|  |
| --- |
| **Maternal physiological changes – Under hormonal control:** |

***Endocrine changes:***

Placental hormone production:

* Protein hormones:
	+ Human placental lactogen – produced by placenta; complimentary to HCG:
		- Prep. & initiation of lactation – effect blocked by placental oestrogen (pregnancy)
		- Mobilizes free fatty-acids → ↑ S-glucose
		- ↑ Central insulin synthesis BUT ↑ peripheral insulin resistance
		- Facilitates amino-acid transport to fetus
		- Blocks reduction of progesterone to less active metabolite i.e. maintains progesterone levels
	+ Human chorionic gonadotrophin – produced by trophoblast:
		- Stimulates corpus luteum to produce oestrogen & progesterone until placenta takes over this function
* Steroid hormones:
	+ Progesterone – produced first by C. luteum, then syncitiotrophoblast (placenta):
		- Myometrium relaxation
		- Ureteric smooth muscle relaxation → dilated ureter
		- Stomach relaxation → delayed gastric emptying
		- Ileum & colon relaxation → ↓ peristalsis & constipation
		- Fat-deposition regulation
		- Physiological hyperthermia → ↑ 0.5-1.0˚C
		- Suppressing effect on brain cells → tiredness, calmness & ↑ need for rest
		- Hyperventilation → ↓ PaCO2
		- Precursor for fetal corticosteroid production (only a small amount enters fetal circulation)
	+ Oestrogen – produce by placenta; oestriol:oestradiol:oestrone = 3:2:1:
		- Polymerization of acid-mucopolysaccharides → swelling & softening of body esp:
			* Cervix
			* Breasts
			* Fluid retention
* Prolactin – produced by endometrial dicidua (after dicidua has been prepared by progesterone:
	+ Regulates amniotic fluid osmolarity
	+ Involved in chorio-amniotic PG synthesis, which is important in the initiation of labour
	+ Stimulates type II pulmonary aloveoli → surfactant production → mature fetal lungs
	+ Partakes in lactation preparation
* Human chorionic thyrotrophin
* Relaxin – produced in corpus luteum & placenta:
	+ Relaxation of pelvic ligaments
	+ Plays part in ripening of the cervix & ROM

Other endocrine changes:

* ↑ Thyroid size & activity AND ↑ TBG → Euthyroid state (T4 may be ↑ in 20% of patients)
* Gradual ↑ ACTH (pituitary) → ↑ corticosteroids (adrenal gland) → ± Cushingoid state
* ↑ Oestrogen → ↑ Prolactin → prep. for lactation – effect blocked by progesterone (in pregnancy)

***Changes in reproductive system:***

* Ovaries & fallopian tubes: ↑ HCG → “persisting corpus luteus” → ↑ progesterone & ↑ oestrogen for ≈ 10wk
	+ Ovaries remain large (due to congestion) despite shrinking of C. luteum at 10wk (due to ↓ HCG)
	+ Fallopian tubes enlarged (due to slight hypertrophy – if any – & due to congestion)
* Uterus:
	+ Corpus: Hypertrophy & hyperplasia of myometrium until ≈ 20wk
	+ Isthmus: Widens from 5mm → 25mm until 12wk, then dilated by growing fetus → lower segment forms
	+ Lower segment: Formed by passive stretching; Placental implantation here can → APH &/or PPH (due to poor contractility & 160˚ arrangement of muscle fibres vs. 90˚ at fundus)
	+ Blood vessels lengthen → spiral arteries, which supply placenta (≈600ml/min)
* Vulva, vagina & pelvic floor:
	+ ↑ Oestrogen → lengthening & stretching of muscle & connective tissue, which → ↑ vascularity & ↑ congestion → thickened vaginal epithelium & wider & longer vagina
	+ ↑ Oestrogen → ↓ mucous secretion & ↑ epithelial exfoliation → thick lactobicillary discharge → ↓ pH (lactabillus converts glycogen – in secretions - into lactic acid) → ↓ bacterial infections

***General organ & physiological changes:***

* Haematological system:
	+ ↑ Plasma volume → dilution (& ↓ viscosity) & ↓ HcT
	+ ↑ Red cell volume
	+ MCHC, MCV & MCH stay ≈ same (pre-pregnant values)
	+ ↑ Leucocytes (progressive)
	+ ↑ ESR (due to ↑ fibrinogen & S-globulin)
	+ ↑ Blood coagulation (complex) – important in puerperal DVT formation.
		- ↑ Fibrinogen
		- ↑ Factor VII & X (progressive)
		- ↓ Factor XI & XIII
		- ± ↓ Platelets (still within normal limits)
		- BT, PT & PTT unaffected
* CVS – hyperdynamic circulation (due to increased peripheral circulation in uterus):
	+ ↑ Cardiac output (due to ↑ HR & ↑ stroke volume)
	+ ↓ Venous return if supine → ↓output & hypotension = “supine hypotension syndrome”
	+ ABP higher in upper arm if in lateral tilt position; higher if sitting
	+ ↓ Peripheral vascular resistance (due to smooth muscle relaxation of progesterone)
	+ ↑ Venous pressure → lower leg oedema; varicose veins; haemorrhoid aggravation
* Metabolic changes:
	+ ↑ Iron requirements → iron deficiency anaemia if not supplemented prophylactically
	+ ↓ Ca2+ & ↓Mg2+ (both slight)
	+ PO4- unaffected
	+ ↓ PaCO2 & slight respiratory alkalosis due to hyperventilation
	+ ↓ HCO3- (compensatory) → slight ↑ pH → ODC shifts to left → ↑ Hb’s affinity for O2
	+ ↑ S-protein (due to anabolic state during pregnancy)
	+ ↑ HPL (± ↑ oestroge/progesterone/cortisol) → “diabetogenic state” because it opposes insulin activity BUT ↓ s-glucose i.e. insulin resistance
	+ ↑ GFR & ↓tubular reabsorption → glucouria
	+ ↑ Plasma lipids in 2nd ½ of pregnancy
	+ ↓ Cholesterol, triglycerides & lipoproteins postpartum (partly due to loss in breastfeeding)
* Kidney & renal function:
	+ Kidneys enlarge (slight)
	+ ↑ Progesterone → Ureter dilatation
	+ ± Mechanical obstruction of ureter at pelvic inlet (≈ 16wk – due to uterine fundus compression)
	+ ↑ Renal plasma flow (RPF)
	+ ↑ GFR
	+ ↓ GFR:RPF → ↓ Filtration fraction
	+ ↑↑ Creatinine clearance
* Salt, water & nitrogen:
	+ Water retension
	+ Salt retension (complex)
	+ ↓ BUN, ↓ Creatinine & ↓ Urate (all due to ↑ GFR)
* Respiratory changes:
	+ Hyperventilation & deeper respiration (due to progesterone) → ↑ tidal volume (with ↑ gas exchange & O2 absorption) & ↑ minute volume
* Digestive system:
	+ Swollen gums (due to fluid retention) → ↑ risk of food collection (in softer gums) & caries
	+ ↓ Stomach emptying (see above); ↓ Intestinal peristalsis → ↑ nutrient absorption BUT ↑ constipation
	+ Oesophageal reflux
* Hepatobiliary system:
	+ Liver:
		- Relatively unchanged (incl. size, histology & blood circulation)
		- Some physiological function changes → predisposes to pregnancy induced liver disease:
			* Spider angiomata
			* Palmar erythema
			* ↓ S-albumin
			* ↑ S-ALP
			* ↑ S-cholesterol
	+ Bile:
		- ↑ Gallbladder residual volume
		- ↓ Emptying
		- ↑ Biliary cholesterol concentration
		- ↓ Chenodeoxycholin acid
		- The latter 2 → ↑ risk for gall-stone formation
	+ Skin (see above): Spider agiomata; palmar erythema; striae; ↑ sweat; ↑ sebum; ↑ pigmentation (due to ↑ MSH from posterior pituitary → chloasma & linea nigra
	+ Breasts: ↑ Size; ↑ Volume; ↑ Nipple size & mobility; ↑ Areolae; ↑ in no. Montgomery’s tubercles
	+ Skeletal: Lubar lordosis; ↑ General ligament laxity (due to relaxin) →low backache & pelvic pain
	+ Body weight: ↑

