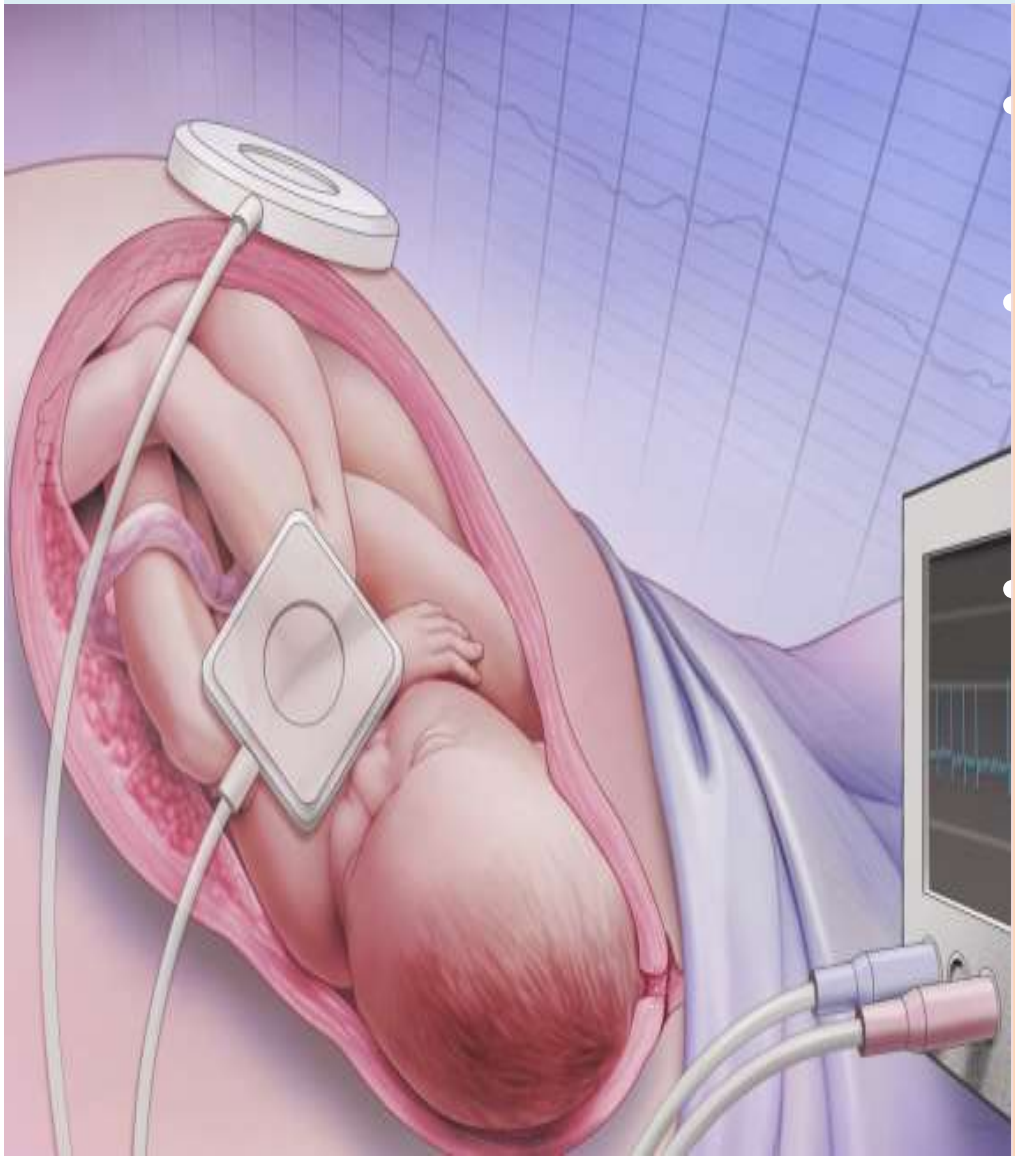
Fetal assessment



DR BEHNAZ MOLAEI.
OB&GYN

FELLWOSHIP OF PERINATOLOGY .

ASSOSIATED PROROSOR IN ZANJAN MEDICAL SCIENCES.

Intrapartum asphyxia

- Perinatal asphyxia
- DEFINITION
- IMPORTANCY
- CUSES
- PREDICTION
- PREVENTION

Perinatal asphyxia refers to deprivation of oxygen severe enough to cause neonatal encephalopathy as a result of events surrounding birth.

Birth asphyxia accounts for approximately **23%** of the 3.6 million **neonatal deaths** per year,
and occur in the antenatal, intrapartum, or postpartum period.

Table 1
Neonatal signs of perinatal asphyxia

Apgar score	Less than 5 at 5 and 10 min of life
Umbilical arterial cord gas	Less than 7.0 and/or base deficit ≥12 mmol/L
Neuroimaging[a]	Deep nuclear gray matter or watershed cortical injury
Organ dysfunction	Multisystem organ failure
CP	Spastic quadriplegic or dyskinetic type

[a] MRI is the most sensitive test.

استفاده از عدد آپگار به تنهایی برای تشخیص آسفیکسی پریناتال و یا احتمال بروز آن کافی نبوده و شاخص ارزشمندی به حساب نمی آید. این مقیاس به تنهایی نمی تواند بعنوان «نشانه» آسفیکسی در نظر گرفته شود، بلکه جهت تشخیص یک واقعه هیپوکسیک - ایسمیک حین زایمان، به بسیاری از شواهد دیگر از جمله اسیدوز جنینی،تغییرات EEG یا aEEG، مارکرهای بیوشیمایی خون و ... نیاز است .

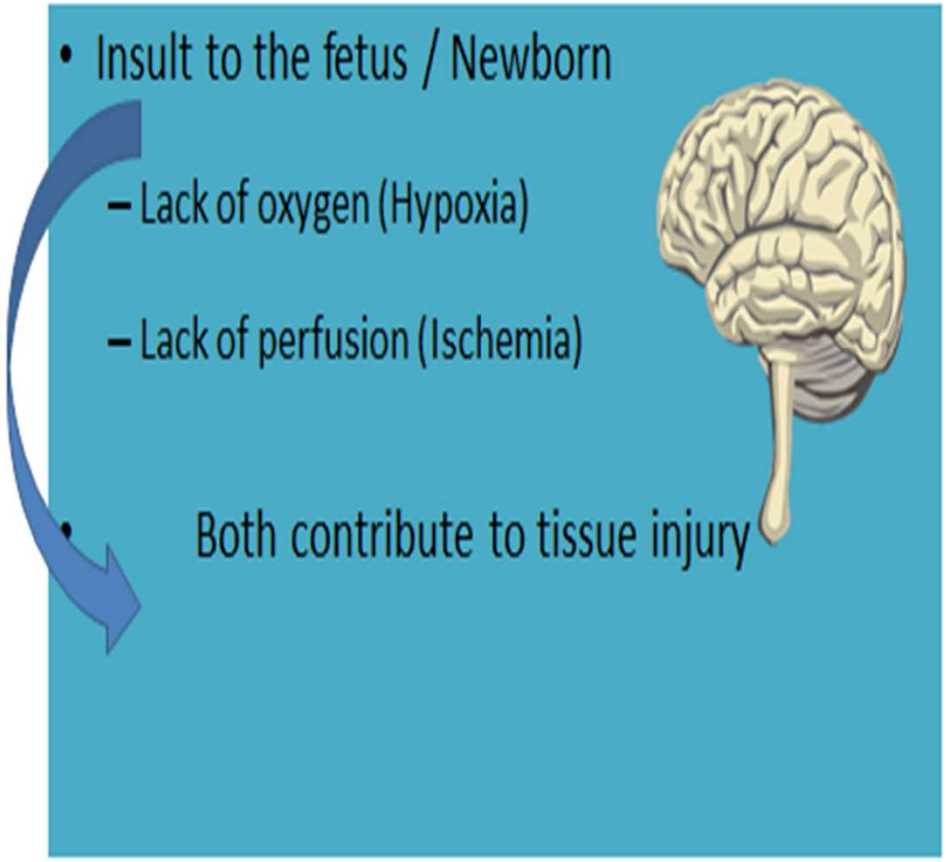
در صورتیکه نوزاد نیاز به احیا داشته باشد قبل از تعیین آپگار دقیقه ی اول احیا شروع می شود لذااز عدد آپگار نباید برای تعیین لزوم احیاء، تعیین مرحله احیاء و یا چگونگی استفاده از مراحل مختلف احیاء استفاده شود .

میزان آپگار دقایق اول و پنجم به تنهایی، نشانگر دقیقی برای پیشگویی عوارض عصبی نیست . در واقع اغلب نوزادانی که بعدها دچار فلج عصبی میشوند، آپگار طبیعی دارند و از طرفی شیوع فلج مغزی در نوزادانی که آپگار دقیقه پنجم آنها بین ۰ تا ۳ است، پایین می باشد. لازم به ذکر است که درجه آپگار پایین دقیقه پنجم توام با PH کمتر از ۷ خون شریان نافی در پیش بینی میزان مرگ و میر نوزادی و عوارض عصبی آینده ارزشمندتر است. هرچند آپگارهای دقایق اول وپنجم دلالت بر نیاز به ادامه احیا می باشند، ولی اپگارهای پایین دقایق ۱۰،

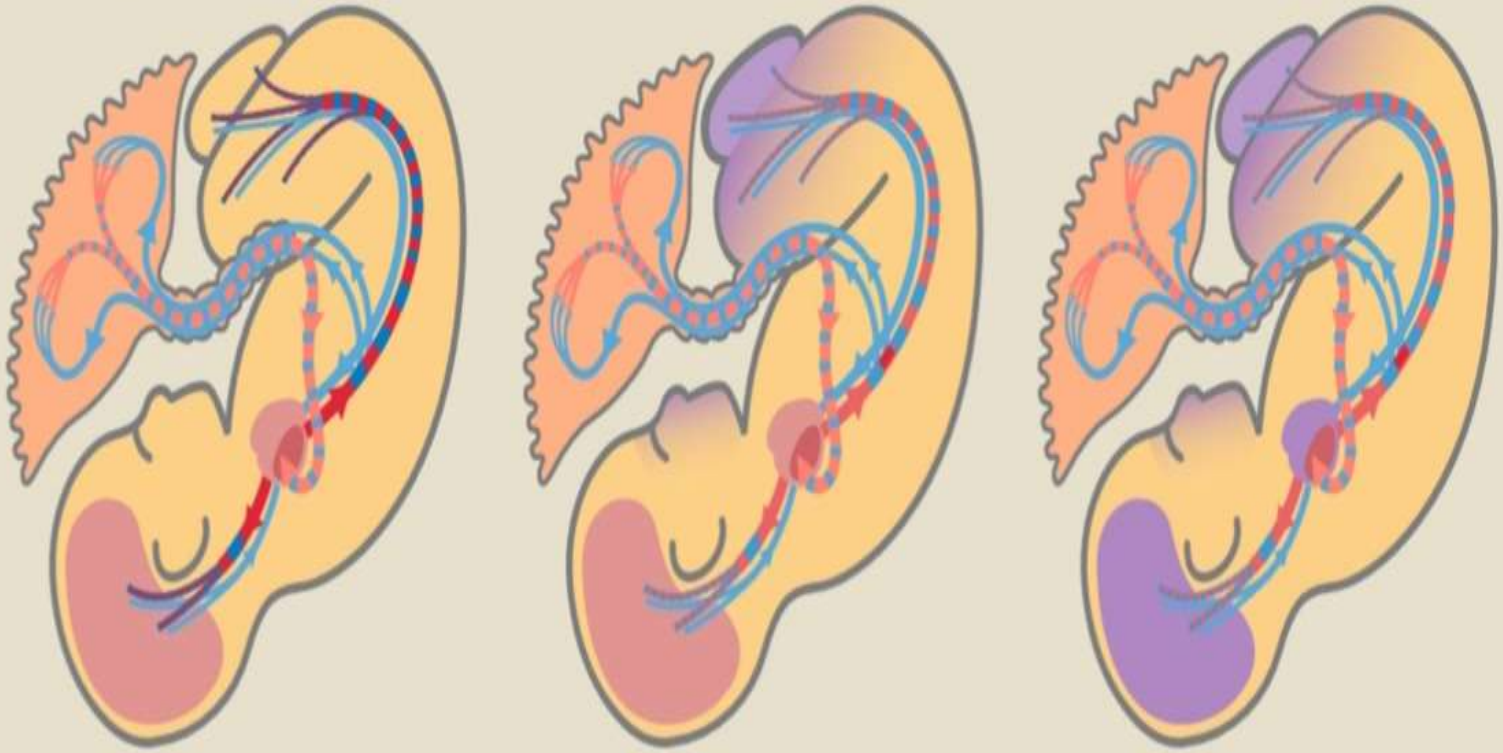
Birth asphyxia refers to deprivation of oxygen severe enough to cause neonatal encephalopathy as a result of events surrounding birth.

- **Hypoxemia** Decreased oxygen concentration in
- Blood.
- **Hypoxia** Decreased oxygen concentration in
- Tissue.
- **Acidemia** Increased hydrogen ion concentration
- in blood
- **Acidosis** Increased hydrogen ion concentration
- in tissue

- **Asphyxia** Hypoxia with metabolic acidosis.



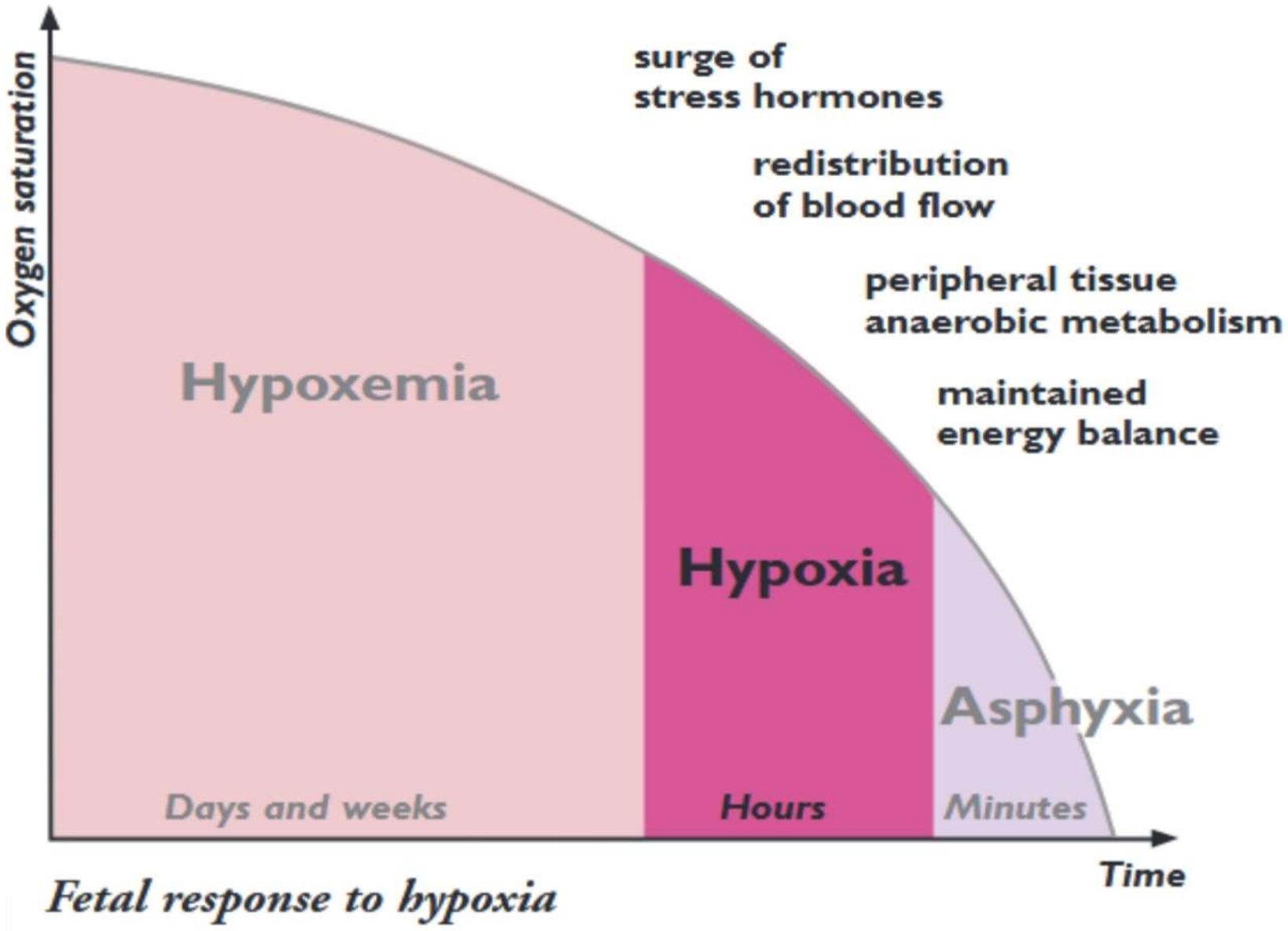
Basic definitions



hypoxemia – affects the arterial blood

hypoxia – affects the peripheral tissues

asphyxia – affects the central organs



Fetal response to hypoxia

CUSES

Table 1
Selected causes of perinatal asphyxia

Maternal	Placental/Umbilical Cord	Neonatal
Diabetes mellitus	Placental abruption	Airway anomalies
Hypertension	Fetomaternal hemorrhage	Neurologic disorders
Preeclampsia	Umbilical cord compression (prolapse, nuchal cord, knot, etc)	Severe cardiopulmonary disease
Hypotension/shock	Infection/inflammation	Severe circulatory compromise (blood loss)
Uterine rupture	Velamentous cord insertion	Infection
Severe anemia	—	Medication effect
Infection	—	—

