evaluate for **Risk Factors** (see below)
If medium risk:
☐ Order Type & Screen
☐ Review Hemorrhage Protocol
If high risk:
☐ Order Type & Crossmatch 2 units PRBCs
☐ Review Hemorrhage Protocol
☐ Notify OB Anesthesia
Identify women who may decline transfusion
☐ Notify OB provider for plan of care
☐ Early consult with OB anesthesia
☐ Review Consent Form

Ongoing Risk Assessment

- ☐ Evaluate for development of additional risk factors in labor:
 - Prolonged 2nd Stage labor
 - Prolonged oxytocin use
 - Active bleeding
 - Chorioamnionitis
 - Magnesium sulfate treatment
- ☐ Increase Risk level (see below) and convert to Type & Screen or Type & Crossmatch
- ☐ Treat multiple risk factors as High Risk

Admission Hemorrhage Risk Factor Evaluation

Low (Clot only)	Medium (Type and Screen)	High (Type and Crossmatch)
No previous uterine incision	Prior cesarean birth(s) or uterine surgery	Placenta previa, low lying placenta
Singleton pregnancy	Multiple gestation	Suspected Placenta accreta or percreta
≤4 previous vaginal births	>4 previous vaginal births	Hematocrit <30 AND other risk factors
No known bleeding disorder	Chorioamnionitis	Platelets <100,000
No history of PPH	History of previous PPH	Active bleeding (greater than show) on admit
	Large uterine fibroids	Known coagulopathy
	Estimated fetal weight greater than 4 kg	
	Morbid obesity (BMI >35)	

STAGE 0: All Births: Prevention & Recognition of OB Hemorrhage

Active Management of Third Stage

- ☐ Oxytocin infusion: 10-20 units oxytocin/1000ml solution titrate infusion rate to uterine tone; or 10 units IM; do not give oxytocin as IV push
- ☐ Vigorous fundal massage for at least 15 seconds

Ongoing Quantitative Evaluation of Blood Loss

- ☐ Using formal methods, such as graduated containers, visual comparisons and weight of blood soaked materials (1gm = 1ml)

Ongoing Evaluation of Vital Signs

**If: Cumulative Blood Loss >500ml vaginal birth or >1000ml C/S -OR-
 Vital signs >15% change or HR ≥110, BP ≤85/45, O2 sat <95% -OR-
 Increased bleeding during recovery or postpartum,
 proceed to STAGE 1**