|  |
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| **Antenatal Care:** |

***Goals:***

* Evaluate mother & fetus risk factors & health
* Determine gestation
* Develop plan for rest of pregnancy

***Procedure:***

* Registration & administration
* Good Hx – previous, current obstetric, gynaecological, medical, surgical & social Hx
* Good Ex – full systemic examination: “Big 5; Forgotten 4; Core 1”
* Specific investigations
* Patient counseling

***Hx – Pregnancy risk factors (see below for evaluation):***

* **General**: Unmarried; Recent divorce; ≥ 35yr; < 18yr; primip; grand-multip; poor socio-economics; Rh-isoimmunization
* **Physique**: Under-/overweight; ≤ 1.5m tall
* **Habits**: Smoking; alcohol; drugs
* **Disease profile**: DM; Heart pathology; HT; Hx of DVT/PTE
* **Uterine considerations**: Previous C/S; Myomectomy; Uteroplasty; Leiomyomata
* **Placental considerations**: Hx of APH (esp. abruption)
* **Fetal factors**: Hx of IUD/NND; Hx of congenital malformations; Hx of SGA/LGA; Hx of multiple pregnancy
* **Labour**: Hx of preterm labour; Hx of PPH; Hx of 3˚ tear; Hx of PID/STD’s
* **Family Hx**: DM; HT; Hereditary disease

**Note: Daily requirements**

**(Supplement if not in diet)**

* **Energy 10000kJ**
* **Protein 65mg**
* **Ca2+ 1000mg**
* **Fe2+ 25mg**
* **Vitamin A 5000IU**
* **Vitamin C 50mg**
* **Vitamin D 400-600IU**
* **Thiamine 1mg**
* **Riboflavin 1.5mg**
* **Niacin 15mg**
* **Folic acid 1mg**

***Special investigations:***

* Side-room:
	+ Body mass, height & BMI
	+ Urinalysis
	+ Hb or FBC
	+ RPR
	+ Blood group – ABO & Rh status
	+ PAP smear
	+ US (if available esp. at 18-24wk)
* Special:
	+ HIV VCT
	+ Rubella (not routinely done in the state)
	+ DM
	+ Endocervical swabs – screening for N. Gonorrhoea; C. Trachomatis; Group B haemolytic streptococci

***Counseling*** – to report any of the following if positive danger Sx or abnormal:

* **Danger signs – report ASAP:**
	+ **PVB**
	+ **Severe facial oedema**
	+ **Headache (sever/constant)**
	+ **Visual disturbances**
	+ **Abdominal pain(esp. RUQ)**
	+ **Persistent/recurrent vomiting**
	+ **Rigors/fever**
	+ **Fluid per vagina**
* Weight gain: 1st TM – 1-2kg; 2nd TM – 5kg; 3rd TM – 5kg
* Diet – recommended daily requirements: See note above
* General considerations:
	+ Iron & folate supplementation
	+ Vitamins (if indicated)
	+ Paracetamol for pain
	+ No alcohol; No smoking;
	+ Moderate exercise (avoid exhausting exercises); Moderate/normal work (avoid exhausting work)
	+ Regular movement of legs (prevents congestion & DVT)
	+ Comfortable, practical & loose-fitting clothing; Good quality, well-fitting bra
	+ Avoid coitus in last 2wk (adapt position before that) & avoid if indicated
	+ Avoid vaginal douches
	+ Avoid travelling to malaria endemic area
* Signs of onset of labour – report to clinic/hospital: Painful contractions, show or ROM

***Procedure at 2nd (1-3wk after 1st) & return visits:***

**Note: Problems requiring referral**

* **Anaemia**
* **Uterus large e.g. multiple pregnancy**
* **Small for dates e.g. IUGR**
* **Malpresentation at 34wk**
* **Rh negative moth with antibodies**
* **No weight gain (in mother who was 60kg at booking)**
* **Pregnancy reaching 42 weeks**
* **↓ Fetal movements after 28 weeks**
* **Hypertension or PET**
* **APH**
* BP
* Body weight
* Urinalysis
* SF
* Fetal lie/position
* FHR
* Fetal movements
* AFV (clinically)
* Oedema (if excessive)
* Discuss results of previous visits
* Modify plan for pregnancy
* Classify according to risk profile

***Risk evaluation & follow-up dates:***

* **Low risk:** q8wk until 34wk THEN 1 visit 4 weeks later (see also “Gauteng antenatal care policy”)

|  |
| --- |
| * **Normal 1st pregnancy**
* **Normal current pregnancy**
* **1x previous C/S or breech (≤36wk)**
 |

* **Medium risk:** q4wk unti 30wk THEN q2wk until 36-38wk THEN weekly until term

|  |
| --- |
| * **Maternal age ≤ 15yr**
* **Previous PPH requiring blood transfusion**
* **Last pregnancy had forceps/vacuum delivery**
* **Grand-multipara**
* **Previous C/S/breech (> 36wk)**
 |