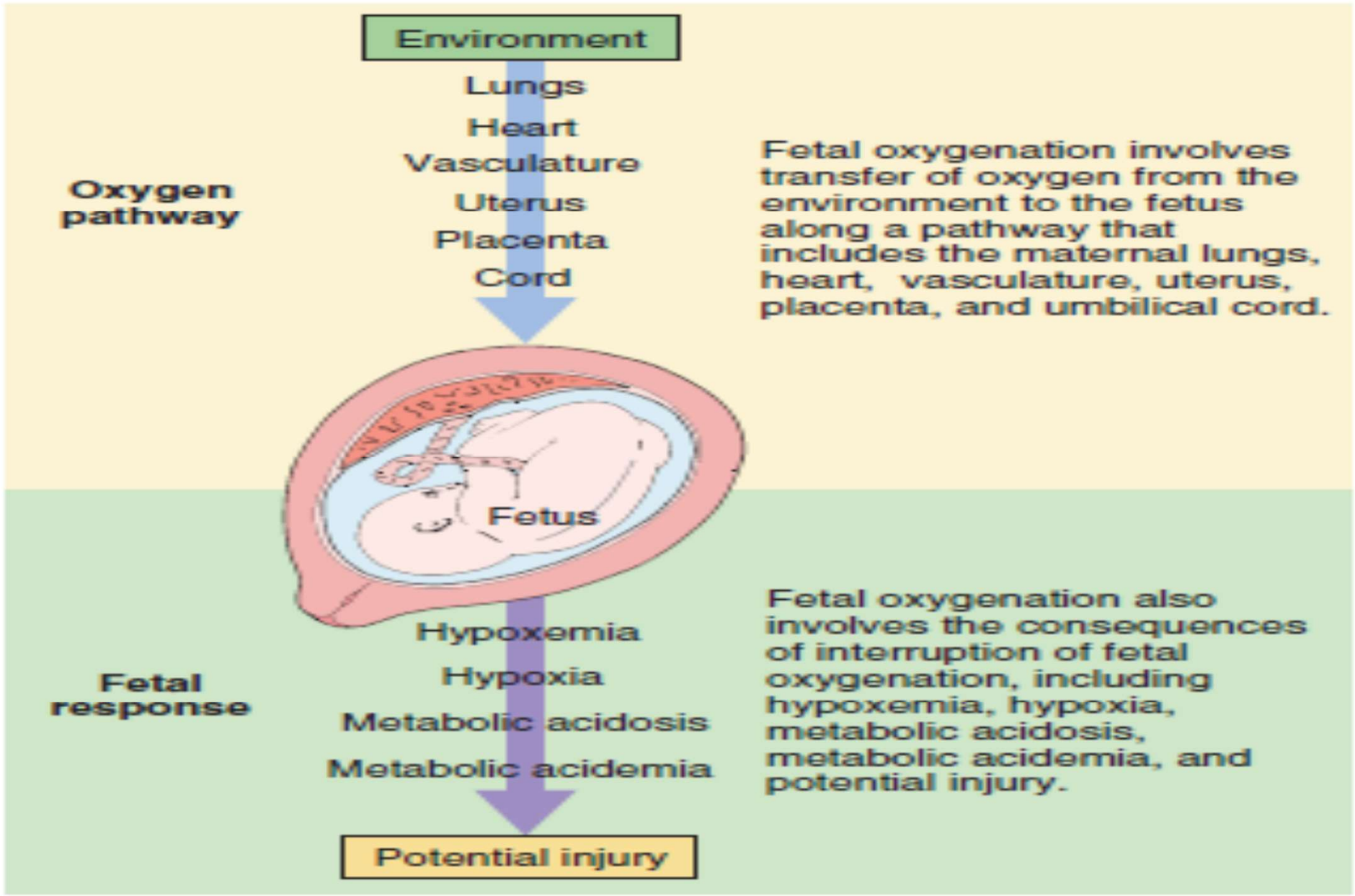
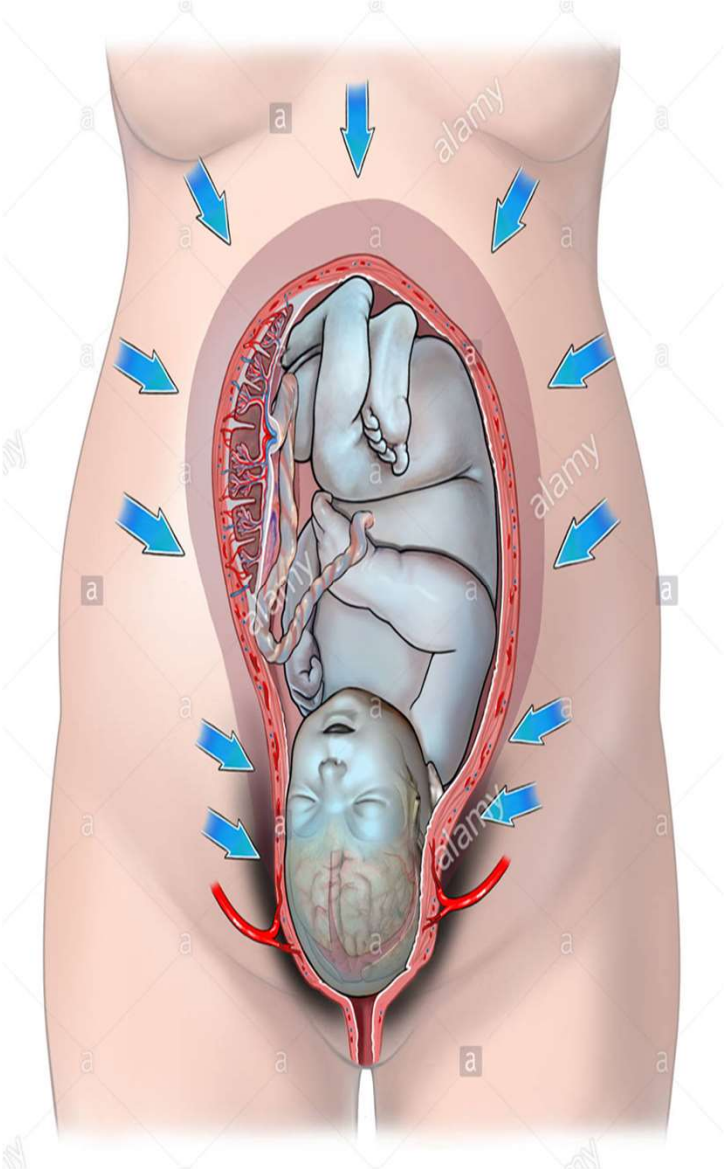


FIG 15-3 The oxygen pathway.

- **OVERVIEW**
- Normal human **labor is characterized by rhythmic uterine contractions** that intermittently interrupt the trans placental passage of oxygen from the mother to the fetus.

- These brief episodes of transient interruption of oxygenation are tolerated without consequence
- by almost all fetuses.

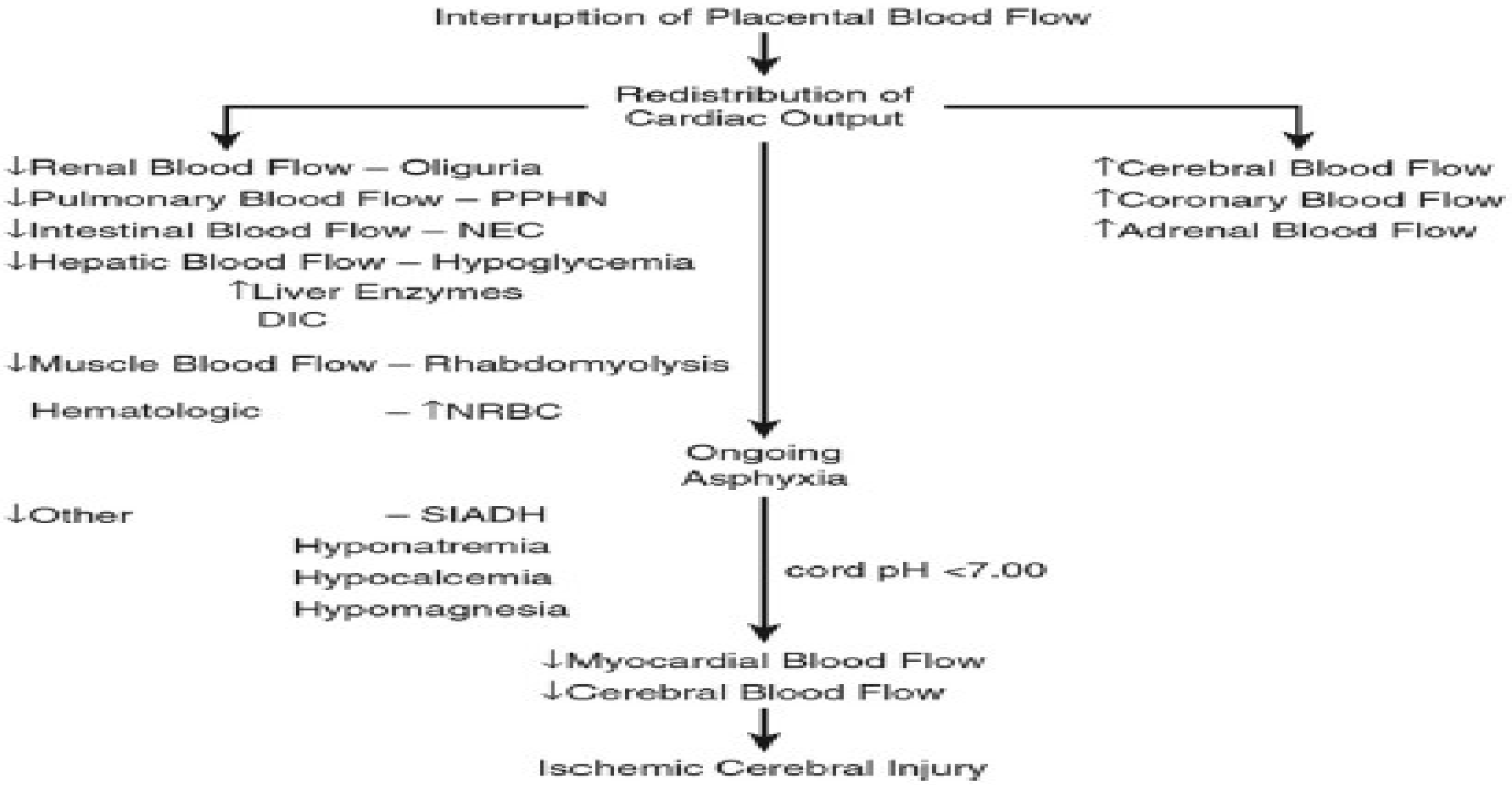
- In a very small subset, however, severe fetal oxygen deficiency can lead to hypoxic injury or even death.



- When placental blood flow is compromised, the fetus aims to redistribute cardiac output to protect more vital organs (eg, **brain, myocardium, and adrenal glands).**

- Known as the **"diving reflex,"** this alteration of blood flow is at the expense of decreased flow to
- less vital organs, such as the kidney, intestine, skin, and muscle.

1. Adaptive mechanisms and systemic consequences of interruption of placental blood flow



Etiology

injury to the developing brain occurs

75% and 80%	antepartum
10%	intrapartum
10%	postnatal

MOST OF THESE AND RELATED POSTNATAL FACTORS ARE MUCH MORE IMPORTANT IN THE PATHOGENESIS OF HYPOXIC-ISCHEMIC BRAIN INJURY IN THE *PREMATURE INFANT THAN IN THE TERM INFANT.*

*only **1** percent of* CP cases

caused **by birth asphyxia**

(ACOG) and the International Cerebral Palsy Task Force

acute intrapartum hypoxic event identified in only 1% with CP

*Despite **improvements** in perinatal care*

, the prevalence

*of CP unchanged over **the past 50 years,***

1.5 to 2.5 cases per 1000 live births

50?? مورد

در استان زنجان

آمار موالید در استان زنجان

	سال96	سال 97	سال 98	سال 99
تعداد زایمان	19928	18324	16082	14870
تعداد نوزادان متولد شده	20248	18626	16384	15149
تعداد نوزاد زنده متولد شده	20082	18461	16252	15029
تعداد مرگ نوزاد	170	145	127	135
تعداد نوزاد متولد شده با آپگار زیر هفت در دقیقه پنج	286	298	223	197

The etiology

- ***Prematurity (78 %)***
- *IUGR (34 %)*
- *Intrauterine infection (28 %)*
- *Antepartum hemorrhage (27 %)*
- ***Severe placental pathology** (21 %)*
- *Multiple pregnancy (20 %)*

Multiple births

—Causes

low birth weight,

prematurity,

congenital anomalies,

cord entanglement

abnormal vascular connections

In a study of births in Western Australia from 1980 to 1989

, the prevalence of CP

singletons	1.6,
Twins	7.3,
triplets,	28 per 1000

.

Death of a co-twin

when one twin died in utero

*(**96 versus 12** per 1000 twin pairs) compared with both surviving*

mechanism

release of thromboplastin and emboli from the dead twin causing injury to the survivor

Death of a co-twin

It is possible that some cases of CP in ***apparent singletons***

may be due to

an unrecognized fetal death of a co-twin

obstetric emergencies	Vasa previa
prolapsed umbilical cord	dystocia at delivery
umbilical cord being pinched	**Chorioamnionitis and funisitis**
Meconium Aspiration Syndrome	**shoulder dystocia**
Prematurty, lungs are under developed	complicated pregnancies such as monochorionic, multi-fetal gestations
uterine rupture	**hypertension**
placental abruption,	**diabetes**

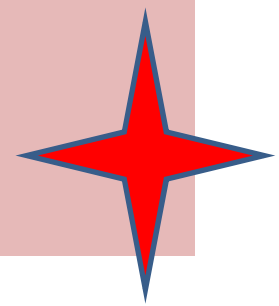
Intrauterine infection

Congenital infections

as CMV, syphilis, VZV, toxo.

Bacterial infections

Maternal ***chorioamnionitis***



Histologic chorioamnionitis

Without clinical signs

increased likelihood of congenital IVH, PVL, and CP

intrauterine infection and inflammation

production

of ***proinflammatory cytokines,***

white matter brain injury

CP

Meconium-associated vascular necrosis

vascular necrosis

highly significant risk factor for CP

Chronic intermittent umbilical cord ؟؟occlusion

Placental findings :

intimal fibrin

increase in circulating (NRBC)

indicative of ***significant fetal hypoxemia***.