	Assessments	Meds/Procedures	Blood Bank
Stage 0	Every woman in labor/giving birth		
<i>Stage 0 focuses on risk assessment and active management of the third stage.</i>	<ul style="list-style-type: none"> Assess every woman for risk factors for hemorrhage Ongoing quantitative evaluation of blood loss on every birth 	Active Management 3rd Stage: <ul style="list-style-type: none"> Oxytocin IV infusion or 10u IM Fundal Massage-vigorous, 15 seconds min. 	<ul style="list-style-type: none"> If Medium Risk:T&Scr If High Risk: T&C 2 U If Positive Antibody Screen (prenatal or current, exclude low level anti-D from RhoGam):T&C 2 U
Stage 1	Blood loss: >500 ml vaginal <u>or</u> >1000 ml Cesarean, <u>or</u> VS changes (by >15% <u>or</u> HR ≥110, BP ≤85/45, O2 sat <95%)		
<i>Stage 1 is short: activate hemorrhage protocol, initiate preparations and give Methergine IM.</i>	<ul style="list-style-type: none"> Activate OB Hemorrhage Protocol and Checklist Notify Charge nurse, Anesthesia Provider VS, O2 Sat q5' Calculate cumulative blood loss q5-15' Weigh bloody materials Careful inspection with <u>good exposure</u> of vaginal walls, cervix, uterine cavity, placenta 	<ul style="list-style-type: none"> IV Access: at least 18gauge Increase IV fluid (LR) and Oxytocin rate, and repeat fundal massage Methergine 0.2mg IM (if not hypertensive) May repeat if good response to first dose, BUT otherwise move on to 2nd level uterotonic drug (see below) Empty bladder: straight cath or place foley with urimeter 	<ul style="list-style-type: none"> T&C 2 Units PRBCs (if not already done)
Stage 2	Continued bleeding with total blood loss under 1500ml		
<i>Stage 2 is focused on sequentially advancing through medications and procedures, mobilizing help and Blood Bank support, and keeping ahead with volume and blood products.</i>	OB back to bedside (if not already there) <ul style="list-style-type: none"> Extra help: 2nd OB, Rapid Response Team (per hospital), assign roles VS & cumulative blood loss q 5-10 min Weigh bloody materials Complete evaluation of vaginal wall, cervix, placenta, uterine cavity Send additional labs, including DIC panel If in Postpartum: Move to L&D/OR Evaluate for special cases: <ul style="list-style-type: none"> -Uterine Inversion -Amn. Fluid Embolism 	2nd Level Uterotonic Drugs: <ul style="list-style-type: none"> Hemabate 250 mcg IM <u>or</u> Misoprostol 800-1000 mcg PR 2nd IV Access (at least 18gauge) Bimanual massage Vaginal Birth: (typical order) <ul style="list-style-type: none"> Move to OR Repair any tears D&C: r/o retained placenta Place intrauterine balloon Selective Embolization (Interventional Radiology) Cesarean Birth: (still intra-op) (typical order) <ul style="list-style-type: none"> Inspect broad lig, posterior uterus and retained placenta B-Lynch Suture Place intrauterine balloon 	<ul style="list-style-type: none"> Notify Blood Bank of OB Hemorrhage Bring 2 Units PRBCs to bedside, transfuse per clinical signs – do not wait for lab values Use blood warmer for transfusion Consider thawing 2 FFP (takes 35+min), use if transfusing >2u PRBCs Determine availability of additional RBCs and other Coag products
Stage 3	Total blood loss over 1500ml, <u>or</u> >2 units PRBCs given <u>or</u> VS unstable <u>or</u> suspicion of DIC		
<i>Stage 3 is focused on the Massive Transfusion protocol and invasive surgical approaches for control of bleeding.</i>	<ul style="list-style-type: none"> Mobilize team <ul style="list-style-type: none"> -Advanced GYN surgeon -2nd Anesthesia Provider -OR staff -Adult Intensivist Repeat labs including coags and ABG's Central line Social Worker/ family support 	<ul style="list-style-type: none"> Activate Massive Hemorrhage Protocol Laparotomy: <ul style="list-style-type: none"> -B-Lynch Suture -Uterine Artery Ligation Hysterectomy Patient support <ul style="list-style-type: none"> -Fluid warmer -Upper body warming device -Sequential compression stockings 	Transfuse Aggressively Massive Hemorrhage Pack <ul style="list-style-type: none"> Near 1:1 PRBC:FFP 1 PLT pheresis pack per 6units PRBCs Unresponsive Coagulopathy: After 10 units PRBCs <u>and</u> full coagulation factor replacement: may consider rFactor VIIa

STAGE I Hemorrhage:

EBL>500cc vaginal or > 1000cc cs

Nursing Interventions

- IV access
- On-going assessment: ARE VS UNSTABLE??
- Give medications
- Calculating blood loss
- TYPE and CROSS
- Keep patient warm and oxygenated
- Place a foley

MD/CNMW

- Find cause for bleeding
- MANUAL EXAM OF UTERUS: if you cannot reach the fundus, Reach in further!
- Order medications
- TYPE and CROSS
- ARE VS UNSTABLE???:

Stage I hemorrhage: Medications

Methergine
0.2 mg IM

- Usually first line—onset action within 5 minutes
- Contraindicated with HTN
- Little or no response to 1st dose then MOVE ON

Hemeabate
0.25 mg IM

- Usually works within 2 doses
- Contraindicated in ASTHMA/HTN**
- No response after the 2nd dose then MOVE ON

Cytotec
800-1000
mcg pr

- Onset of action usually 30-60 minutes PR
- SL dose 400mcg-600mcg onset within 11 minutes

STAGE 2: Continued bleeding or Unstable VS or EBL 1000-1500 cc

Nursing interventions

- On-going Assessment of VS
- Transfuse!
- Notify eCare: eER

MD/CNM interventions

- Continued assessment of VS
- Continued uterotonic use
- Notify eCare: eER
- 1500 CC EBL with ongoing bleeding---Start transfusing (do not wait for lab results)

STAGE 2: Continued bleeding or
Unstable VS or EBL > 1500 cc

Vaginal Delivery

- Laceration repair
- Bakri Balloon Placement/Uterine packing
- Stabilize and Transport

Stage 3: EBL>1500cc, > 2U PRBCs given, unstable VS or Suspect DIC

Nursing interventions:

- Continued monitoring of EBL
- SUGGEST MTP activation
- Manage activation of MTP

ED Provider Interventions

- Consider CVP or Art line
- Manage Blood products

Stage 3: EBL>1500cc, > 2U PRBCs given,
unstable vs or Suspect DIC

MD
interventions

- MTP activation
- Transfuse 2 U FFP
- Keep transfusion
ratio 4:4:1
(PRBCS:FFP:PLT)

Massive transfusion

- ▶ Classic transfusion therapy:
 - ▶ Crystalloid administration
 - ▶ PRBCs
 - ▶ FAILED to prevent coagulopathy!!
 - ▶ Dilutional; Increased hydrostatic pressure and clot dislodgement at endothelial injury sites
 - ▶ DIC: early hypoperfusion leads to up-regulation of the Protein C pathway and inhibition of factors Vs and VIIIa and enhanced fibrinolysis.