* **High risk:** q2-4wk until 30wk THEN q1-2wk until 34-36wk THEN q3-7d until labour

|  |
| --- |
| * **Primigravida aged ≥ 35yr**
* **Previous infertility treatment**
* **Previous myomectomy**
* **Previous cervical/vaginal Ø (incl. cerclage)**
* **Previous hysterotomy**
* **Prevenious perinatal death**
* **Previous baby with congenital abnormalities**
* **Last pregnancy with preterm deliver (≤ 7months)**
* **Last pregnancy with PET (≤7months)**
* **3/more previous miscarriages**
* **DM**
* **Symptomatic asthma**
* **Epilepsy**
* **Active TB**
* **Heart disease**
* **Autoimmune disease**
* **History of DVT/PTE**
* **Psychiatric illness (incl. previous puerperal psychosis)**
* **Thyroid disease/thyroidectomy**
* **Serious disease/deformity of spine, pelvis or hip**
* **Any other serious medical illness**
 |

***Gauteng antenatal care policy* –** routine low-risk/medium risk ANC visit schedule:

|  |  |  |
| --- | --- | --- |
| **Gestation (weeks)** | **Multip – objectives** | **Primip – objectives** |
| **6-20** | Risk assessment; gestational age; blood tests |
| **24-28** | Exclude multiple pregnancy; HT; Risk for preterm labour |
| **28-30** |  | HT |
| **32-34** | Fetal growth; HT |
| **34-36** |  | HT |
| **36-38** | Fetal growth; Lie; Presentation; HT; Anaemia |
| **38-40** |  | HT |
| **40-42** | Fetal growth; Lie; Presentation; HT; Post-dates |
| **Total # visits** | 5 | 8 |

***Problems in pregnancy, which require referral: See note above***

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| **Congenital abnormalities:** |

***Increased incidence:***

* Oligohydramnios & polyhydramnios
* Diabetes Mellitus
* Advanced maternal age
* Multiple pregnancy
* Family history & previous personal history of congenital abnormalities
* Breech presentation
* IUGR
* Fetal distress

***Special investigations –*** gestation dependant:

|  |  |  |  |
| --- | --- | --- | --- |
| **9 ½ -12 weeks** | **11-14 weeks** | **16-20** | **> 20weeks** |
|  | US – Nuchal translucency (10-13wk) | US* Anencephaly (14-16wk)
* Hydrocephalus
 | US – Gestation (18-24wk) |
| Chorionic villi sampling:* Kayotyping
* DNA Analysis
 | PAPP-A & Free β-hCG:* PAPP-A ↓ in Tr. 21
* Free β-hCG ↑ in Tr. 21
 | Amniocentesis (16wk) if:* Mother > 37yr
* Previous congenital abnormality
* Family Hx of congenital abnormality
 | Chordocentesis - indications:* Chromosomal analysis
* Virus specific IgM studies
* Genetic disorders
* Dx & Rx of Rh disease
* Exclusion of haemoglobinopathies
 |
| Maternal & amniotic fluid α-FP; β-hCG & S-Oestriol:* ↑ α-FP:
	+ Spina bifida
	+ Anencephaly
	+ Omphalocele
	+ Gastroschisis
	+ Multiple pregnancy
	+ Congenital nephrosis
	+ Turner’s syndrome
	+ Tr. 13
	+ Teratomas
* ↓ α-FP:
	+ Tr. 21
 |

* Other tests for congenital abnormalities:
	+ X-ray – Demonstrates anencephaly
	+ Fetoscopy – Refer to specialist centre
	+ Council patient and risk assessment – Give options regarding prognosis and TOP

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| **NOTE: Amniocentesis carries a risk for:** |
| * Micarriage
* Premature labour
* Rhesus iso-immunization – Give 100μg Anti-D Ig if mother rhesus neg.
 |

***Indications for TOP (Termination of pregnancy)***

* **< 13 weeks**
	+ Upon request
* **13-20 weeks (if doctor in consultation with mother is of the opinion that-)**
	+ Continuation of pregnancy a risk to mother’s physical/mental health
	+ Fetus would suffer severe physical/mental abnormality
	+ **> 20 weeks (if a doctor in consultation with another doctor/midwife is of the opinion that-)**
	+ Pregnancy would endanger mother’s life
	+ Result in sever malformation of fetus
	+ Pose a risk of injury to the fetus

***Genetic counseling***– Allow for 5 stages of grieving:

* Shock
* Denial
* Anger
* Depression
* Acceptance
* Remember to counsel on contraceptive use while in grieving process

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|  **Antenatal surveillance – Maternal factors & Fetal welfare, growth, age and maturity:** |

***Maternal factors:***

* Uterine enlargement – only an approximation
* SF measurement – reliable (< 24wk) if read off a Belizan curve ELSE only reliable ≥ 24wk
* Abdominal circumference – inaccurate i.e. not repeatable; important in monitoring AFV
* Maternal weight gain:
	+ 1st ½ of pregnancy: 2-4kg
	+ 2nd ½ of pregnancy: 8kg
	+ Note: From 20-30wks weight gain rate ≈ 0.5kg/week

***Fetal welfare:***

* Fetal movements
	+ Assessed for 1 hour mane or time taken to reach 10
	+ Abnormal if <4/hr OR >12hr/10 movements
* Fetal heart rate
	+ <100 bpm
		- CTG & US to rule out congenital abnormalities
	+ >160 bpm
		- Maternal fever
		- Intrauterine infections
		- β-Stimulants
		- Parasympatholytics
		- Smoking
		- Thyrotoxicosis
		- Maternal anxiety
	+ >180 bpm
		- CTG & US
* Ultrasound
	+ Oligihydramnios **IF** <1cm fluid in largest pocket
	+ Demonstrate decreased breathing movements
	+ Demonstrate decreased body movements
	+ Demonstrate abnormal tone:
		- Extension
		- Fetal movements without returning to flexion
		- Open hand
* Biophysical profile = US (see below) + Non-stress test = 10

|  |  |  |  |
| --- | --- | --- | --- |
| **Testing method** | **Biophysical variable** | **Normal (2 points)** | **Abnormal (0 points)** |
| **US** | General body movements | ≥ 3 distinct body/limb movements/30min | ≤ 2movements/30min |
| Fetal muscles tone | ≥ 1 episode of active extension & return to flexed position limb or trunk (opening & closing of hands = normal) | Absence of movement or slow extension with only partial flexion |
| Fetal breathing movements | ≥ 30 sec of sustained breathing/30min | Absence of breathing movements or < 30 sec of breathing movements/30min |
| Qualitative AFV | ≥ 1 pool, 1 cm in 2 dimensions – measured at right angles to each other | Non or a pool smaller than 1cm |
| **Non-stress test** | Reactive fetal heart rate pattern | ≥ 2 accelerations or ≥ 15 bpm & ≥ 15 sec following fetal movements (in 30min) | < 2 accelerations of < 15bpm – per 30min |