BOX 61-1 CAUSES OF FETAL HYPOXIC-ISCHEMIC INSULT

MATERNAL

- Cardiac arrest
- Asphyxiation
- Severe anaphylactoid reaction
- Status epilepticus
- Hypovolemic shock

UTEROPLACENTAL

- Placental abruption
- Cord prolapse
- Uterine rupture
- Hyperstimulation with oxytocic agents

FETAL

- Fetomaternal hemorrhage
- Twin-to-twin transfusion syndrome
- Severe isoimmune hemolytic disease
- Cardiac arrhythmia

MEDICAL History Taking

Risk factors for 3rd trimester stillbirth

Risk Factor	OR multivariate
• IUGR / SFD	7.0 (3.3-15.1)
• Age >35 yrs	4.1 (1.0-16.5)
• BMI >25 Kg/m^2	4.7 (1.7-10.2)
• Education <10 yrs	3.4 (1.2- 9.6)
• IUGR / BMI >25 Kg/m^2	71 (14 - 350) (univariate OR)

Froen, Gardosi *et al.*. Acta Obstet Gynecol Scand 2004: 83: 801-7:

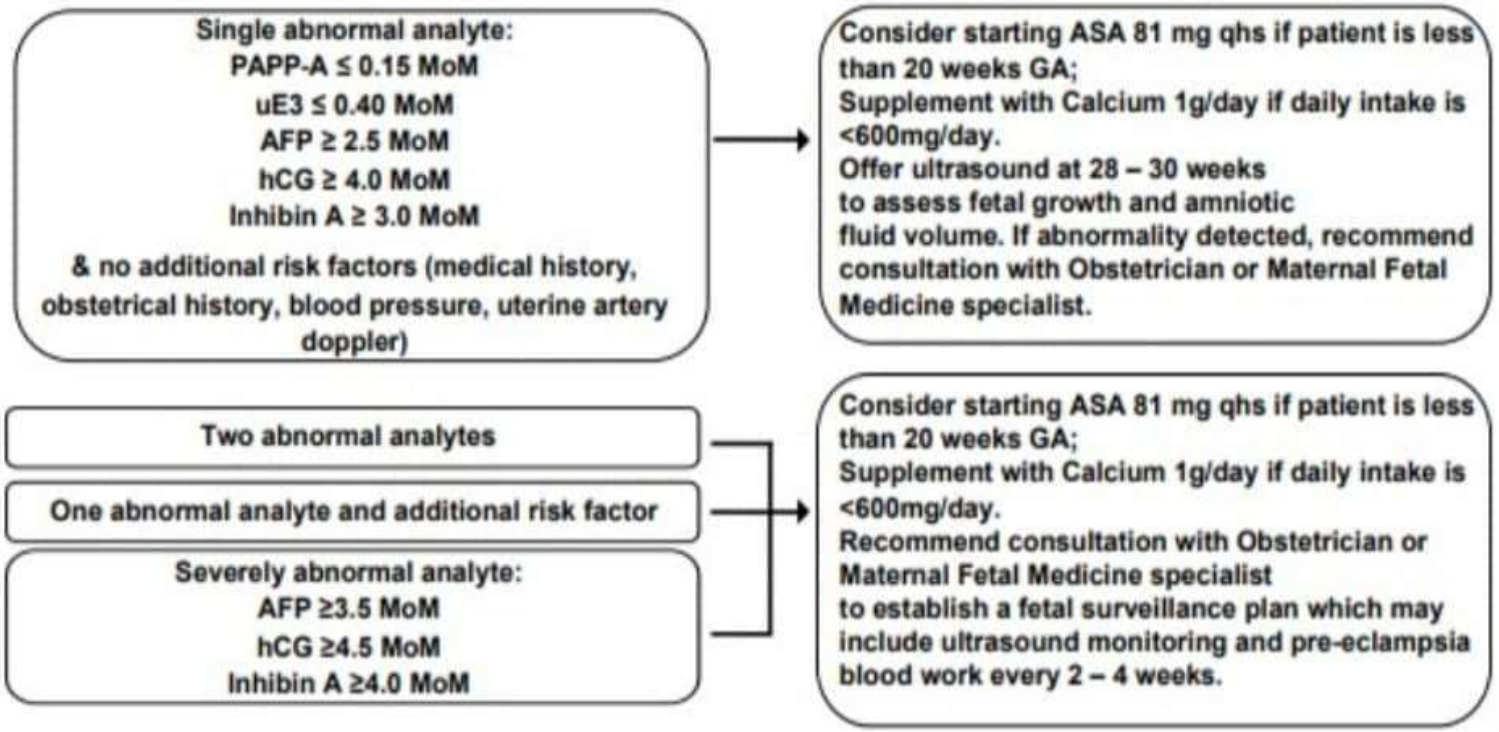
- Maternal biochemical screens have been proposed as a method to screen for and
- predict fetal growth restriction.

- Elevated alpha fetal protein, HCG, and inhibin A or low unconjugated estriol,PAPPA are associated with fetal growth restriction; the presence of 2 or more abnormal markers increases the risk.

- **Abnormal biomarkers may prompt increased**
- **pregnancy surveillance with obstetric ultrasounds and/or antenatal testing, although u is uncertain**

Recommended Management

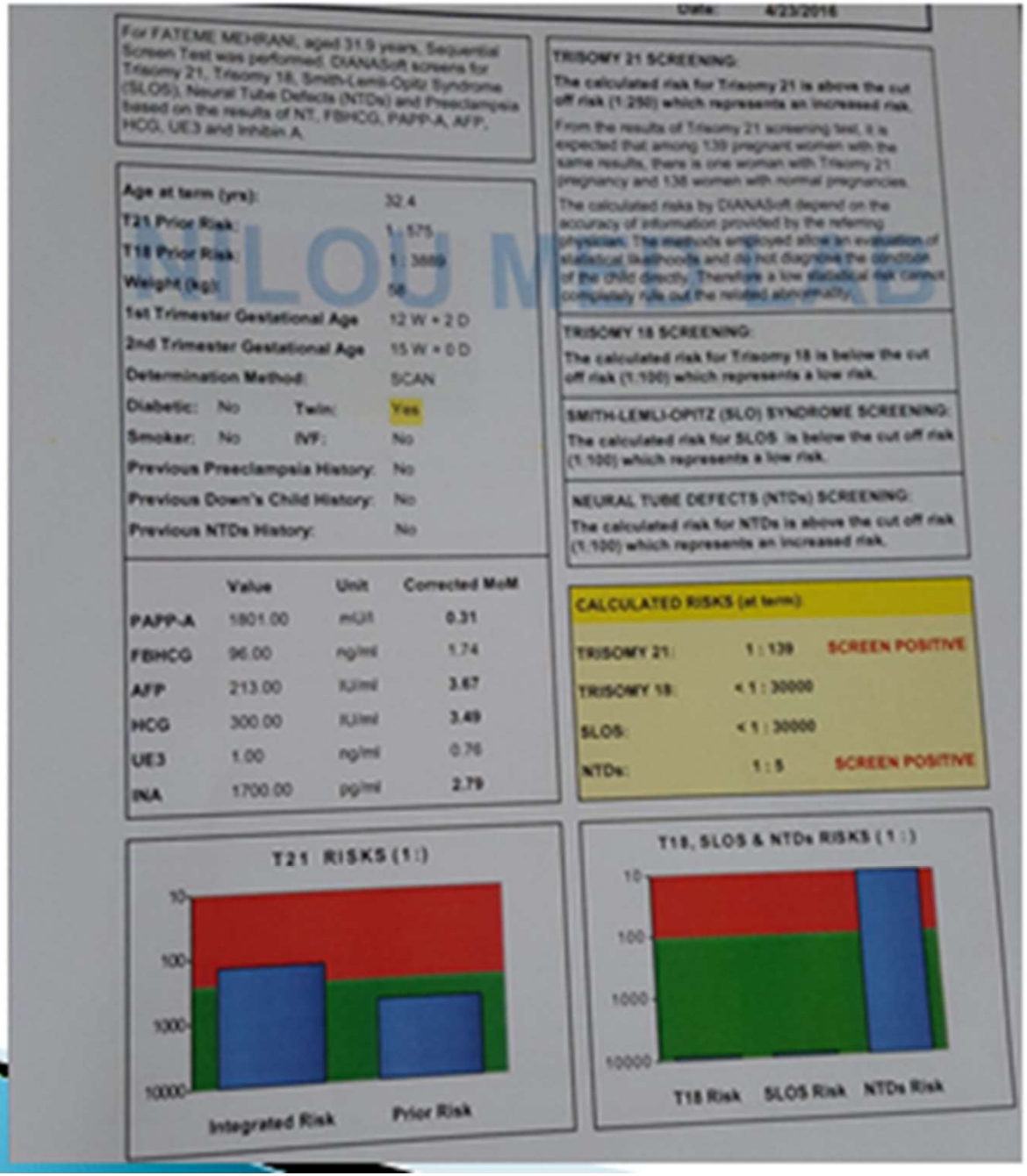
Pregnancies with abnormal serum analyte(s) AND a negative screen or positive screen for T21 or T18, with negative results on NIPT or Amnio, should be followed as below:



Related References:

Gagnon, A et al. Obstetrical Complications Associated with Abnormal Maternal Serum Marker Analytes. J Obstet Gynaecol Can. 2008 Oct; 30(10):918-49.
Dugoff L; Society for Maternal-Fetal Medicine. First-and Second-Trimester Maternal Serum Markers for Aneuploidy and Adverse Obstetrical Outcomes. 2010 May; 115(5):1052-61.

September 2013; *Revised December 2020*



Date: 4/23/2016

For FATEME MEHRANI, aged 31.9 years, Sequential Screen Test was performed. DIANASoft screens for Trisomy 21, Trisomy 18, Smith-Lemli-Opitz Syndrome (SLOS), Neural Tube Defects (NTDs) and Preeclampsia based on the results of NT, FBHCG, PAPP-A, AFP, HCG, UE3 and Inhibin A.

Age at term (yrs):			32.4
T21 Prior Risk:			1: 575
T18 Prior Risk:			1: 3889
Weight (kg):			58
1st Trimester Gestational Age			12 W + 2 D
2nd Trimester Gestational Age			15 W + 0 D
Determination Method:			SCAN
Diabetic:	No	Twin:	Yes
Smoker:	No	IVF:	No
Previous Preeclampsia History:			No
Previous Down's Child History:			No
Previous NTDs History:			No

	Value	Unit	Corrected MoM
PAPP-A	1801.00	mU/l	0.31
FBHCG	96.00	ng/ml	1.74
AFP	213.00	IU/ml	3.67
HCG	300.00	IU/ml	3.49
UE3	1.00	ng/ml	0.76
INA	1700.00	pg/ml	2.79

TRISOMY 21 SCREENING:

The calculated risk for Trisomy 21 is above the cut off risk (1:250) which represents an increased risk.

From the results of Trisomy 21 screening test, it is expected that among 139 pregnant women with the same results, there is one woman with Trisomy 21 pregnancy and 138 women with normal pregnancies.

The calculated risks by DIANASoft depend on the accuracy of information provided by the referring physician. The methods employed allow an evaluation of statistical likelihoods and do not diagnose the condition of the child directly. Therefore a low statistical risk cannot completely rule out the related abnormality.

TRISOMY 18 SCREENING:

The calculated risk for Trisomy 18 is below the cut off risk (1:100) which represents a low risk.

SMITH-LEMLI-OPITZ (SLO) SYNDROME SCREENING:

The calculated risk for SLOS is below the cut off risk (1:100) which represents a low risk.

NEURAL TUBE DEFECTS (NTDs) SCREENING:

The calculated risk for NTDs is above the cut off risk (1:100) which represents an increased risk.

CALCULATED RISKS (at term)

TRISOMY 21:	1 : 139	SCREEN POSITIVE
TRISOMY 18:	< 1 : 30000	
SLOS:	< 1 : 30000	
NTDs:	1 : 5	SCREEN POSITIVE

- ANTEPARTUM SCREENING AND DIAGNOSIS
- Antenatal fetal testing was designed to prevent the risk of intrauterine injury or death in pregnancies at high risk.

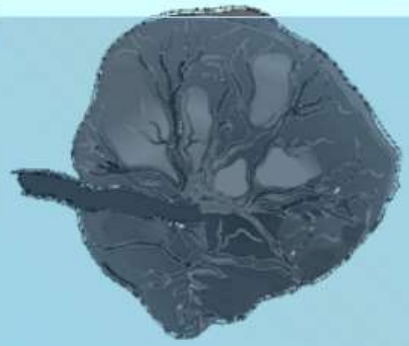
- For women with comorbid medical conditions, such as
- diabetes, hypertension, or complicated pregnancies such as mono chorionic multi-fetal gestations, may benefit from testing.

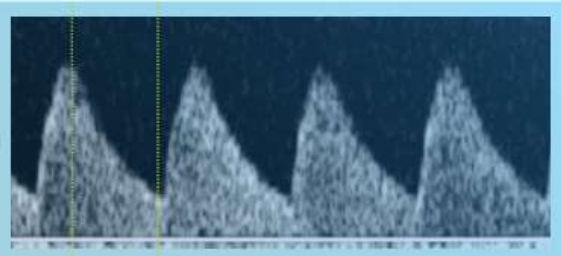
- **Each of these conditions is associated**
- **with an increased risk of stillbirth, neonatal death, and encephalopathy**.
- The contraction stress test (CST), nonstress test (NST), biophysical profile (BPP),
- and modified BPP comprise the most commonly used antenatal testing modalities

umbilical artery

normal and anormal hemodynamics

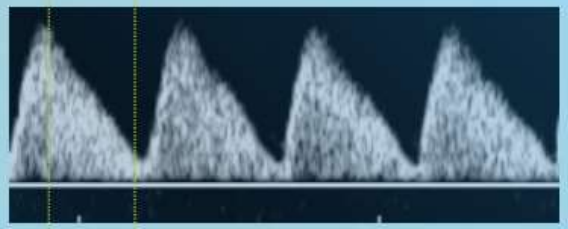
S D

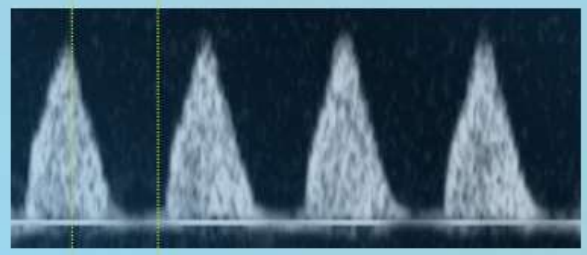




Placental status

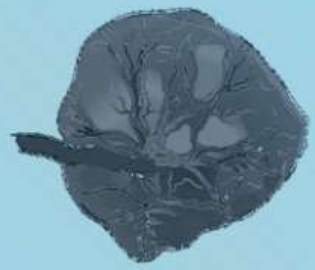
Cardiac pump
normal function

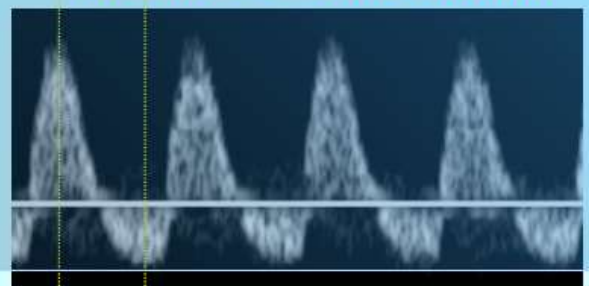




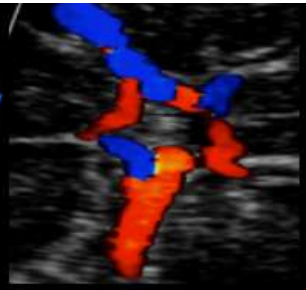
placenta + cardiac ischemia

Cardiac pump
abnormal function



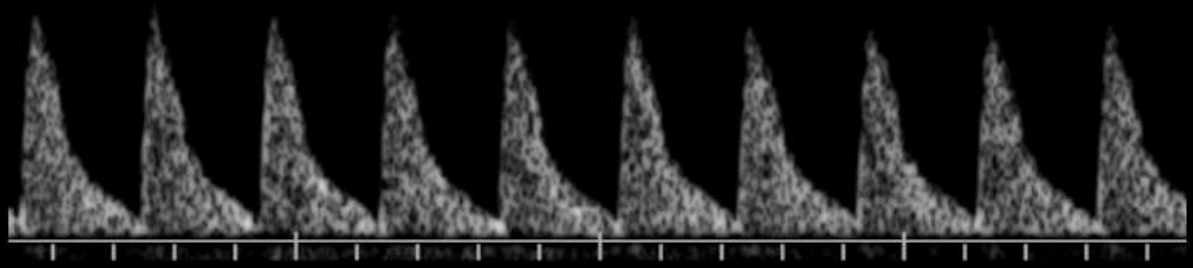


middle cerebral artery
normal and abnormal hrmodynamics

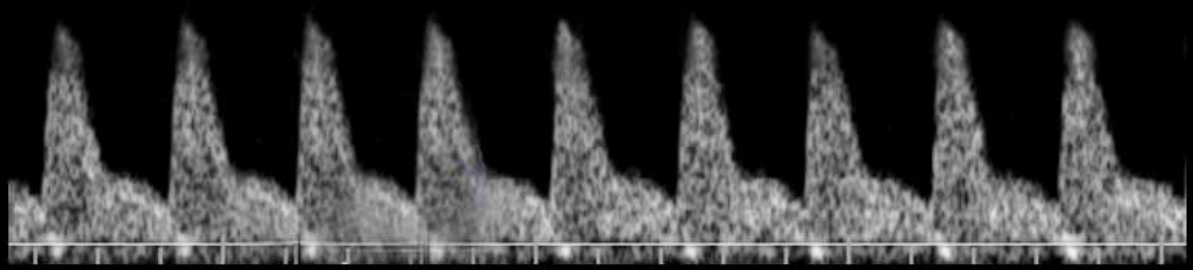


Normal oxygenation

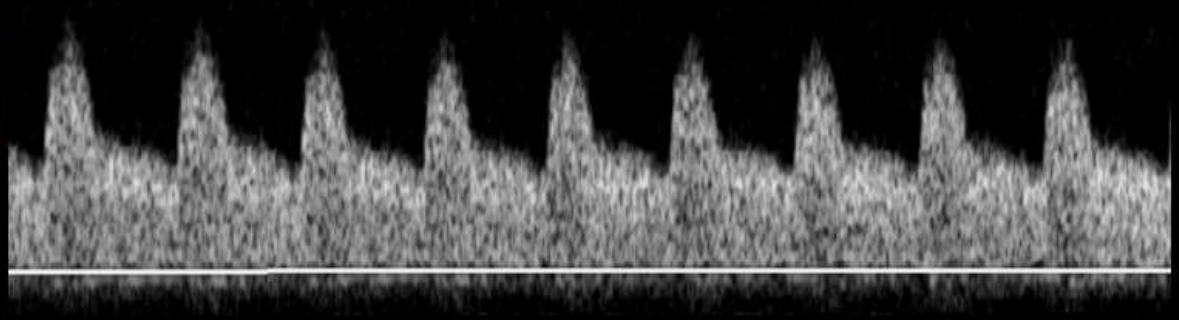
[normal waveform]



[mild vasodilation]



[marked vasodilation]



hypoxia

OBSTETRIC RISK FACTORS

Bleeding in Pregnancy

- Vaginal bleeding during pregnancy is often due to placenta **previa or placental abruption**. (strongest risk factors)
- Depending on severity, placental abruption can lead to catastrophic maternal/fetal outcomes due to acute blood loss and decreased fetal blood flow.