Treatment

Parameters:

- INR > 1.5
- Plt < 50k
- Hgb < 7.5
- Fibrinogen < 100
 - ***If you stick to these guidelines in an obstetric patient, you are way behind.

Massive Transfusion

► Iraq Data

- Casualties who received less than 1U of plasma for every 4U PRBCs were associated with a 65% mortality
- Casualties who received 2U of plasma for every 3U of PRBCs were associated with a 19% mortality.

Spinella PC, Holcomb JB. Resuscitation and transfusion principles for traumatic hemorrhagic shock. Blood Rev. 2009;23:231-240.

Massive Transfusion Protocols

- ▶ Higher intra-operative product use.
- ▶ Lower 24-hour component use.
 - ▶ Lower utilization of PLT
- ▶ Post operative PTT and PLT significantly improved.
- ▶ Lower Crystalloid use.

Colton, BA. Gunter OL Isbell J, et al. Damage control hematology: The impact of a trauma exsanguination protocol on survival and blood product utilization. J Trauma. 2008; 64:1177-1183

Massive Transfusion Protocols

- ▶ Purpose:

- ▶ Structured system-wide process for early and efficient delivery of specific ratios of blood product,
 - ▶ 4 U PRBCs/4U FFP/ 1 Apheresis pack PLT

PPH treated with MTP

Lab data of OB patient receiving blood products from MTP

	Baseline	Most Extreme	Post-MTP
Hgb (g/dl)	11.9 (1.3)	7.1 (1.7)	10.3(2.4)
PLT	192 (56)	103 (75)	124 (44)
INR	1.2 [1.3-2.1]	2.0 [1.3-2.1]	1.3 [1.2-1.4]
aPTT	29.3 [12.9-15.8]	46.2 [31.5-53.7]	30.9 [30.2-35]
Fibrinogen	405 [302-533]	229 (170)	325 (125)
()=mean AND []=interquartile range			

Gutierrez MD et al. PPH treated with MTP at a tertiary ob center: a retrospective study;
Int J of Ob Anesth 2012 (21): 230-35.

PPH Protocol

Key Concepts

- Reduce delay.
- Follow a plan.
- Move steadily through the algorithm.

“

But what is MTP in a Less-Resourced Hospital?

”

What most hospitals have:

1. PRBCs
2. FFP
3. TXA (traneximic acid)=1g

Preeclampsia

- Criteria:

- Without Severe Features

- BP elevated 140s/90s
 - Proteinuria

- With Severe Features

- BP 160s/90s
 - Headache
 - Lab abnormalities!

- Eclampsia

- All of the above, but with seizures



Preeclampsia

- ▶ Severe Preeclampsia must have one of the following:
 - ▶ Symptoms of central nervous system dysfunction = Blurred vision, scotomata, altered mental status, severe headache
 - ▶ Symptoms of liver capsule distention = Right upper quadrant or epigastric pain
 - ▶ Nausea, vomiting
 - ▶ Hepatocellular injury = Serum transaminase concentration at least twice normal
 - ▶ Systolic blood pressure ≥ 160 mm Hg or diastolic ≥ 110 mm Hg on two occasions at least six hours apart
 - ▶ Thrombocytopenia = $< 100,000$ platelets per cubic millimeter
 - ▶ Proteinuria = 5 or more grams in 24 hours
 - ▶ Oliguria = < 500 mL in 24 hours
 - ▶ Severe fetal growth restriction
 - ▶ Pulmonary edema or cyanosis
 - ▶ Cerebrovascular accident

Preeclampsia vs. Severe Preeclampsia

Criteria for Preeclampsia

- ▶ Previously normotensive woman
- ▶ ≥ 140 mmHg systolic
- ▶ ≥ 90 mmHg diastolic
- ▶ Proteinuria:
 - ▶ ≥ 300 mg in 24 hour collection
 - ▶ Protein/creatinine ratio of 0.3 mg/dL.
 - ▶ Dipstick protein discouraged.