* Interpretation & management:

|  |  |  |
| --- | --- | --- |
| **Score:** | **Interpretation:** | **Management:** |
| **10** | Normal fetus; low risk for chronic asphyxia | Repeat weekly; 2x/week in DM; at ≥ 42wk gestation |
| **8** | Normal fetus; low risk for chronic asphyxia | Repeat weekly; 2x/week in DM; at ≥ 42wk gestation; if oligohydramnios → TOP |
| **6** | Indicative of chronic asphyxia | Repeat within 24hr; if oligohydramnios → deliver |
| **4** | Indicative of chronic asphyxia | ≥ 36wk & if circumstancea are favourable → deliver; if < 36wk & L:S<2.0 → repeat test on same day & if profile still ≤ 4 → deliver |
| **0-2** | Probable chronic asphyxia | Extend test period to 120min; if profile < 2 → deliver regardless of gestation |

* uE3 and HPL – indicate impaired welfare IF:

**Note:**

**Indications for CTG:**

* Abnormal fetal movements
* Abnormal fetal heart rate
* Antepartum haemorrhage
* Diabetes mellitus
* Post-maturity
* Impaired fetal growth

**Contra-indications to stress test:**

* Impending premature labour
* PROM
* Incompetent cervix
* Grade III/IV placenta praevia
	+ Decreased E3 OR
	+ Decreased E3/24hrs OR
	+ Decreased HPL
* Amnioscopy if cervix sufficiently dilated:
	+ Look for meconium staining
* Doppler US
	+ Look for absent end diastolic velocity in cord (EDV absent)
* Fetal blood gas & acid-base values

***Fetal growth:***

* Gain in maternal weight
* SF measurements (NOTE: Patient’s bladder must be emptied)
* Oligohydramnios
* Ultrasound measurements – F/U measurement important:
	+ Biparietal diameter
	+ Trunk diameter
	+ Skull:Trunk ratio
	+ EFW
	+ Uterine volume
		- MRI – Not cost effective

***Fetal age:***

* Pregnancy calculator; Naegele’s rule; 1st fetal movements felt (20weeks in primip; 16 weeks in multip)
* SF measurements > 24 weeks
* Ultrasound (<24 weeks esp. 20 weeks) – range:
	+ Gestational sac volume: ± 9 days
	+ Crown-Rump length (Before 14 weeks): ± 3-5 days
	+ Femur length (12-24wk): ± 8-14 days
	+ BPD (12-24wk): ± 8-14 days
	+ Other methods: Length of humerus, ulna, radius, tibia, fibula; Circumference of head, abdomen
* Ossification centres on X-ray
	+ Lower femur = 36 weeks
	+ Upper tibia = 38 weeks
	+ Os Cuboidum in foot = 40 weeks

***Fetal maturity (see also “post-maturity”):***

* Skull hardness
* Ballard score @ birth
* L/S Ratio (Note: unreliable if blood/meconium stained)
	+ 2:1 = lungs are mature
	+ If rhesus iso-immunization the ≥ 2.5:1 = lungs are mature
* Phosphotidylglycerol presence
	+ Used in DM: If L/S > 2.5 and PTG present = mature lungs
* Tap/Shake test (only if there is no meconium/blood and mother is HIV negative)
* Ultrasound – Demonstrates calcification in placenta
* Liver maturity: No bilirubin present at 36 weeks
* Renal maturity: Creatinine > 0.17 @ 37 weeks
* Skin maturity: Fetal cells present @ 36 weeks

***Note: Uses for diagnostic ultrasound in obstetrics:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1st Trimester:****Determination of -**  | **2nd Trimester:****Determination of -**  | **3rd Trimester:****Determination of -**  | **Puerperium & neonatal** | **Other** |
| * Pregnancy incl. multiple –
* Gestation age
* Fetal life
* Ectopic pregnancy (only aids Dx)
* Mola pregnancy
* Adnexal masses
 | * Fetal age (≤ 24wk)
* Congenital abnormalities
* Cervical incompetetence
 | * Placental examination
* Fetal lies; presentation; attitude
* AFV
* Aids in Rh incompaitibility & preterm labour
* Fetal well-being
* Doppler
 | * Uterus; adnexal masses (hematoma)
* Neonatal complications (congenital abnormalities & intracranial haemorrhages)
 | * Aids in amniocentesis; cordocentesis; chorion-villus biopsy
* Doppler – FHR; blood flow studies
 |

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| **Important aspects of normal labour:** |

***Normal mechanism:***

* Engagement
* Descent and flexion
* Internal rotation – has the following pre-requisites:
	+ Good flexion
	+ Effective contractions
	+ Satisfactory pelvic floor muscle tone
	+ Adequate pelvic dimension to allow rotation
	+ Gynecoid pelvic shape
* Extension
* Restitution
* External rotation

***Differences in various positions – Normal L/R-OA vs. “abnormal” positions:***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **LOA** | **LOP** | **LOP** | **Crown (Vertex)** | **Brow** | **Mento-Anterior** | **Mento-Posterior** | **Mento-Poterior** | **Breech** |
| **Descent** | Yes | Yes | Slow | Yes | No | Slow | Slow | No | See below |
| **↑ Flexion** | Yes | Poor | Yes | No | No | No | No | No | See below |
| **Internal Rotation** | 45˚ Ant. | 45˚ Post. | 135˚ Ant. | 45˚ | T-arrest | 45˚ Ant. | 135˚ Ant. | 45˚ Post | See below |
| **Extension** | Yes | Yes | No | Yes | - | No | No | - | See below |
| **Restitution** | 45˚ | 45˚ | 45˚ | 45˚ | - | 45˚ | 45˚ | - | See below |
| **External Rotation** | 45˚ | 45˚ | 45˚ | 45˚ | - | 45˚ | 45˚ | - | See below |
| **Progress** | Normal | Prolonged | Prolonged | Prolonged | - | Prolonged | Prolonged | Prolonged | Usually prolonged |
| **Delivery** | Normal | Difficult | Difficult | Difficult esp. if military position  | - | Difficult | Difficult | Impossible | Difficult |
| **Relevant Diameter** | Suboccipto-bregmatic |  |  | Occipito-Frontal (11.5cm) | Mento-vertical (13.5cm) | Submento-bregmatic (9.5cm) – If complete extension occurs | Submento-bregmatic (as for mento-anterior) | - | Bi-trochanteric → Bis-acromial → Sagittal suture |
| **Pelvic Diameter of Descent** | AP | Oblique/ AP\* | Oblique/ AP\* | AP | - | AP | AP | - | Oblique |
| **Abdominal Signs** | Head well engaged | Head high; Flattening below umbilicus | Head high; Flattening below umbilicus | Either undergoes complete flexion → OP/OA OR ucomplete extension → face pres. (Mento) | As for face presentation (Mento) | Head high; Soft parts ↑ anteriorly | Head high; Distinct neck-back groove | Head high; Distinct neck-back groove | Fetal movements felt low; Head high; Soft parts at pelvic inlet |
| **Vaginal Signs** | Posterior fontanelle; Station progressing well | Both fontanelles palpable; Post. Font. in post. quadrant. | Both fontanelles palpable; Post. Font. in post. quadrant. | Anterior & posterior fontanelles in pelvis at same level → change with attitude change | Glabella on one side and andterior fontanelle on other side. | Orbital ridges; Chin; Bridge of nose & mouth; Triangle of mouth and 2 maxillae | Orbital ridges; Chin; Bridge of nose & mouth; Triangle of mouth and 2 maxillae | Orbital ridges; Chin; Bridge of nose & mouth; Triangle of mouth and 2 maxillae | Presenting part situated very high; Absence of fontanelles and sutures; Anus & 2 iachial tuberosities form straight line |