- placental abruption is usually associated with antecedent maternal hypertension, substance abuse, uterine overdistention, trauma, or PROM.
- umbilical cord prolapse.

- Maternal age (older than 35 years) is associated
- with an increased risk of stillbirth.

- Obesity is an important risk factor for perinatal asphyxia.
- In a Swedish cohort of term infants, the risk of an Apgar score
- of 0 to 3 at 5 minutes increased with increasing maternal body mass index (BMI) to a 3-fold increase.

- with morbid obesity, with **a BMI greater than 40** (OR 3.41, CI 1.91–6.09).
- The mechanism for asphyxial events is unclear. Theories include increased inflammation due to adipokines, insulin resistance, and fatty acids, which may lead to lipotoxicity resulting in oxidative stress and endothelial dysfunction in maternal and placental tissues.

Intra-Amniotic Infection

Intra-amniotic infection (IAI) or chorioamnionitis refers to maternal/fetal infection duringlabor usually caused by ascending microbial invasion from the vagina.

- Symptom include maternal fever, tachycardia, elevated white blood cell count,
- foul-smelling amniotic fluid, uterine tenderness, or fetal tachycardia.
- Two or more criteria are required for the diagnosis of IAI.

- Intrapartum **fever** alone and **IAI increase the** risk of neonatal encephalopathy by **3.1** fold and **5.4 fold**, respectively.

- both intrapartum fever alone and IAI increase the risk of CP

Delivery Complications also associated with an increased risk of asphyxia

- shoulder dystocia ,abdominal wall dystocia,
- difficult or (prolonged) deliveries
- This risk is primarily due to a lack of fetal oxygenation
- during uterine contractions, cord compression, and maternal expulsive efforts proximal to delivery.

- Importantly, prolonged second stage of labor without dystocia at delivery has not been associated with adverse neonatal outcomes.

- The second stage of labor should not be terminated for duration alone.

MEDICAL History Taking

Three Tiered System for Classifying FHR Tracings

Category I	Category II	Category III
All of the Following: ❖ Baseline 110-160 ❖ Variability: Moderate ❖ Late or Variable Decels: Absent ❖ Early Decelerations: Present or Absent ❖ Accelerations: Present or Absent	**Examples:** ❖ Moderate Variability with recurrent late or variable decelerations ❖ Minimal Variability with recurrent variable decelerations ❖ Absent Variability WITHOUT recurrent decelerations ❖ Bradycardia with Moderate Variability ❖ Prolonged Decelerations	**Either:** ❖ Absent Variability with: ❖ Recurrent late decels OR ❖ Recurrent variable decels OR ❖ Bradycardia ❖ OR: ❖ Sinusoidal Pattern

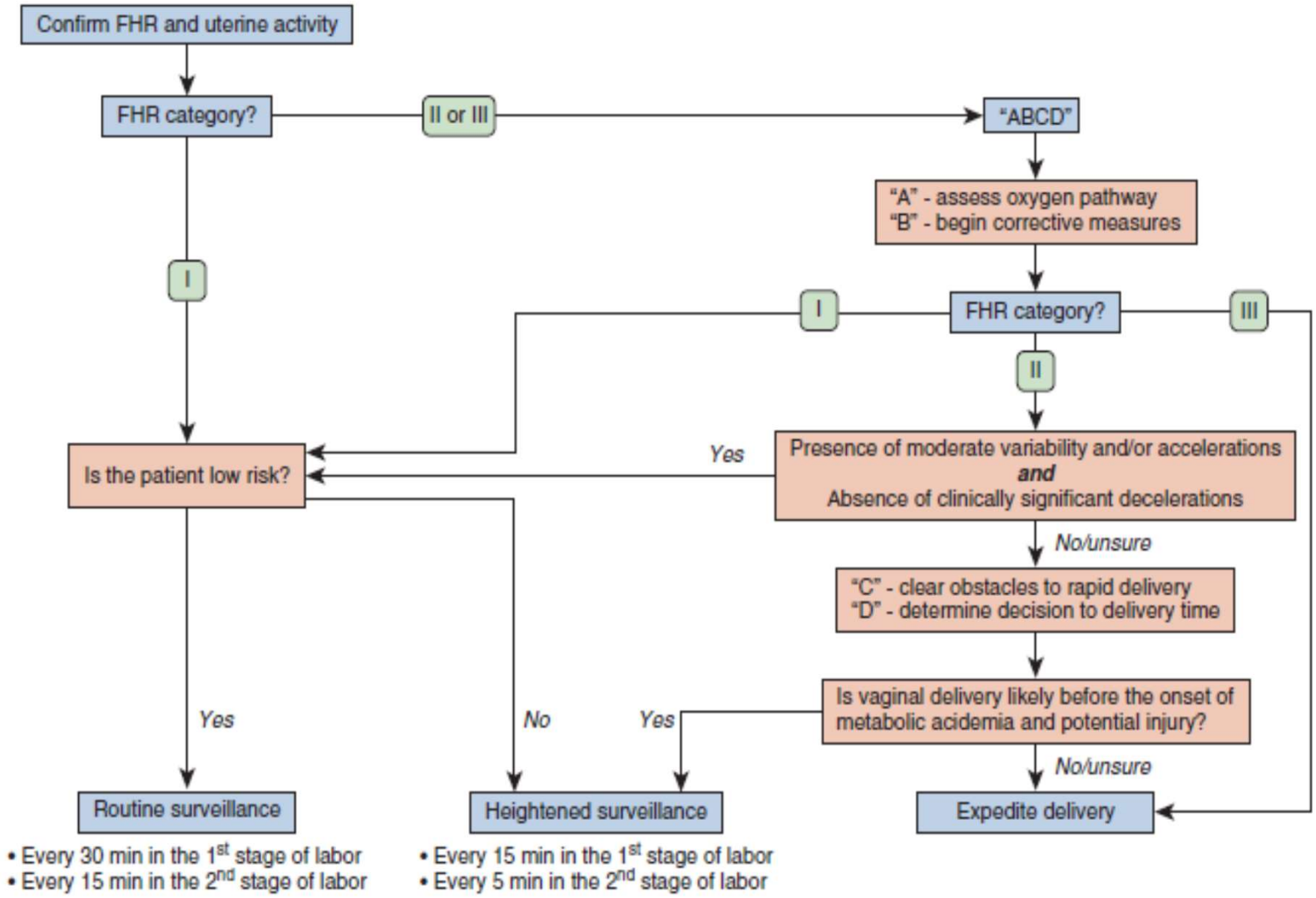
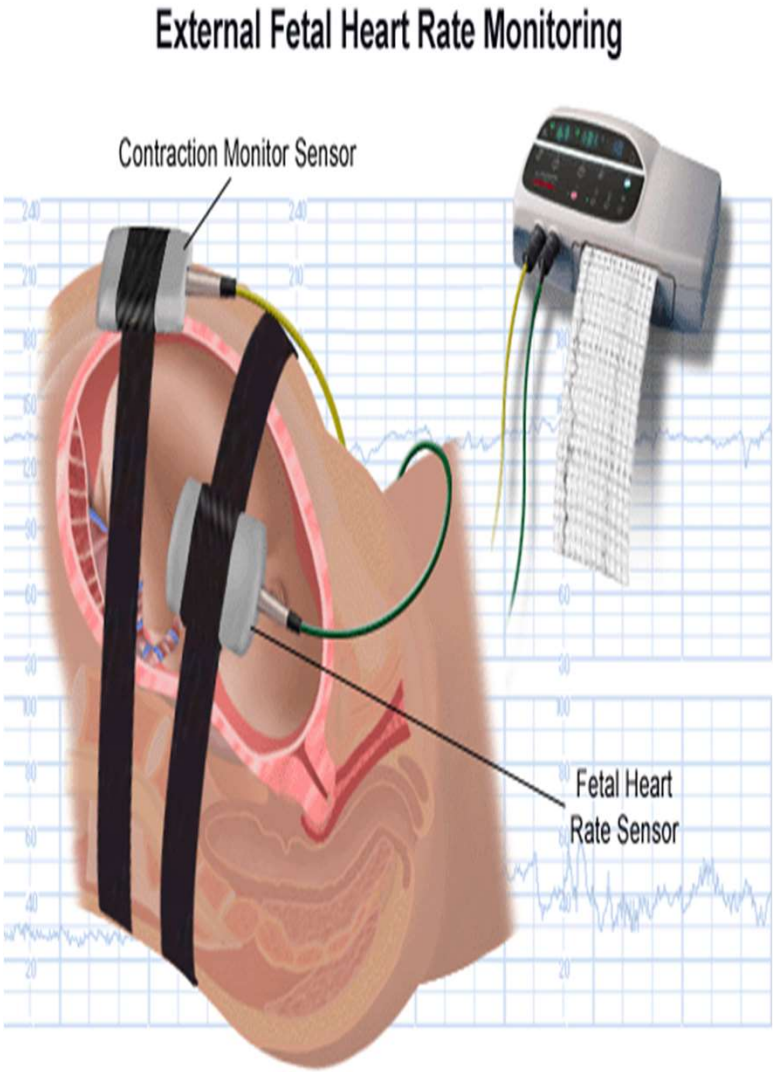


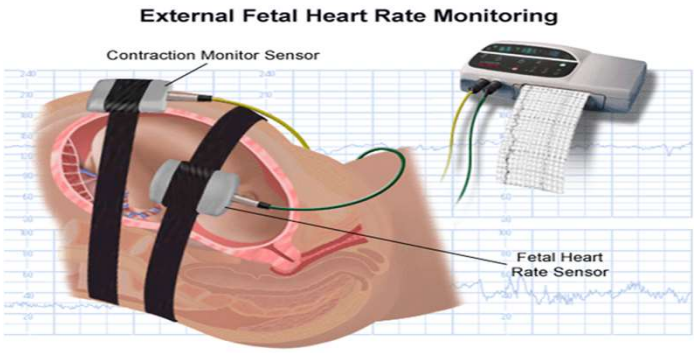
FIG 15-22 Intrapartum fetal heart rate (FHR) management decision model.

INTRAPARTUM SCREENING AND DIAGNOSIS

- Intrapartum electronic fetal heart monitoring (EFM) during labor was designed to prevent perinatal asphyxia.

- Unfortunately, despite the use of EFM, CP rates have not decreased over the past 3 decades.





- A Cochrane review of 13
- trials assessing the effectiveness of continuous EFM during labor showed that the
- intervention was associated with a reduced risk of neonatal seizures ,
- but no difference
- in neonatal mortality or CP.
- Furthermore, EFM significantly increased the rate of cesarean deliveries and operative vaginal deliveries.

SOGC CLINICAL PRACTICE GUIDELINE 2007

- **Recommendation :**

- **Admission Fetal Heart Test??**
- 1. Admission fetal heart tracings are not recommended for healthy women at term in labour in the absence of risk factors for adverse perinatal outcome, as there is no evident benefit. (I-A)

- 2. Admission fetal heart tracings are recommended for women with risk factors for adverse perinatal outcome. (III-B)

- **Support During Active Labour**
- 1. Women in active labour should receive continuous close support from an appropriately trained person. (I-A)

- **Professional One-to One Care**

- **And**

- **Intrapartum Fetal Surveillance**
- 1. Intensive fetal surveillance by intermittent auscultation or
- electronic fetal monitoring requires the continuous presence of
- nursing or midwifery staff.

- **Intermittent Auscultation in Labour:**

- 1. Intrapartum fetal surveillance for healthy term women in
- spontaneous labour in the absence of risk factors for adverse
- perinatal outcome.

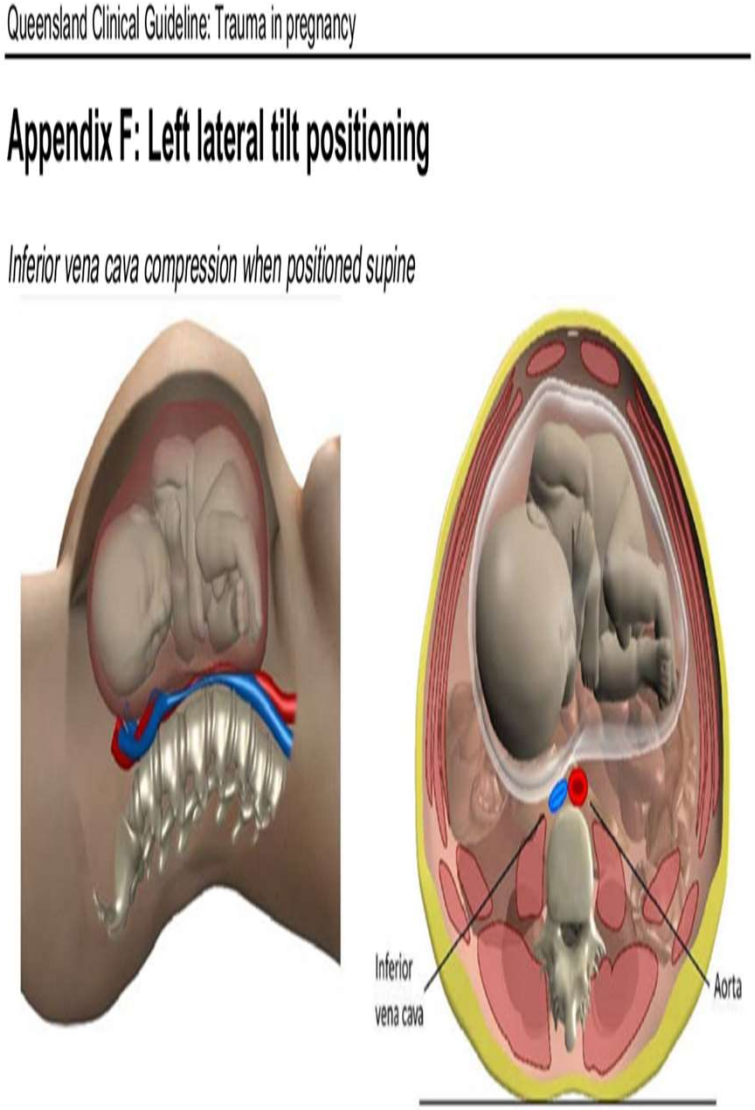
- Intermittent auscultation following an established protocol of
- surveillance and response is the recommended method of fetal
- surveillance; compared with electronic fetal monitoring, it has
- lower intervention rates without evidence of compromising
- neonatal outcome. (I-B)

Recommendation :
Intrapartum Fetal Surveillance for
Women With Risk Factors for Adverse Perinatal Outcome

- **1.** EFM is recommended for pregnancies at risk of adverse perinatal outcome. (II-A)
- **2.** Normal electronic fetal monitoring tracings during the first stage of labour.