Criteria for Preeclampsia with Severe Features

- ▶ BP ≥ 160 systolic or ≥ 110 diastolic
- ▶ Thrombocytopenia $<100,000$
- ▶ Impaired liver function (LFT's 2X normal) severe RUQ pain or epigastric pain or both
- ▶ Progressive renal insufficiency (serum creatinine >1.1 mg/dL or doubling of serum creatinine in the absence of renal disease)
- ▶ Pulmonary edema
- ▶ New onset cerebral or visual disturbances

Preeclampsia: Rapid assessment

Physical Exam:

- ▶ VS: Elevate bp that is sustained
- ▶ Pulmonary:
 - ▶ Findings of Pulmonary Edema
- ▶ Abdomen:
 - ▶ Palpable tenderness in RUQ and Epigastrium
- ▶ Extremities:
 - ▶ Edema
 - ▶ DTRs brisk

Lab

- ▶ CBC
 - ▶ Platelets <100k
- ▶ LFTs (CMP)
 - ▶ Elevated
- ▶ Urine:
 - ▶ +3 on dip
 - ▶ Protein/Creatinine ratio >0.3

Treatment of Preeclampsia

- ▶ Definitive Treatment = Delivery
- ▶ Major indication for antihypertensive therapy is prevention of stroke.
 - ▶ Diastolic pressure ≥ 105 -110 mmHg or systolic pressure ≥ 160 mmHg
- ▶ Choice of drug therapy:
 - ▶ Acute - IV labetalol, IV hydralazine, SR Nifedipine
 - ▶ Long-term - Oral methyldopa or labetalol

Magnesium Sulfate: Mainstay of treatment

- ▶ Is not a hypotensive agent
- ▶ Works as a centrally acting anticonvulsant
- ▶ Also blocks neuromuscular conduction
- ▶ 4-6 g bolus
- ▶ 1-2 g/hour
- ▶ Monitor urine output and DTR's
 - ▶ Foley Catheter
- ▶ With renal dysfunction, may require a lower dose
- ▶ Serum levels: 6-8 mg/dL are considered therapeutic

Toxicity

- ▶ Respiratory rate < 12
- ▶ DTR's not detectable
- ▶ Altered sensorium
- ▶ Urine output < 25-30 cc/hour
- ▶ Antidote: 10 ml of 10% solution of calcium gluconate 1 v over 3 minutes

Treatment of Eclampsia

- ▶ Few people die of seizures
- ▶ Protect patient
- ▶ Avoid insertion of airways and padded tongue blades
- ▶ IV access
- ▶ MgSO₄ 4-6 bolus, if not effective, give another 2 g

Alternate Anticonvulsants

- ▶ Have not been shown to be as efficacious as magnesium sulfate and may result in sedation that makes evaluation of the patient more difficult
 - ▶ Diazepam 5-10 mg IV
 - ▶ Sodium Amytal 100 mg IV
 - ▶ Pentobarbital 125 mg IV
 - ▶ Dilantin 500-1000 mg IV infusion

After the Seizure

- ▶ Assess maternal labs
- ▶ Fetal well-being
- ▶ Effect delivery
- ▶ Transport when indicated
- ▶ No need for immediate cesarean delivery

Hypertensive Emergencies

- ▶ Fetal monitoring
- ▶ IV access
- ▶ IV hydration
- ▶ The reason to treat is maternal, not fetal
- ▶ May require ICU

Criteria for Treatment

- ▶ Diastolic BP $> 105-110$
- ▶ Systolic BP > 160
- ▶ Avoid rapid reduction in BP
- ▶ Do not attempt to normalize BP
- ▶ Goal is DBP < 105 not ≤ 90
- ▶ May precipitate fetal distress

Hydralazine

- ▶ Dose: 5-10 mg every 20 minutes
- ▶ Onset: 10-20 minutes
- ▶ Duration: 3-8 hours
- ▶ Side effects: headache, flushing, tachycardia, lupus like symptoms
- ▶ Mechanism: peripheral vasodilator

Labetalol

- ▶ Dose: 20mg, then 40, then 80 every 20 minutes, for a total of 220mg
- ▶ Onset: 1-2 minutes
- ▶ Duration: 6-16 hours
- ▶ Side effects: hypotension
- ▶ Mechanism: Alpha and Beta block

Other Complications

- ▶ Pulmonary edema
- ▶ Oliguria
- ▶ Persistent hypertension
- ▶ DIC

Conclusion:

General rules of obstetrics:

1. 90% of decision making is common sense.
2. If you stabilize mom, then the baby will likely be ok too.