***Active labour*** = Regular contractions (6-8/hr) AND cervical dilatation/effacement AND show

***Pelvic shapes***

* Gynaecoid
* Android
* Anthrapoid
* Platypelloid

***10 important things on pelvic examination:***

* PROM; **ROM**
* Bishop’s Score:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Score** | **0** | **1** | **2** | **3** |
| Cervix **dilatation** (cm)  | <1 | 1-2 | 2-4 | >4 |
| Cervix **length** (cm) | >4 | 2-4 | 1-2 | <1 |
| **Station** | -3 | -2 | -1/0 | +1/+2 |
| **Consistency** | Firm | Average | Soft | - |
| **Position** | Posterior | Mid/Anterior | - | - |

* **Presentation**
* **Engagement**
* **Moulding** (I-III) &/or **Caput** succedaneum
* **Pelvimetry**:

|  |  |  |
| --- | --- | --- |
| **Inlet:** | **Mid-pelvis:** | **Outlet:** |
| ShapeAP diameterRetropubic angle | Curve of sacrumSpinae ischii (present or not)Sacrospinous ligament length | Mobility of coccyx (? Forward)Subpubic angleIntertuberous diameter |

***Pelvic measurements:***

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Anteroposterior** | **Oblique** | **Transverse** |
| **Brim** | **11-11.5** | **12** | **12.5** |
| **Cavity** | **12** | **12** | **12** |
| **Outlet** | **12.5** | **12** | **11-115** |

***Phases & stages of labour:***

* **1st stage:**
	+ Latent phase – mainly effacement (cervical dilatation < 4cm):
		- ≈ 8hr long in primip
		- ≈ 6hr long in multip
	+ Acceleration phase (minor phase): Not of any clinical importance
	+ Active phase – mainly dilatation:
		- ≈ 1cm/hr in primip
		- ≈ 1.5cm/hr in mutip
	+ Deceleration phase (just before 2nd stage): ≈ 1-2cm of cervix remains; DON”T MISTAKE FOR SLOW PROGRESS!!!
	+ Mx:
		- Ambulant before 6-7cm dilatation; Lie down after 7cm dilatation (on side)
		- Psychological support → relieve anxiety; reassure patient esp. primips
		- IV fluids if poor progress
		- CTG – if indicated
		- Pain relief
		- Sterility measures – limit PV’s & use aseptic lubricant
		- Plot partogram correctly (see community obstetrics):
			* Latent phase – only record on left of partogram with each examination 1 space apart:
				+ Everything q4hr
			* Active phase:
				+ PV q2hr
				+ BP q1hr (q½h if high risk)
				+ Contractions & FHR q½hr (CTG if high risk)
				+ Urinalysis q2h or prn
				+ Temperature q2-4hr
* **2nd stage** (from full dilatation to delivery): ≈ 1hr in primip; ≈ ½hr in multip
	+ Phase 1: Decent under uterine action until head reaches pelvic floor
	+ Phase 2: From pelvic floor to delivery - Bearing down-urge develops (Ferguson reflex); no HAB; risk for fetal distress (decelerations common); increased pain on contractions; mother restless ± anxious
		- Prepare for delivery: Swab; sterile draping
		- Bimanual PV: Determine descent
		- Local anaesthetic infiltration of perineum (prophylactically for tear/cut)
		- Empty bladder
		- If urge to bear down – encourage patient (“as if defecating”)
		- Relax between contractions
		- Support perineum during contractions → controlled stretching of perineum/descent of head
		- Listen to FHR after contractions
		- When crowning → inspect perineum for tearing risk → if yes → EPISIOTOMY!
		- Head is born, then exclude CORD AROUND NECK → if around neck → clamp & cut
		- Suction mouth gently just before delivery
		- Anterior shoulder delivered – avoid too much traction → brachial plexus injuries
		- Posterior shoulder delivered & then rest of baby
		- Clean mouth and pharynx; clamp & cut cord; wrap baby in warm towel & hand to paediatrician/sister for further care
* **3rd stage** (from delivery of baby to delivery of whole placenta): ≈ 5-10min
	+ Mx:
		- PV – exclude twin – Oxytocin 10IU IMI
		- Pressure on bleeding episiotomy
		- Collect umbilical cord blood if needed
		- Examine vulva for abnormal bleeding
		- Wait for signs of placental separation – lengthening; slight bleeding; globular uterus
		- Brandt-Andrews delivery of placenta
		- Rub up uterus
		- Examine membranes and placenta for completeness
		- Suture episiotomy
		- Monitor maternal vitals
		- Clean vulva and apply sanitary pad
		- Monitor mother for 1hr actively to exclude PPH

***Slow progress*** – ensure following have been addressed:

* Delayed first stage:
	+ < 1cm/hr dilatation in nullipara
	+ < 1.5cm/hr in multipara
* Factors, which could speed up delivery (if delayed):
	+ Analgesia
	+ Positioning of patient
	+ Empty bladder (Test urine dip-sticks as well)
	+ Oral energy – Sugar water
	+ IV energy – 5%Dextrose in 0.9% NaCl

***Episiotomy – indications:***

* Delay in 2nd stage with tight perineum
* Risk of perineal tear with or without tight perineum
* Fetal distress
* Forceps delivery
* Vantouse
* Breech presentation and NVD
* 1/more previous episiotomies
* Exhaustion of mother