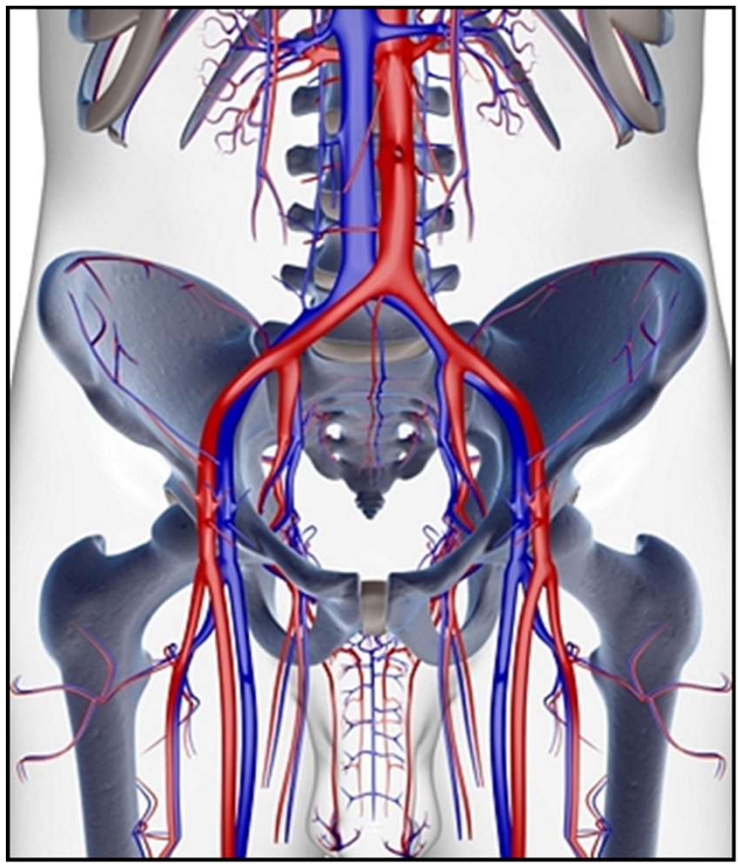
- When a normal tracing is identified, it may be appropriate to
- interrupt the electronic fetal monitoring tracing for up to 30 minutes
- to facilitate periods of **ambulation, bathing, or position change**,
- providing that (1) the maternal-fetal condition is stable and (2) if
- oxytocin is being administered, the infusion rate is not increased. (III-B)

- **In a healthy obstetric**
- **patient, the most common cause of reduced cardiac output is**
- **reduced preload resulting from hypovolemia or compression**
- **of the inferior vena cava by the gravid uterus.**



Alternative positions

- Supine/lithotomy: uterus compresses vessels → reduced uterine blood flow
- 1st stage labor: left side, standing, walking
- 2nd stage labor: squatting, sitting, hands & knees



- Expeditious delivery can be life saving for the fetus and, depending on the circumstance,
- may decrease the risk of perinatal asphyxia.

- For patients who are remote from delivery,
- cesarean delivery can be urgently performed.
- ??
- For patients proximal to delivery (complete cervical dilation),
- operative vaginal delivery should be considered and can decrease exposure to intrauterine insults.

Category I
All of the following criteria must be present. Tracings meeting these criteria are predictive of normal fetal acid-base balance at the time of observation.
Baseline rate: 110 to 160 bpm
Moderate baseline FHR variability
No late or variable decelerations
Early decelerations may be present or absent
Accelerations may be present or absent

category I

- normal
- absence of fetal metabolic acidemia
- No intervention

Category III

Category III tracings are predictive of abnormal fetal acid-base status at the time of observation. Prompt evaluation is indicated and most parturients will require expeditious intervention, such as provision of supplemental oxygen, change in position, treatment of hypotension, and discontinuation of any uterotonic drugs being administered. Category III tracings include either (1) or (2) below.

(1) Absent baseline FHR variability and any of the following:

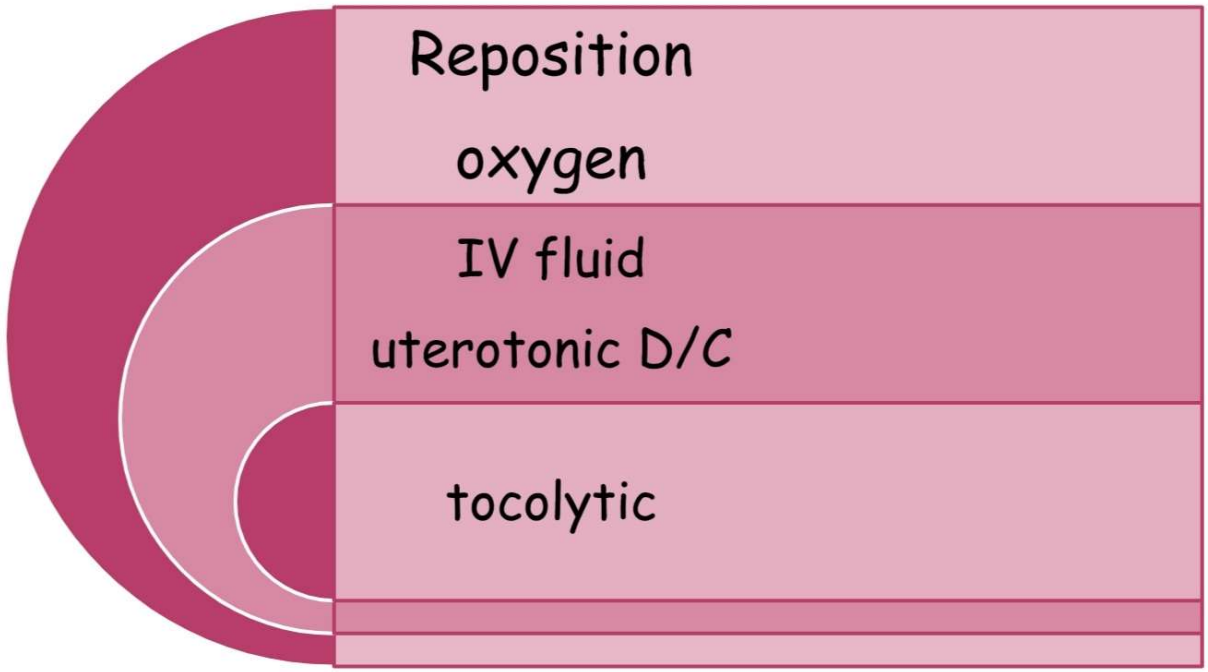
- Recurrent late decelerations
- Recurrent variable decelerations
- Bradycardia

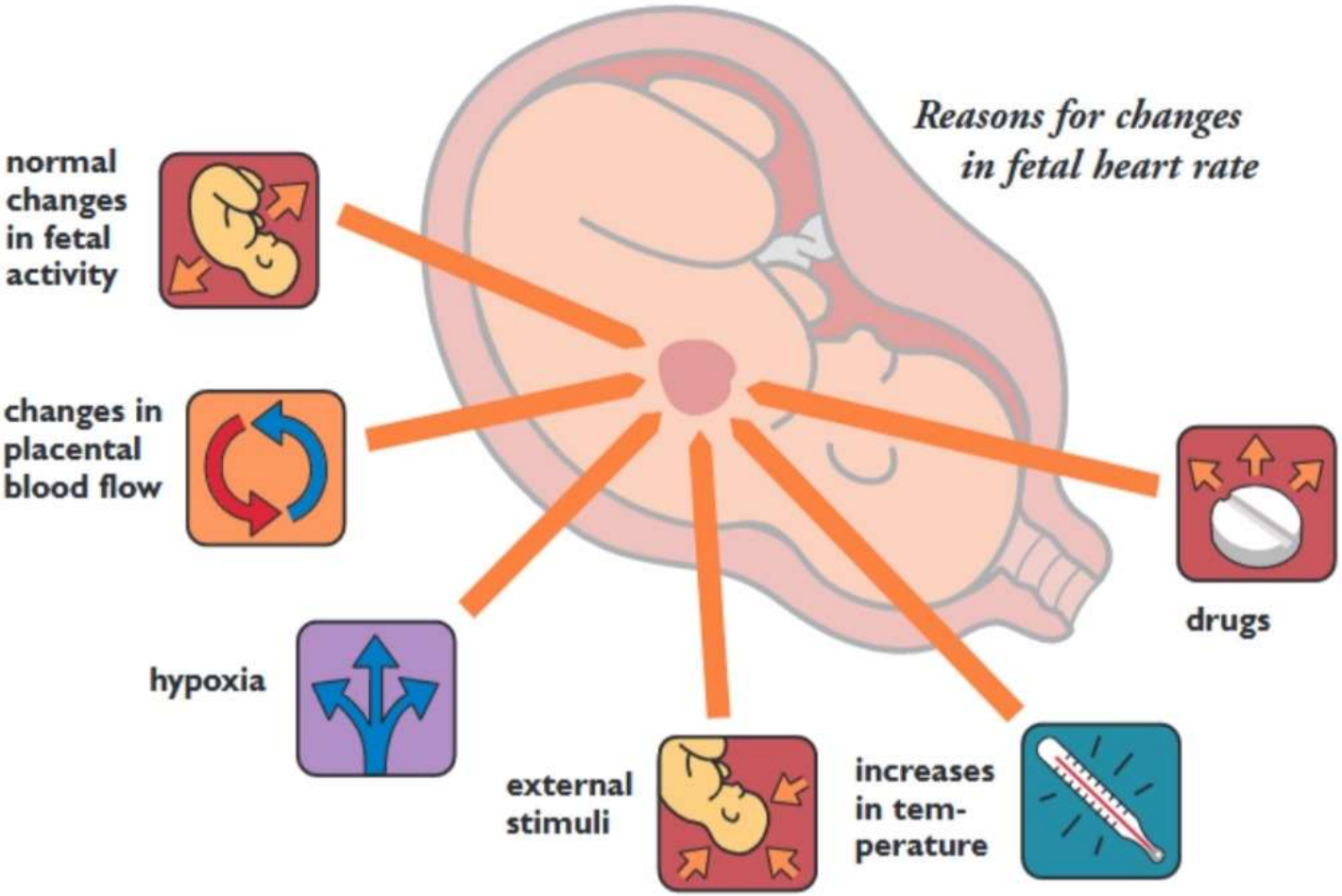
(2) Sinusoidal pattern

category II

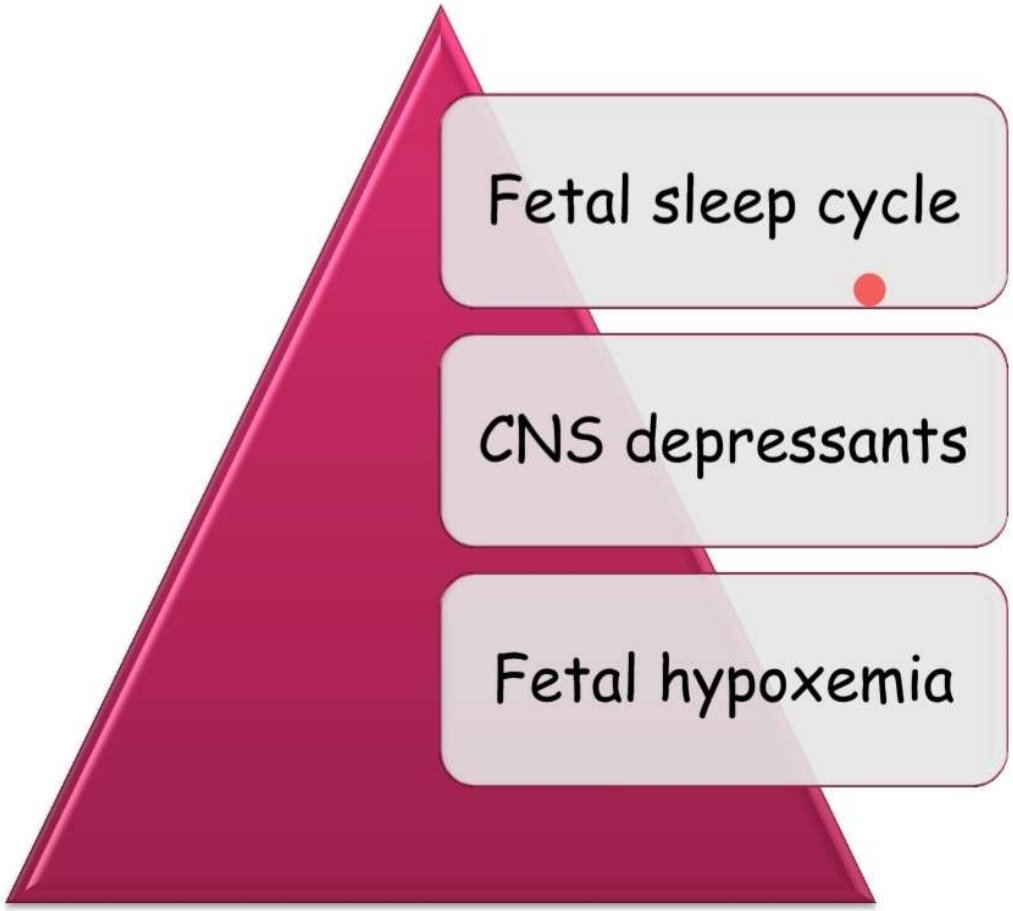
- **Explanation:** Category 2 tracings are not associated with fetal acidosis but do sometimes require intervention to limit their progression to something worse.
- Category 2 tracings are considered indeterminate. Interventions should be directed toward the **observed abnormality** (e.g., late or variable decelerations, tachycardia, decreased variability.)

In utero resuscitation




Reasons for changes in fetal heart rate
normal changes in fetal activity
changes in placental blood flow
hypoxia
external stimuli
increases in tem-perature
drugs

Loss of variability without decelerations



Loss of variability without decelerations

- congenital or acquired anomalies of the CNS
- congenital or acquired anomalies of the heart
- to very preterm gestation

Late decelerations without loss of variability or accelerations

- CNS response
- myocardial depression

Fetal tachycardia

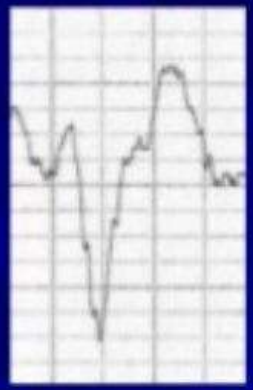
- Maternal-fetal infection
- Medications
- Maternal hyperthyroidism
- Placental abruption
- Fetal hypoxia

concerning characteristics of variable decelerations

- lasting more than 60 seconds
- reduced baseline variability within the deceleration
- failure to return to baseline
- biphasic (W) shape
- no shouldering

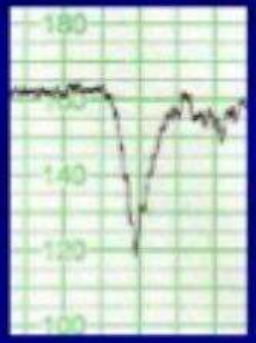
Types of variable decelerations

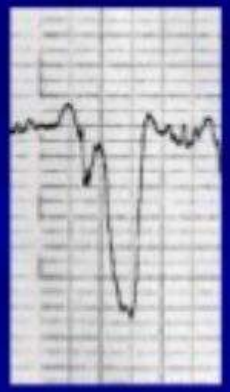
Normal shouldering, usually with variability



Overshoot shouldering +/- variability (pre-pathological)

Loss of shouldering (pathological)

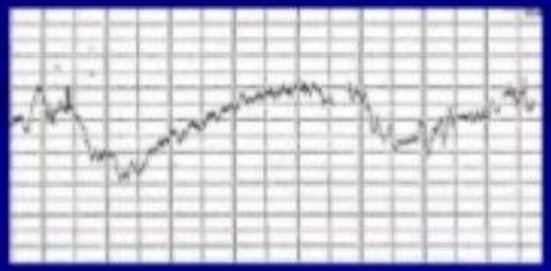


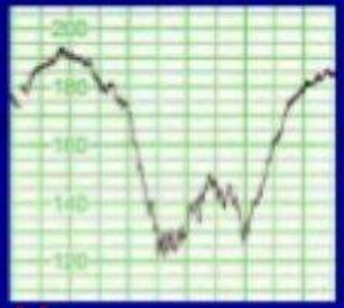


Smoothing at trough (pathological)

Late recovery *

(pathological)