***APGAR score:*** Do at 1min; 5min & 10min

|  |  |  |  |
| --- | --- | --- | --- |
|  | **0** | **1** | **2** |
| **HR****RR****Muscle tone****Reflexes (Pain response)****Colour** | --LimpNo responsePale | <100Weak cry/hypoventilationSome flexionGrimaceBlue | >100Good/strong cryActive motion/ ++ FlexionCryCompletely pink |

***Neonatal resuscitation:*** See paediatrics

***Neonatal evaluation:*** See paediatrics

***Stage 4 (1hr post delivery):***

* Vitals
* General examination
* Systemic examination (if indicated with appropriate special investigations)
* Exclude PPH

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| **Abnormalities of labour:** |

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| **Abnormal labour – 4P’s: Patient; Powers; Passenger; Passage** |

***Ax:***

* Delayed latent phase:
	+ False labour
	+ Excessive sedation; anaesthesia; paracervical or epidural analgesia
	+ Abnormal myometrial function:
* Delayed active phase:
	+ CPD
	+ Abnormal position of fetal head e.g. OP
	+ Abnormal myometrial function
	+ Excessive sedation
	+ Over-distention of uterus
	+ Pathology of cervix → inhibits dilatation e.g. stenosis
* Arrest of labour – NB. Vaginal delivery unlikely if arrest of labour accurs → C/S:
	+ CPD
	+ Malpresentation (crown; persistent OP; OT with deflection; face; brow)
	+ Abnormal lie e.g. transverse
	+ Pelvic tumors
	+ Inability to bear down (can be corrected)
	+ Increased perineal resistance (can be corrected)

***Cx:***

* Maternal:
	+ Mortality ↑
		- Infection
		- Birth-related trauma
		- Shock
	+ Morbidity ↑
		- Dehydration
		- Keto-acidosis
		- Hypokalemia → myometrial hypotonia → atonic uterus → PPH
		- Colon dilatation
		- Puerperal infection (see puerperal sepsis)
		- UTI
* Fetal:
	+ Perinatal mortality ↑
		- Pneumonia due to intra-uterine infection
		- Hypoxia with fetal distress → acidosis
		- Birth trauma
1. **Identify cause(s) of poor progress – Rule of 4 P’s. Under optimal management labour is allowed to continue for another 4hrs. If progress still poor → C/S**
2. **Evaluate mother and fetus for complications of prolongued labour → attend to them before C/S since a C/S can aggravate these problems.**
	1. **Fluid and electrolyte status**
	2. **Hb concentration – anaemia → post-partum infection**
	3. **Psychological support**
	4. **Early recognition of fetal distress with adequate intra-uterine resuscitation**
	5. **Recognition of meconium → Infection risk ↑ and asphyxia risk ↑**
	6. **Empty full bladder**
	7. **Anti-biotic treatment:**
		1. **In labour limited to patients with signs of infection**
		2. **Prophylactic antibiotics for emergency C/S**
		3. **Prophylactic antibiotics for numerous PV, meconium in amniotic fluid & fetal tachycardia**
		4. **If C/S while infection → broad spectrum antibiotics for 5 days**
	8. **Address PPH**
	9. **Address common complications of prolonged labour:**
		1. **Post-partum myometritis**
		2. **Peritonitis**
		3. **Post-partum endometritis**

***Mx:***

***The rule of 4 P’s of prolonged labour:***

**Patient:**

* Pain
* Full bladder
* Dehydration
* Position (supine hypotensive syndrome)
* Fear (psychological condition)

**Powers:**

* Normal labour requires 3-4 contractions/min each lasting at least 45s
* Uterus dysfunction/Abnormal uterine action
	+ Inefficiency – hypoactive; un-coordinated; cervical dystocia
	+ Overefficiency – Precipitate labour; titanic contractions (>90sec duration)
* Uterine rupture – Sx:
	+ Continuous pain between contractions – suddenly stop
	+ Tenderness
	+ Haematuria
	+ Shock
	+ PVB
	+ Acute abdomen
	+ No contractions following rupture +/- fibrillating
	+ NB. Examine with 4 fingers to assess previous scar
	+ Rx: Resus; CVP; Emergency laparotomy; suture if small ELSE emergency C/S

**Passenger:**

* Size of fetus → CPD
* Amount of fetal head above brim is important
* Persistent OP position
	+ Long rotation 135˚ or 65˚ > OA > normal progress
	+ Short 20˚ > OT > C/S
	+ Intermediate 45˚ or 15˚ > Direct OP – if action line crossed do C/S; if in 2nd stage - forceps
* Asynclitism – C/S (sagital suture to posterior or anterior)
* Breech – Mostly C/S
* Face/brow presentation
* Median vertex presentation (military)
* Compound presentation
* Shoulder presentation
* Transverse lie/Oblique lie
* Shoulder dystocia
* Cord prolapse

**Passage:**

* Considerations:
	+ Cervix – true labour vs. false labour
	+ Membranes – not artificially ruptured in normal labour but AROM can accelerate poor progress
	+ Application – poor application is caused by:
		- False labour
		- Latent phase
		- Inadequate contractions
		- CPD or obstruction or descent
	+ Pelvimetry (see above)
* Placenta Praevia
* CPD – assess also passenger

***Other abnormalities of 3rd stage:***

* PPH
* Uterine inversion
* Placenta accrete – abnormal tight attachment
* Placenta increta – chorionic villi penetrate myometrium –tight attachment
* Placenta percreta – through myometrium up to serosa – part of uterus
	+ Rx: Family complete – hysterectomy
	+ Else left in situ – Give antibiotics and observe for PPH

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|  **Abnormal lie, presentation & position:** |

***Ax:***

* Maternal factors:
	+ Pelvic abnormalities (see pelvimetry)
	+ Pelvic tumors
	+ Placenta praevia
	+ Uterus abnormalities e.g. bicornuate
	+ Pendulous abdomen
* Fetal factors:
	+ Large baby
	+ Multiple pregnancies
	+ Congenital abnormalities of fetus e.g. hydrocephaly
	+ Polyhydramnios
	+ Preterm labour (esp. in breech)
	+ IUD → prevents spontaneous version

***Sequelae:***

* Effect on labour – CPD; Abnormal myometrial function; Delayed/incomplete cervix dilatation; Persisten high presenting part; Early ROM with prolapse; Bandl’s retraction ring; Uterine rupture
* Effect on mother – Maternal exhaustion; Tears; PPH; Infection; Labour discomfort; Urine retention; Paralytic ileus
* Effect on fetus - ↑↑ Caput succedaneum & moulding; Anoxia; Asphyxia; Trauma; Cord prolapse

***Specific positions:***

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| **Occipito-Posterior:*** **Background:** Associated with android/anthropoid pelves; CPD; Incomplete flexion of fetal head; Poor progress in labour
* **First stage:** Often poor progress due to CPD → C/S; Abnormal uterine function → Oxytocin; Sever pain → Analgesia; Risk of fetal distress → Good monitoring
* **Second stage:** Often prolonged with risk of fetal distress; Poor maternal bearing-down efforts; C/S for CPD
* **Outcomes:** Long anterior rotation → spontaneous vertex delivery; Short posterior rotation → persistent OP → exclude CPD, ensure adequate contractions & consider forceps delivery; No rotation or short anterior rotation; right or left occipito position or deep transverse arrest

***Manage as above, but delivery with ventouse (allows rotation)**** **Third stage:** Usually normal; Continue oxytocin if it was used before delivery
* **Cx**: Slow cervical dilatation; Severe backache; myometrial dysfunction (often CPD); Early ROM; ↑↑ Perineal tears (Persistent OP); Early distension of perineum → dilatation of anus;
* **Signs against long anterior rotation**: Late engagement; Early ROM; Poor flexion of fetal head; Laterally displaced anterior shoulder; Anthropoid pelvis; Poor contractions
* **Specific management**: Exhaustion; Fetal distress; No progress (≥ 4 hours in 1st stage OR ≥ 1 hour in 2nd); Coincidental complications e.g. cord prolapse
* **Pre-requisites of possible vaginal delivery**: Head engaged; No CPD; Full dilatation of cervix
* **Methods for vaginal delivery**: Forceps; Manual rotation; Rotation-forceps delivery; Ventouse delivery; Destructive operation (if fetus dead); C/S if pre-requisites not met.
 |
| **Face-Presentation:*** **First stage:** Frequent variable deceleraitions – Rule out fetal distress; High fetal head; Prolonged labour common; Vaginal examination:
	+ Triangle of face
	+ Gingivae in mouth
	+ Determine position: If anterioir → expectant; Lateral → Wait for rotation & ensure good contractions; Posterior → C/S if long ant. rotation doesn’t occur
	+ Evaluate pelvis: If contracted → C/S
* **Vaginal delivery:** Only for mento-anterior or those having undergone change in position to mento-anterior; Ensure good contractions; Monitor FHR meticulously; Wide episiotomy; Forceps delivery if poor progress occurs
* **Neonatal course:** Active resuscitation often necessary; Oedema of face (subsides within days); Fetal abnormalities in15%; Perinatal loss in 6%
* **Ax:** CPD; Anencephaly/hydrocephaly/large thyroid tumor; Cord around neck → prevents flexion; Prematurity; Multiple pregnancy; Hydramnios; Placenta Praevia; Pelvic tumors; Grand multipara; 1˚ Hypertonus of fetal neck extensors; Very large baby; Idiopathic
* **Mx:** Find cause first and manage if accordingly if determined → else: Evaluate size of pelvis; Size of fetus; Precise position; Exclude fetal abnormalities → If mento-anterior do wide episiotomy. If delay in second stage → forceps delivery. If MP → Might rotate anteriorly ELSE can rotate manually, rotate with Kielland’s forceps, rotate by Thorn’s manoeuvre; Craniotomy (if fetus is dead); If persistent MP → C/S!!!
 |

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|  **Breech-presentation:*** **First stage:** Hard at fundus and soft at pelvic inlet on abdominal examination; Bi-trochanteric line passes through anus on PV; No sutures or fontanelles felt on PV.
* **Radiological examination:** Usually do abdominal & lateral X-rays (one of the few remaining indications for X-rays). Show the following: **Confirms diagnosis; Pelvis size (lateral); Congenital abnormalities; Attitude**
* Sonar: Confrims diagnosis and BPD shows fetal head size.
* Vaginal delivery – 3 phases:
	+ **Mechanism of breech**: Descent & engagement (bi-trochanteric diameter in oblique diameter of pelvis) – Slower than vertex pres. → Lateral flexion of anterior hip → Internal rotation (45˚) and BTD enters AP diameter of pelvis → Lateral flexion (anterior hip delivered first → second delivered)
	+ **Mech. Of shoulders/arms:** Engagement in oblique diameter (bis-acromial diameter) → 45˚ internal rotation to AP →Anterior shoulder/arm → Posterior shoulderarm.
	+ **Mech. of head:** Descent and engagement (sagittal in AP) → Flexion → Internal rotation (45˚) to AP → Flexion as neck under symphysis → deliver chin, mouth, nose, brow, begma & occiput in that order.
* **Ax:**  **Uterine shape changes** – Uterine abnormalities; PP; Cornual placenta; Polyhyramnios; Multiple pregnancy; Pelvic tumors; Contracted pelvis; Previous breech. **Fetal shape changes:** Congenital abnormalities. **Factors preventing rotation:**  Prematurity; Nuliiparity; Extended legs; Very large fetus; Oligohydramnios; Short umbilical cord; IUGR; Fetal death.
* **Mx:** See Breech for further management
 |

***Other abnormalities of presentation/lie:***

* **Transverse or oblique lies:**
	+ Ax:
		- **Maternal** – Contracted pelvis; Placenta praevia; Fundal placenta; Pendulous abdomen; Cogenital abnormalities of uterus; Temporary oblique lies (when full bladder displaces fetal head); Extra-uterin pregnancies;
		- **Fetal** – Multiple pregnancies; Fetal abnormalities which prevent engagement; Hydramnios; Very large fetus; IUD; Hypertonus of fetal extensor muscles (rare condition known as “flying fetus”); Prematuriy
	+ Head situated in maternal flank (transverse) or in iliac fossa (oblique); Scapula is denominator
	+ Shoulder usually presents
	+ Look for uterine, placental and fetal abnormalities
	+ Spontaneous version prior to/shortyly after commencement of labour is common
	+ Delivery of persistent transverse lies: External version in early labour or immediately before IOL Or by C/S
* **Vertex presentation:**
	+ Head in deflexion with anterior and posterior fontanelles situated in pelvis at same level
	+ Usually temporary as either flexion (or rarely extension → face presentation) follows
	+ Military position (variation) is where deflexion to the degree where anterior fontanelle presents
	+ More prone to CPD as descent without internal rotation, flexion or deflexion occurs
* **Brow**
	+ Partial extension of head
	+ Area between the orbital ridges and bregma presents
	+ Spontaneous delivery if flexion or extension occurs, if fetus is small or pelvis is very large
	+ If labour progresses poorly, or mentovertical AP diameter (13.5cm) persists → C/S
	+ If fetal death occurs → Craniotomy

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| **Breech presentation:** |