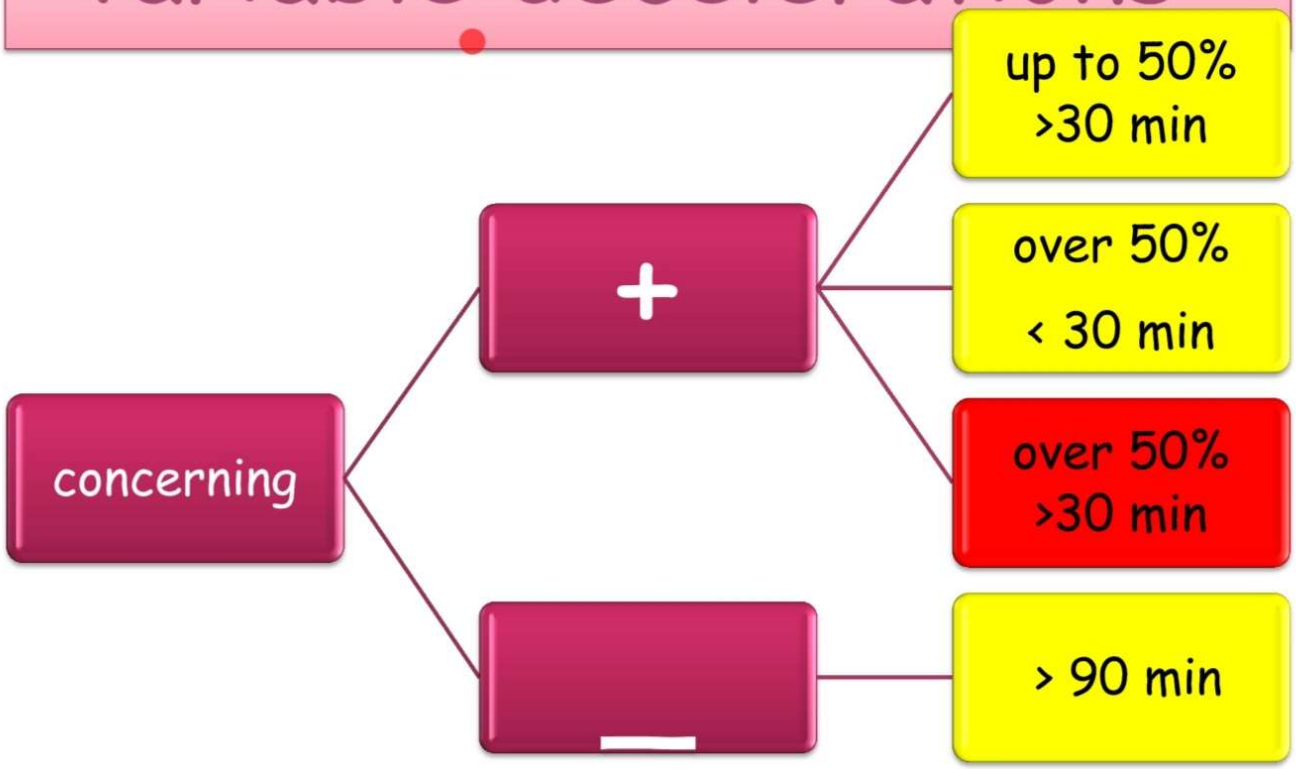


Biphasic deceleration *

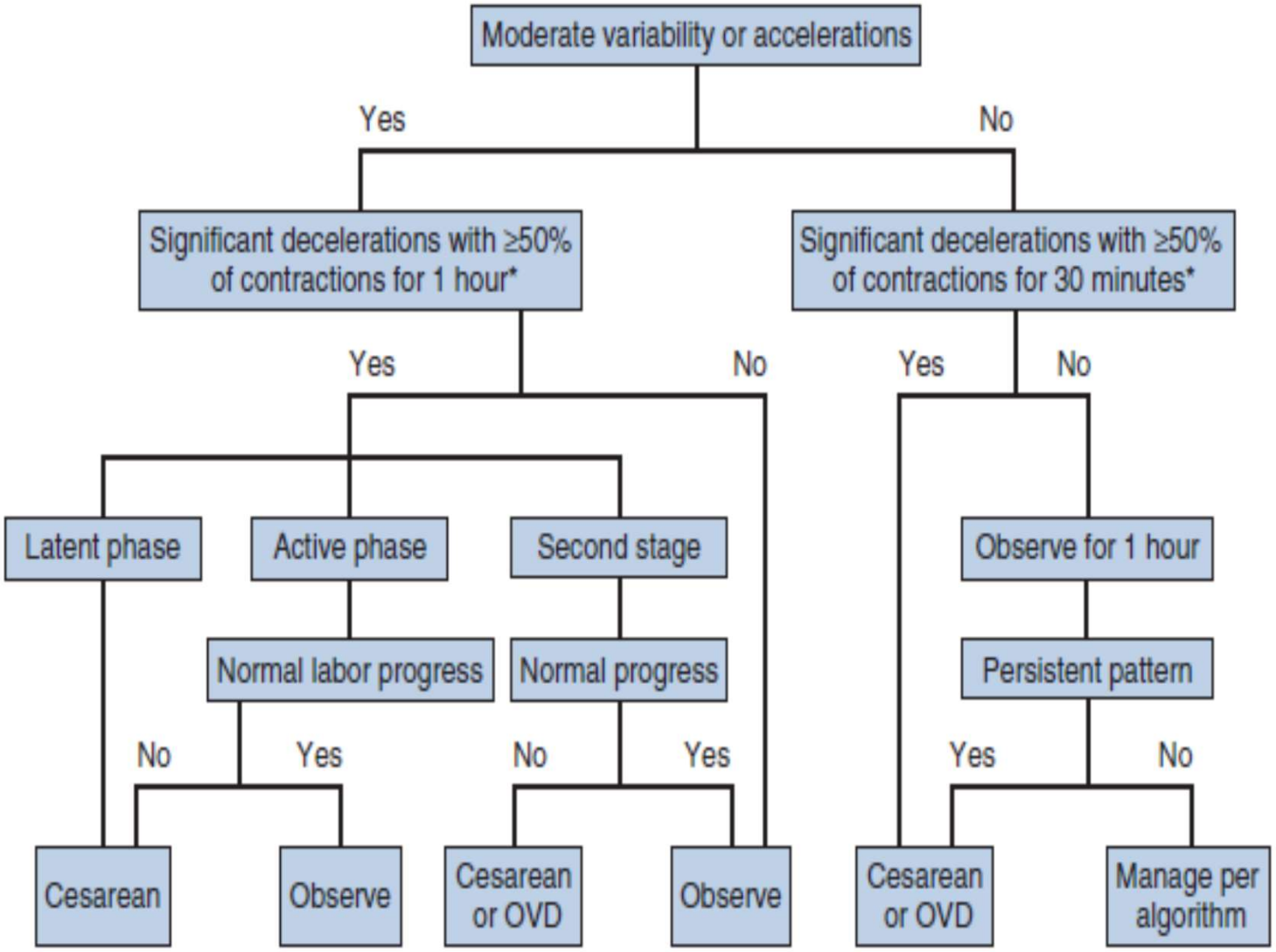
(pathological)

* = also Labour Variable

variable decelerations



Algorithm for management of category II fetal heart rate tracings



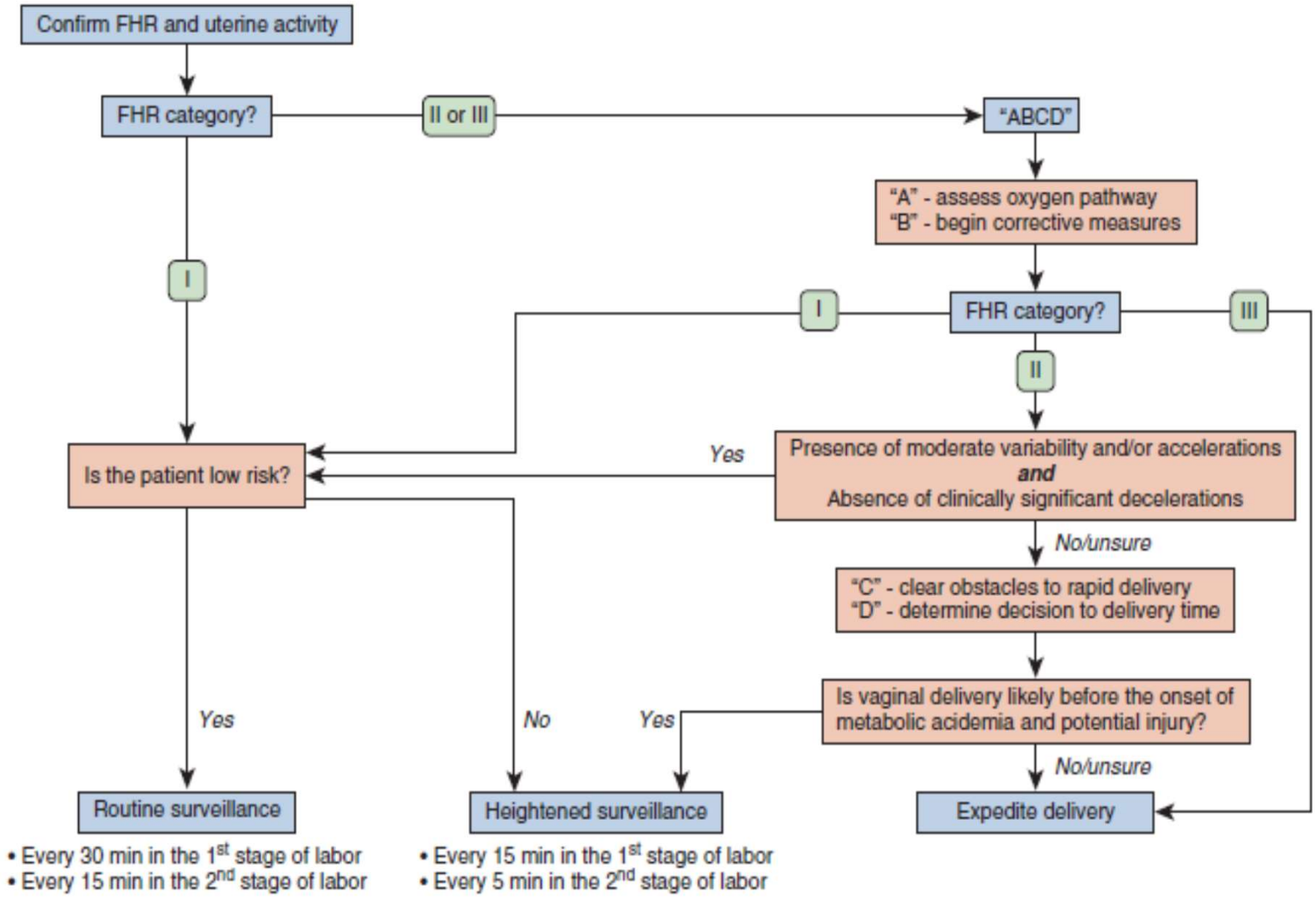
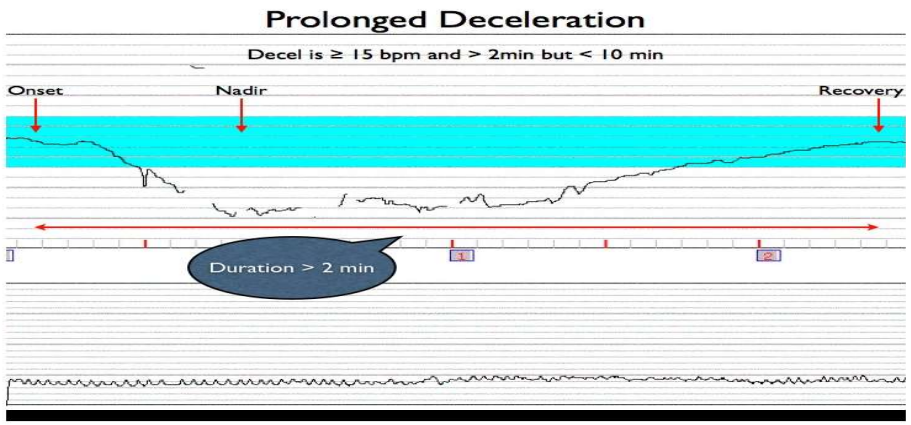


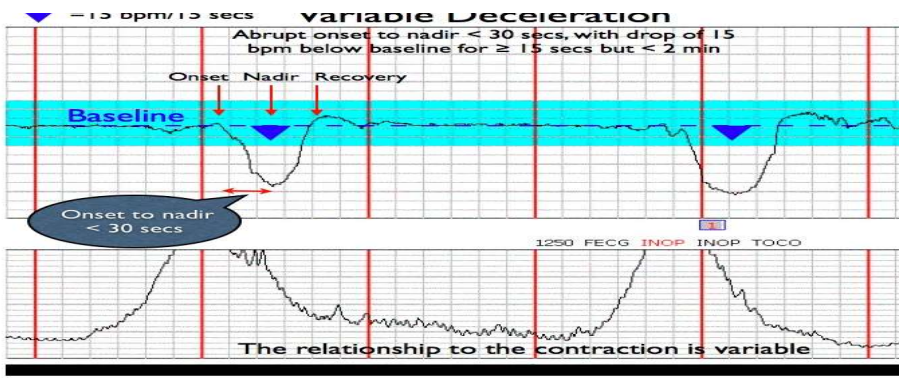
FIG 15-22 Intrapartum fetal heart rate (FHR) management decision model.

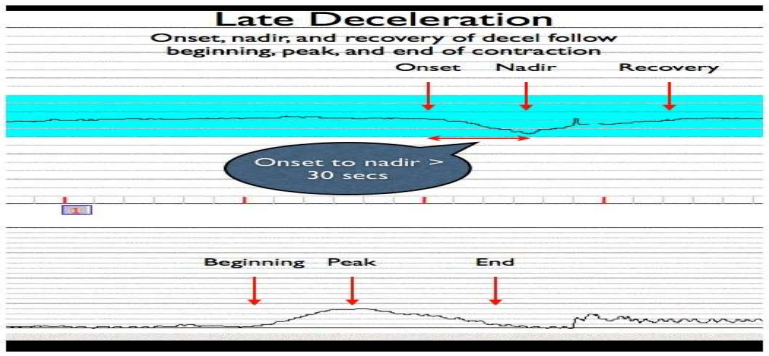
PREDICTION

- **One study determined**
- **that 4 EFM features best predicated fetal acidemia including:**
- **Repetitive** (prolonged
- decelerations,
- variable decelerations,
- late decelerations, baseline tachycardia).

- http://www.ob-efm.com







category II

- **Summary of actions for non-reassuring fetal status**

1. Repositioning or lateral positioning of mother
2. Reversal of hypotension (elevate legs or Trendelenberg, ephedrine, fluids)
3. Cessation of oxytocics
4. Administration of oxygen
5. Decrease frequency of pushing
6. Re-evaluation of mother by provider
7. Urgent or emergent delivery

Fetal Scalp Stimulation

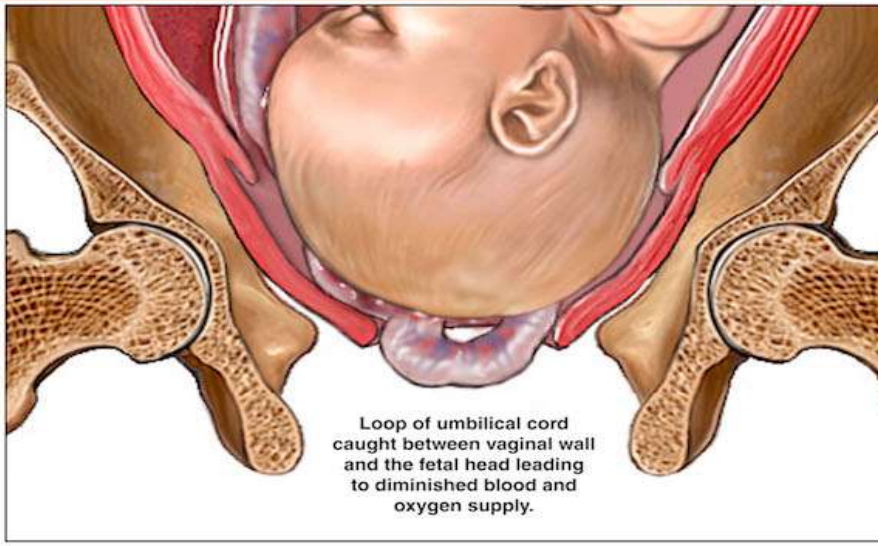
- Gently stroke or massage fetal scalp fo 15 sec. during a vaginal examination
- Assess fetal tracing for signs of accelerations of 15 bpm for 15 sec.
- This is a sign of fetal well-being

A positive fetal scalp stimulation (acceleration) of 15 beats per minute for 15 seconds or more) reliably predicts a fetal pH of at least 7.20 at that moment.

If there is concern for preterm birth

- corticosteroids for fetal lung maturity, tocolytic medications to delay labor
- **magnesium sulfate for fetal neuroprotection**
- should be considered, depending on the clinical situation.
- Intrapartum resuscitative measures may effectively improve category II to I tracings.

- Umbilical cord prolapse:



- is most common after rupture
- of membranes with the fetus
- in a non cephalic presentation.

- Having a well-practiced, standardized, emergency response (often termed obstetric code) for a delivery unit,
- enables and pediatric teams.

- Hospital protocols can aid in standardizing
- safe care for all mothers in these high-risk situations.

Our ability to predict intrapartum asphyxia remains poor

Box 1
Strategies to reduce the risk of perinatal asphyxia

Antepartum

1. Screen for high-risk pregnancy conditions
2. Monitor with serial ultrasound assessments, including Doppler velocimetry if indicated
3. Antenatal fetal testing
4. Consider fetal movement counting

Intrapartum

1. Safe labor conditions, including protocols for trial of labor after cesarean
2. Electronic fetal monitoring
3. Intrauterine resuscitation
4. Fetal scalp stimulation
5. Operative delivery

Postpartum

1. Umbilical cord blood gas ± lactate
2. Placental pathology examination

- A pregnant 40 old years
- G4P1A2(C/S R)
- DM TYPE 2
- HTN in pervious pregnancy
- BMI=34

Reduce Neonatal Asphyxia

- **Improved Labor Care**
  - Improved quality of care
  - Respect for women and newborns

- Improved maternal care will result in improved newborn outcomes.
- Reduced maternal and newborn morbidity and mortality

Obstetrics/Midwifery is watchful waiting.

- Obstetrics –
  - From the Latin *obstare*: to stand by
  - To wait, to be vigilant, to be ready
- Midwife
  - *With women*
- **Watchful waiting**
  - For mother, for newborn
  - For complications
  - Interventions when proven and necessary

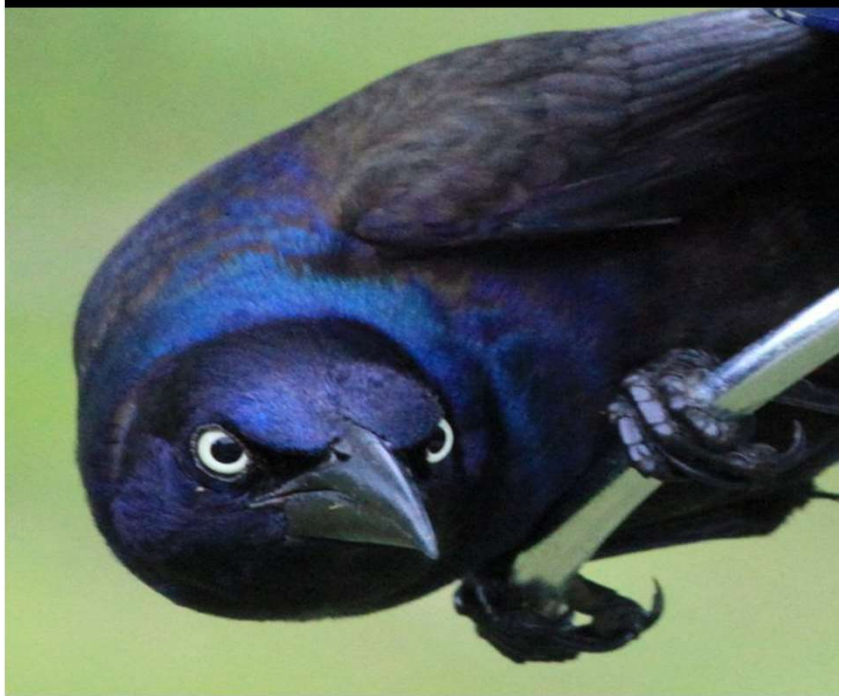
- **The word *obstetrics is derived from***

the Latin "**ob**" and "**stare**"

Which mean "**to stand by**"

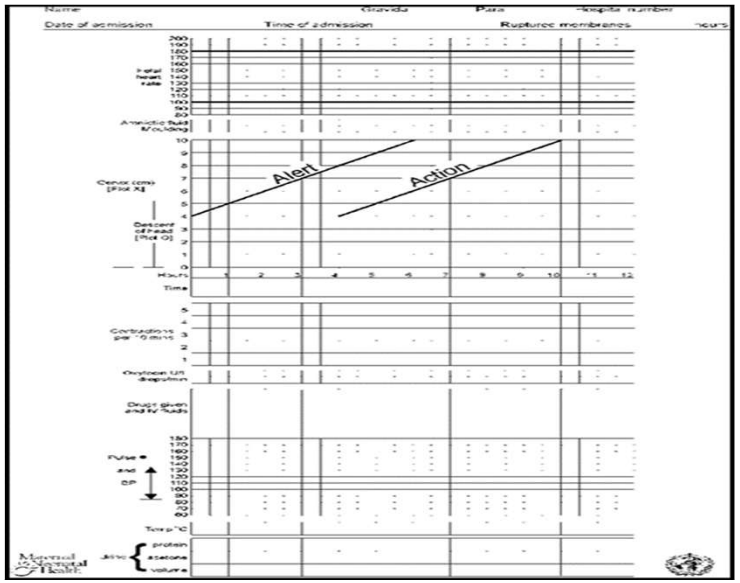
Standing by, or in front of, the laboring woman :

is intended to be the assistance to the pregnant woman during labor and delivery.



Prevention of future complains

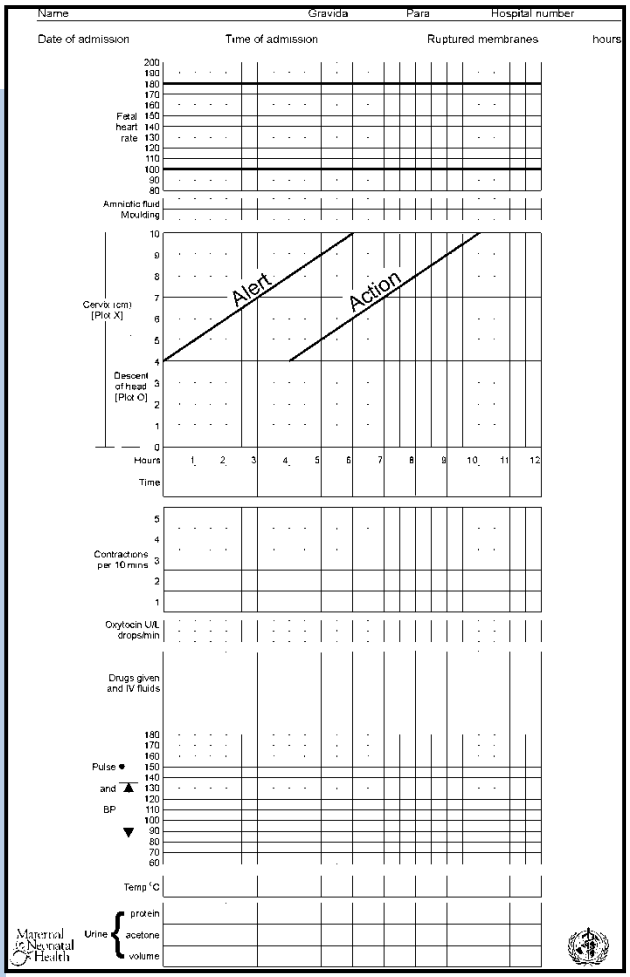
- Partograph:
  - Drugs provided
    - Including oxytocin
  - Amniotic fluid condition
  - Fetal heart rate
- Use of Partograph combines all needed documentation
- Ob and midwifes leaders should ensure use it.



- Good maternal and newborn care:
  - Use partograph for vigilant labor monitoring
  - Allow companionship during labor and birth
  - Ensure supportive 2nd stage management based on fetal and maternal condition
  - Avoid incorrect practices
  - Manage pre-eclampsia correctly
- Ensure skilled attendance at birth to prevent and manage asphyxia

Use of the Partograph

- How does the Partograph prevent asphyxia?
  - Identify abnormal heart rate patterns
  - Prevent prolonged labor
    - Prevents unnecessary augmentation using oxytocin
    - Prevents infection
  - Ensure timely Caesarean
  - Prevent hyperstimulation
  - Encourage greater vigilance

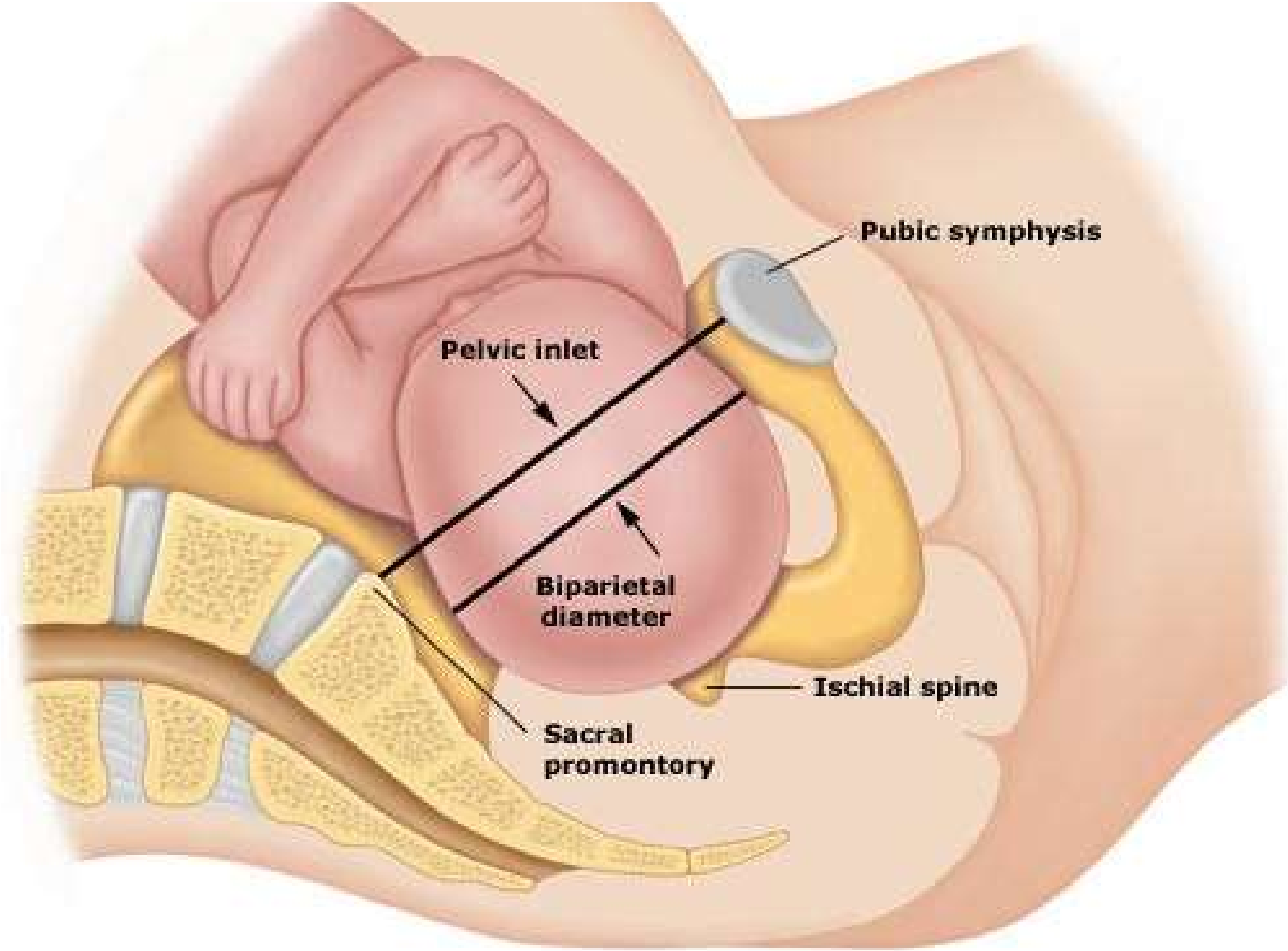


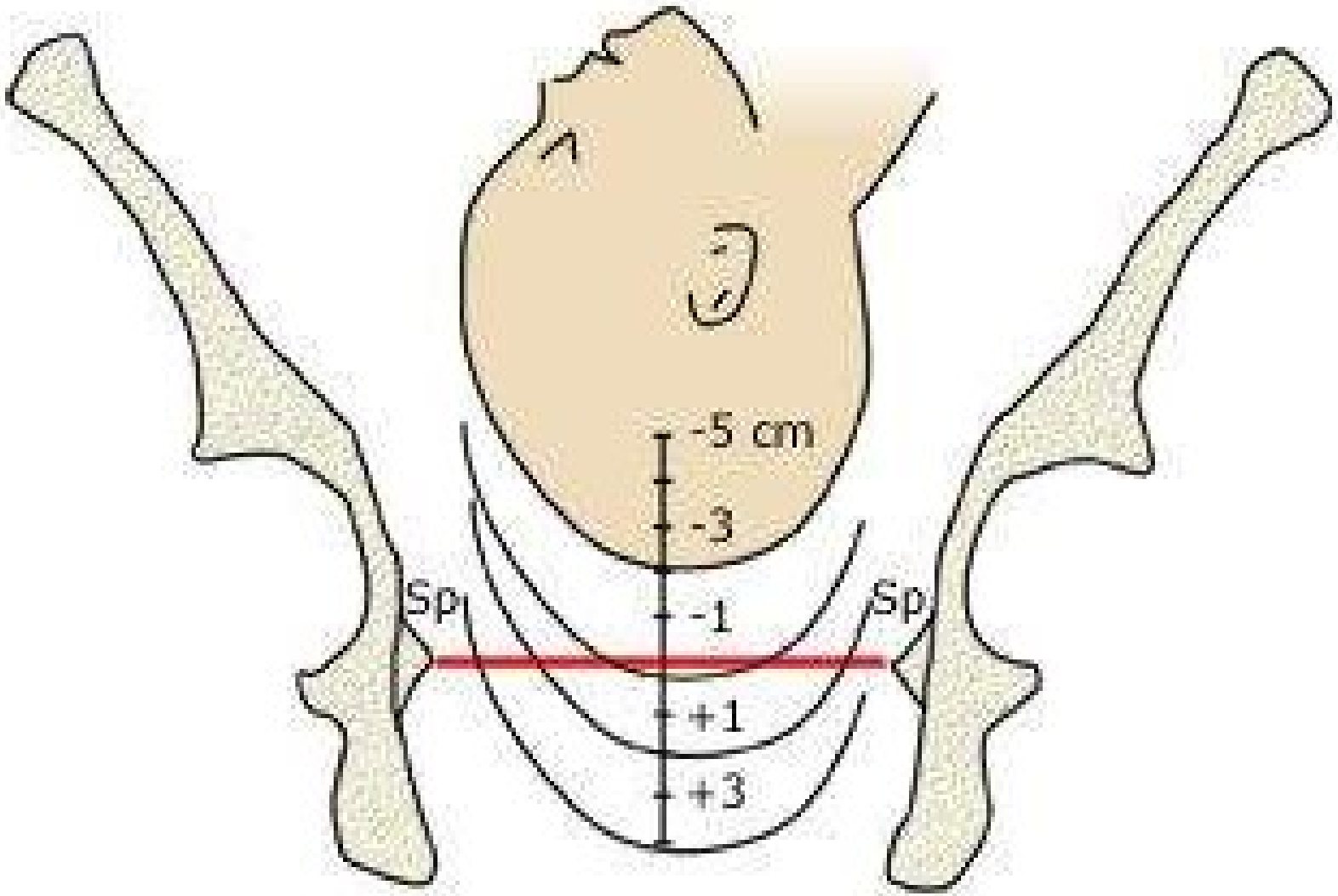
Intrapartum care to prevent asphyxia

Second stage labor management

- Continue monitoring of FHR
  - Check every 5 minutes
  - If fetal heart rate is normal,
  - no need to rush delivery.
- Do **NOT** urge the woman to immediately and continuously bear down
  - Allow some descent – makes pushing easier
  - **Rest in between pushes allows oxygenated blood to reach placenta/fetus.**

Do **NOT** push on fundus


Pubic symphysis
Pelvic inlet
Biparietal diameter
Ischial spine
Sacral promontory


-5 cm
-3
Sp
Sp
-1
+1
+3

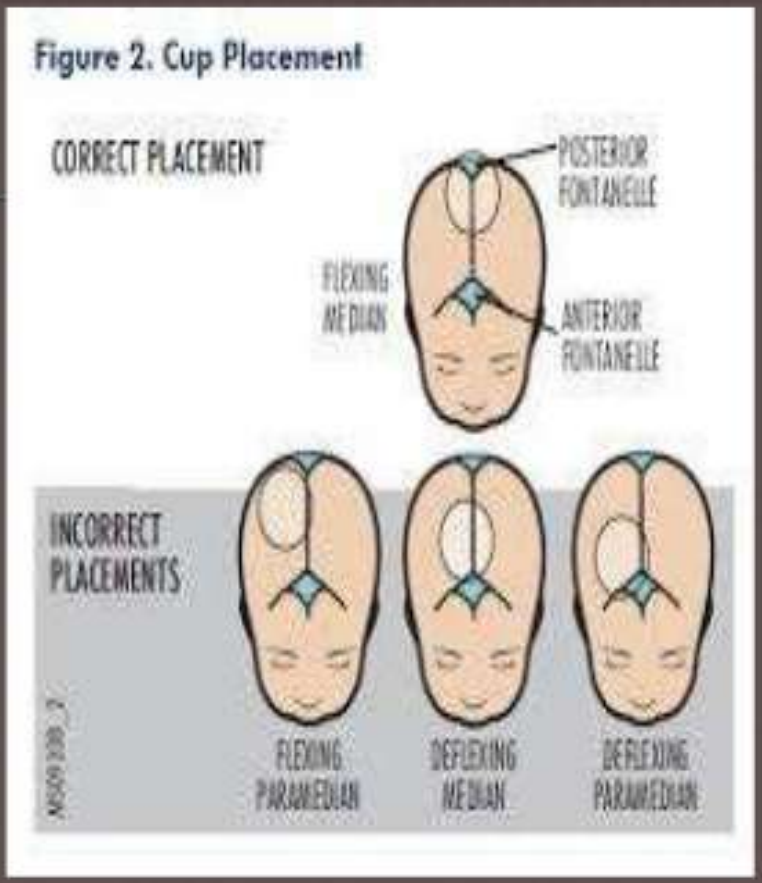


Figure 2. Cup Placement
CORRECT PLACEMENT
POSTERIOR FONTANELLE
FLEXING MEDIAN
ANTERIOR FONTANELLE
INCORRECT PLACEMENTS
FLEXING PARAMEDIAN
DEFLEXING MEDIAN
DEFLEXING PARAMEDIAN

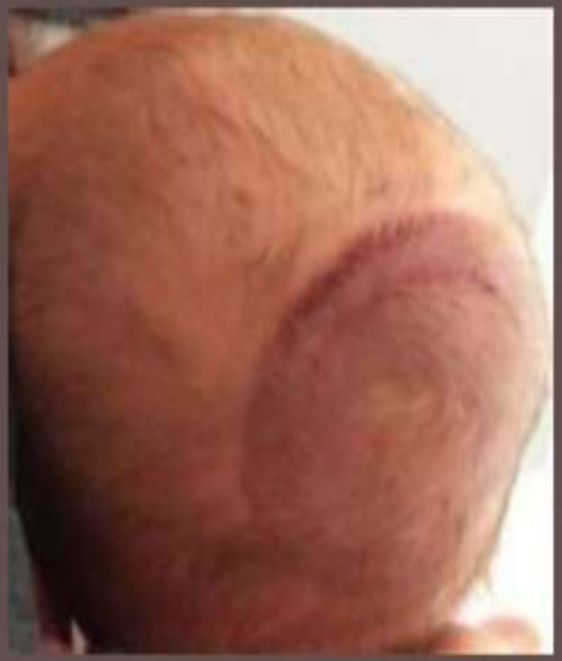
Complications

* Foetal:

>Cephalohaematoma.

>Scalp lacerations.

> Rarely, intracranial haemorrhage.



- Fetal CPR could be used to identify fetuses at high risk before labor and to help guide intrapartum management decisions.
- Neonatology consultation and appropriate facilities for CPR after birth.
- Appropriate consultation and facilities for mother CPR .

- TIMING??

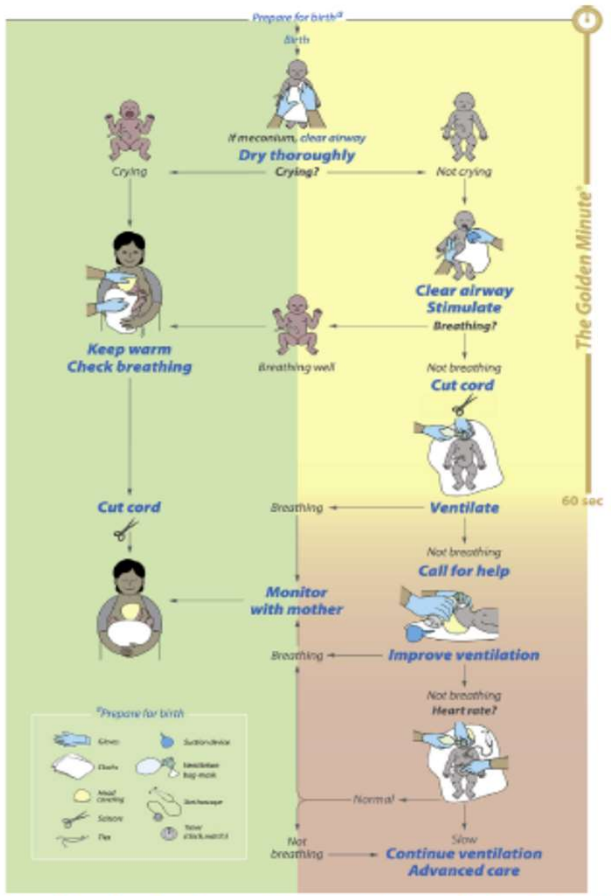


Fig. 3. Helping Babies Breathe Action Plan. (*Courtesy of* American Academy of Pediatrics Elk Grove, IL, USA. Available at: http://internationalresources.aap.org/; with permission

PHYSIOLOGY OF PLACENTAL TRANSFUSION

Fetal and Neonatal Blood Volume

Throughout pregnancy, the fetal-placental blood volume is approximately 110 to 115 mL/kg of fetal weight.[8] Waiting to clamp the cord results in a net transfer of blood from the placenta to the neonate.[8,9] The volume of the transfusion can be estimated by comparing birth weight,[10] by measurement of the residual placental blood volume (RPBV),[11,12] and by serial weights on individuals directly after birth.[13] In the Cochrane analysis in 2013, including 12 trials and 3139 infants, birth weight was ~100 g higher in the delayed CC group, compared with early CC.[2] In a study on serial measurements on individual neonates, weight after delayed CC increased by ~87 g.[13]

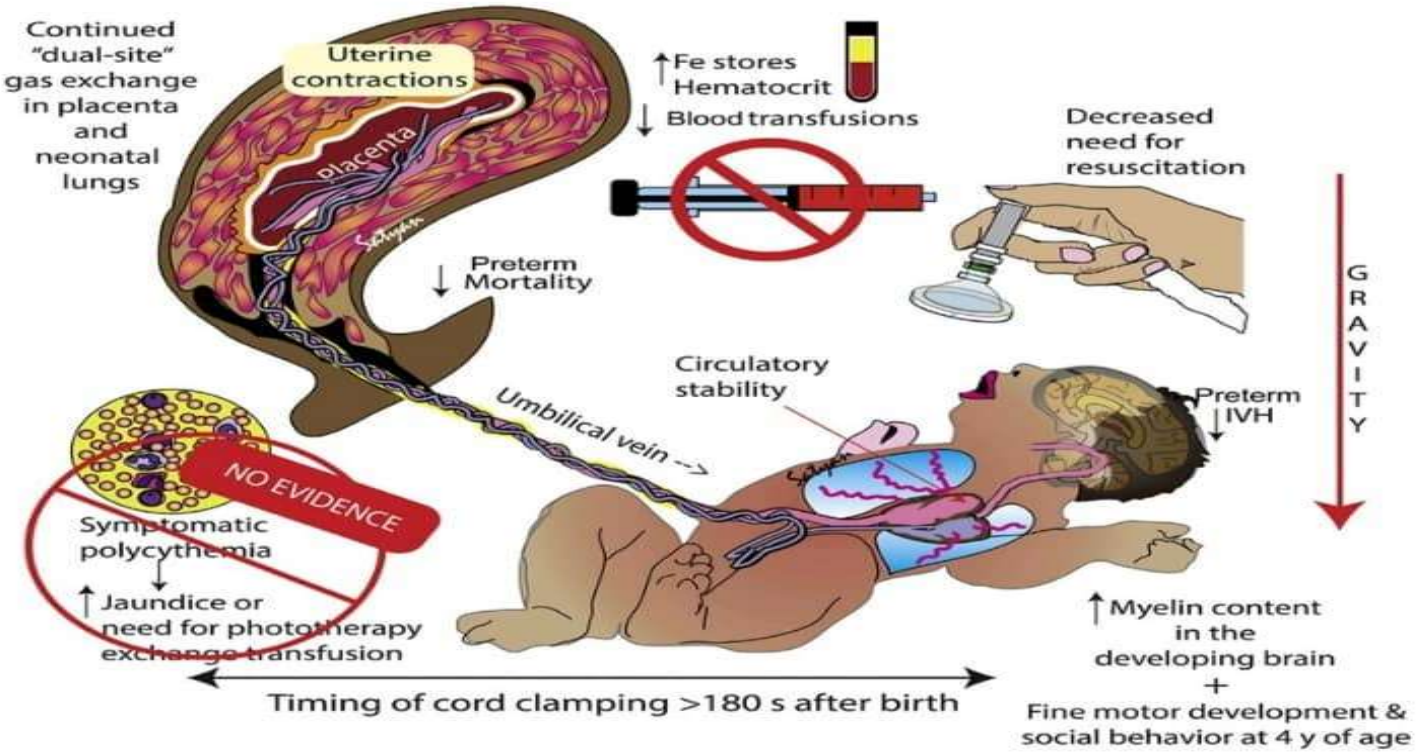


Fig. 1. Factors influencing placental transfusion with delayed CC. Timing of CC, uterine contractions, spontaneous respirations and gravity influence the magnitude of transfusion. Reported long-term benefits are shown. IVH, intraventricular hemorrhage. (*Courtesy of* Satyan Lakshminrusimha; with permission.)

POSTPARTUM SCREENING AND DIAGNOSIS

- Post partum examinations to consider after delivery include placental histologic examination and umbilical cord gas analysis with lactate.

- Placentas may be abnormal in women with placental insufficiency. Findings may include placental infarction, chorionic villitis, chronic chorioamnionitis, membrane necrosis, increased nucleatedred blood cells, increased syncytial knotting, increased villous maturation, fetal thrombosis, and distal villus hypoplasia.

- Certain placental lesions are also strongly associated with stillbirth, including : acute inflammation, retroplacental hematomas,
- and thrombotic lesions.

INDICATIONS FOR PLACENTAL PATHOLOGICAL EXAMINATION

insight into both ***acute and chronic*** *events.*

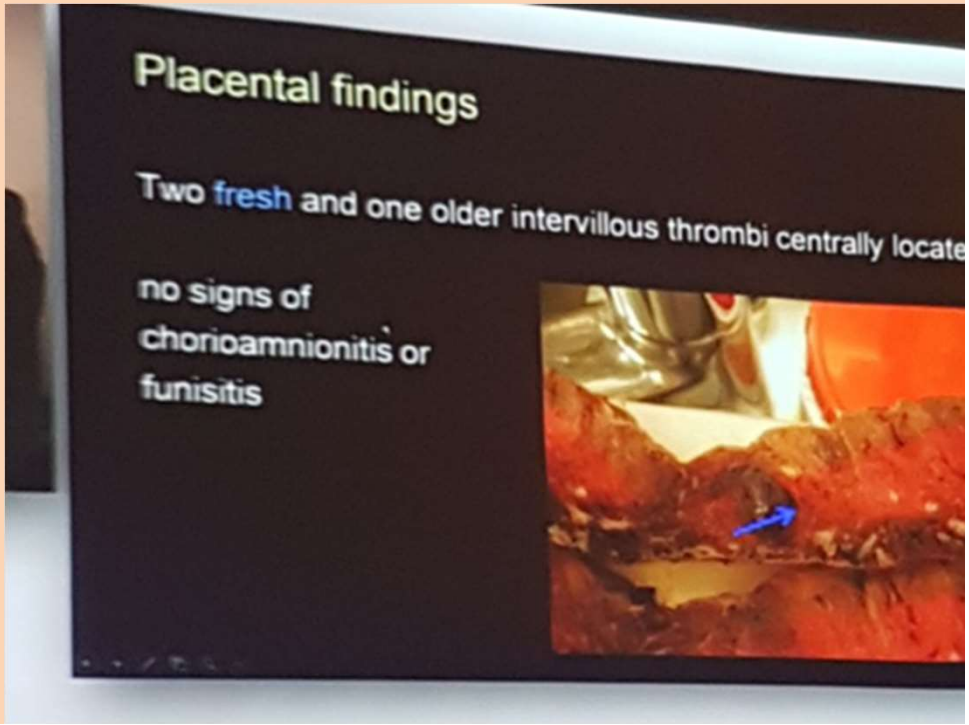
all placentas should have a ***minimal examination*** *:*

1-color,

2-length of umbilical cord,

3-number of cord vessels,

4-weight.



INDICATIONS FOR PLACENTAL PATHOLOGICAL EXAMINATION

- *Stillbirth (current or past)*
- *Neonatal resuscitation or (NICU) admission*
- *Preterm or postterm*
- *Multiple gestation*

Abnormal gross examination of the placenta

- *anomalies or hydrops*
- *SGA/LGA*
- *Any apgar score <7*

Obstetric complications/disorders chorioamnionitis, preterm birth, preeclampsia , cholestasis, fetal intolerance of labor, antepartum or postpartum hemorrhage, thick meconium,

severe oligohydramnios/polyhydramnios

Relevant maternal diseases

diabetes, obesity, hypertension,

tobacco/alcohol/illegal drug use,

thyroid disease, malignant neoplasm,fever/infection, uterine anomalies or scars

THE PLACENTAL PATHOLOGY REPORT

(1) providing information that helps

to explain complications that occurred during pregnancy,

(2) ***prompt immediate intervention*** *(eg, previously unrecognized infection),*

(3) ***predictive of future maternal or offspring problems***.

an example of the diagnostic section of a placental pathology report

- *Diagnosis:*
- *Immature placenta (215 g, ~10th percentile for reported gestational age of 28 weeks)*
- *Long hyper-coiled umbilical cord (cord length 75 cm; normally expect about 45 cm at 28 weeks)*
- ***Fetal thrombotic vasculopathy** (multiple large regions of avascular villi)*
- *Patchy chronic villitis*
- *Small placental infarct*

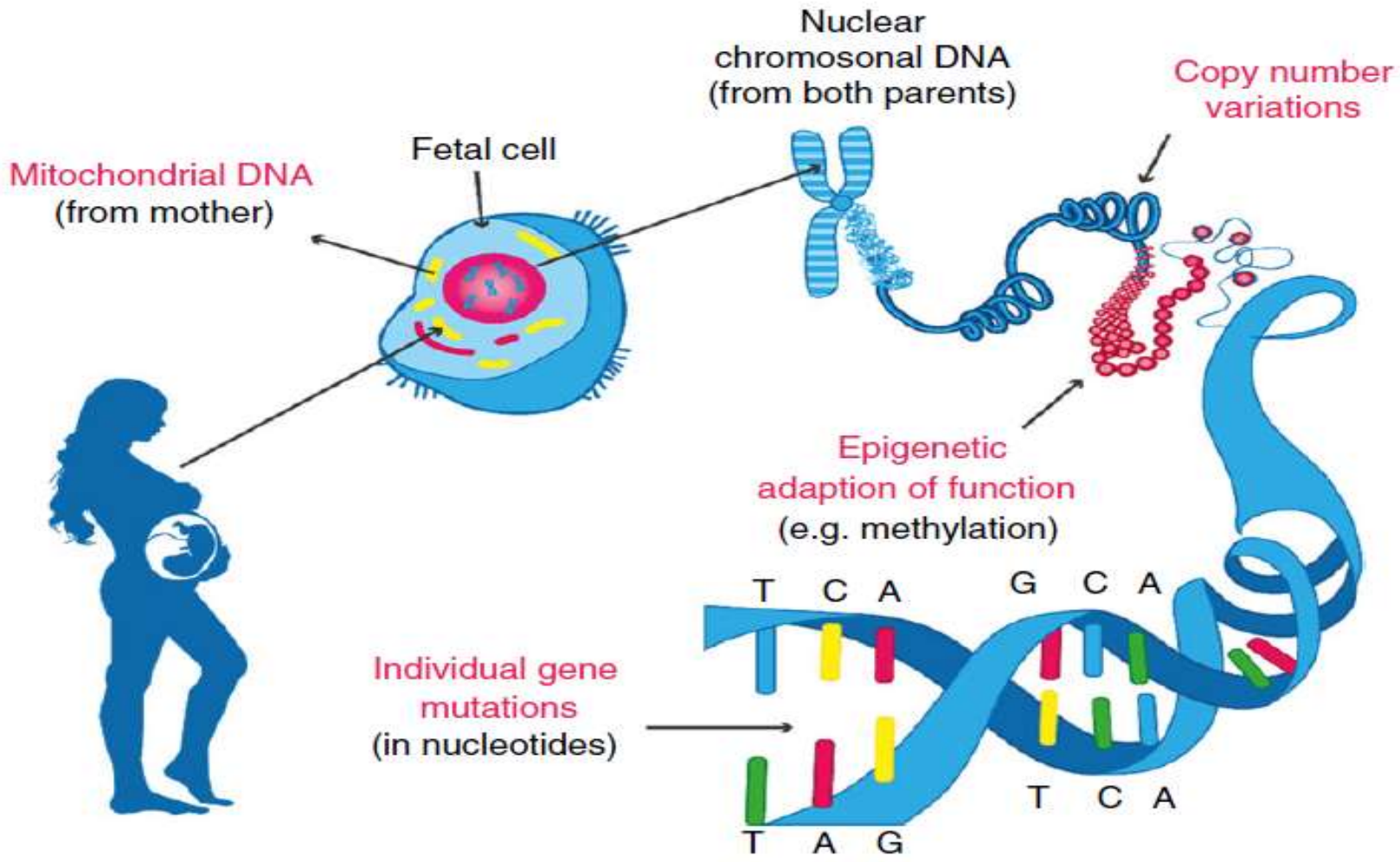
DEVELOPMENTAL MEDICINE & CHILD NEUROLOGY INVITED REVIEW

ec Editor's Choice

- Although prematurity and hypoxic-ischaemic injury are well-recognized contributors to the pathogenesis of cerebral palsy (CP), as many as **one-third of children with CP may lack traditional risk factors**.

- For many of these children, **a genetic basis to their condition is suspected**.

4 most common mutations cause CP



Looking at maternal & neonatal mortality and morbidity is a great way to look at a health system as a whole because it requires you to do a great many things

Saving women's & neonates lives is imperative but it is neither cheap nor simple

TAKE HOME MASSAGE

- SAFE MOTHERHOOD
- Respect the mother
- keep Privacy
- Be careful
- Be calm
- Be patient

زندگی صحنه یکتای هنرمندی ماست
هرکسی نغمه خود خواند و از صحنه رود
صحنه پیوسته بجاست
خرّم آن نغمه که مردم بسپارند به یاد