***Management options:***

* Expectant (<37 weeks duration)
* ECV (at 37 weeks)
* C/S
* Vaginal delivery (seldom done in modern practice)

***ECV Contra-indications:***

* Absolute
	+ Fetal distress
	+ Vaginal bleeding of unknown origin
	+ Rupture membranes
	+ Previous uterus surgery
	+ Anhydramnios
	+ Non-viable fetus
	+ Other obstetric indications for C/S
	+ HIV
* Relative
	+ Severe oligohydramnios
	+ Severe maternal HT
	+ Premature fetus
	+ Uterine abnormalities
	+ Advanced labour

**Management of breech:**

**1st Stage:**

1. **IV Line**
2. **Keep membranes intact for as long as possible**
3. **PV immediately after ROM to exclude cord prolapse**
4. **Epidural is preferable: No adverse fetal effects; Facilitates vaginal manipulations; Inhibits urge to bear down befor cervix is fully dilated**
5. **Meticulous monitoring using partogram: 1cm/hr → @ 6cm breech should be on ischial spines’ level → @ 10cm should be on perineum → failure in any of the above → C/S**

**2nd Stage:**

1. **Lithotomy & 15˚ lateral tilt**
2. **Empty bladder**
3. **Regular FHR monitoring**
4. **Bear sown in contraction ONLY. No traction!!!**
5. **Episiotomy always done as soon as posterior buttock bulges beneath perineum**
6. **Delivered SPONTANEOUSLY as far as umbilicus**
7. **Pull cord PARTLY downwards as soon as it appears – YOU NOW HAVE 5 MINUTES!!!**
8. **Cover fetus with warm towel to prevent spontaneous breathing (due to exposure to cold)**
9. **Assistant maintains gentle suprapubic pressure**
10. **With appearance of anterior scapula → do PV → Feel for arms (usually folded) infront of chest → sweep them downwards**
11. **Ensure back remains anterior or anterolateral**
12. **Let body hang to improve flexion**
13. **Deliver head actively as soon as posterior hairline appears. Several methods:**
	1. **Forceps (Pijper’s or Wrigley’s)**
	2. **Wigand-Martins method**
	3. **Mauriceau-Smellie-Veit’s method**
	4. **Burns-Marchall’s method**
14. **Treatment of delay:**
	1. **Gentle groin traction**
	2. **Pinard’s manoeuvre to deliver legs**
	3. **Lovset’s/Classical method (shoulders)**
	4. **Forceps (see 18.)**

**External cephalic version – method:**

1. **Monitor fetus – fetoscope; CTG; movements etc.**
2. **Hexoplrenaline 10μg IVI slowly OR Nifedipine 10mg IMI/IVI**
3. **Lift breech out of pelvis on either side**
4. **Each attempt < 5min**
5. **Monitor FHR before and after each attempt**
6. **Turn in direction of flexion of head**
7. **If FHR decreases return to original position**
8. **If it still doesn’t improve then C/S indicated**
9. **Maximum attempts allowed = 3x**
10. **Warn mother about signs of ruptured membranes/abruption before discharge**

***C/S***

* Indications – Term breach (according to Hannah et al. & Obstetrics in Southern Africa):
	+ >2500g (some texts say >3700g)
	+ 1000-1500g
	+ Fooltling breech
	+ Obstetric indications
	+ Contraction of pelvis to any degree
	+ “Star-gazing” attitude
	+ Additional medical problems e.g. HT, DM
	+ Uterine dysfunction – NB!!! Don’t use oxytocin to improve function.
	+ Foot or knee presentations
	+ Previous baby with birth injury
	+ Previous difficult vagainal delivery
	+ Fetal distress or IUGR
	+ Breech in primigravida (relative C/I)
* Contra-indications:
	+ Non-viable fetus (<28 weeks)
	+ Patient declines
	+ Patient already bearing down

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|  **Abnormal myometrial function:** |

***Classification & summary:***

* **Uterine hyperactivity:**
	+ **Precipitate labour** – strong contractions and full dilatation within 1 hr
		- Ax: Weakness of pelvic floor; Spinal injuries with neurological lesions
		- Cx: Uterine rupture; Lower genital tract injuries; Fetal intracranial bleeds
		- If diagnosed before full dilatation → can try and use β2-stimulants
	+ **Tonic contractions** – Usually iatrogenic owing to Oxytocin use with 3 presentations:
		- Multiple contractions in rapid succession; ↑ resting tone; contraction ≥ 90s (tonic)
		- Cx: Fetal distress → STOP oxytocin; β2-stimulants; if tonic without oxytocin consider abruptio placentae as diagnosis
		- Note: Braxton-Hicks contractions may be ≥ 90s; significance unknown
	+ **Irritable myometrium** – uncoordinated uterin contractions; Have following traits:
		- Amplitude & frequency ↑; Resting tone ↑; Uteroplacental blood flow may be impaired if excessive contractions; Pain ↑↑ in duration and severity; Slow cervix dilatation despite strong contractions; Other signs of CPD usually absent; Ketosis common; Primigravidas predominantly
		- Three types:
			* Hyperactive lower segment – starts here → spreads to fundus and down → fetus can’t descend → cervix doesn’t dilate; Mx consists of eliminating pain, psychological support; sedation, IV fluids, side position, empty bladder & no oxytocin.
			* Colicky uterus – uncoordinated contractions – different parts contract independently → ineffective fetal descent; Mx as for hyperactive lower segment
			* Constriction ring dystocia – Ax: Result from colicky uterus OR iatrogenic oxytocin use OR following intra-uterine manipulations; Dx only usually made at C/S
* **Uterine hypoactivity:**
	+ **Primary** – primips mainly; ↑ with age; ↑ in post term pregnancies; doesn’t recur;
		- Following aspects may play a role:
			* CPD/OP → poor Fergusson’s cervical-oxytocin-pituitary reflex
			* Psychological factors
		- Charcterised by:
			* Insufficient contractions with ↓ amplitude & ↓ frequency; ↓ resting tone; good uteroplacental circulation; ↓↓ pain and backache; Occurs anytime during labour (continuing or transitory)
		- Mx: No active treatment needed in latent phase except if complications arise; morphine 15-20mg IM for sedation & pain relief; In active phase creat optimal conditions for labour
	+ **Secondary inertia** – atonia due to exhaustion e.g. CPD
* **Cervical dystocia** – full effacement without dilatation = thin cervix preventing descent
	+ - Ax: Idiopathic (especially in primips); 2˚ e.g. cervical fibrosis
		- Mx: Digital dilatation of cervix under adequate analgesia (preferable epidural or GA)

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|  **CPD – The great common mistake: See above for ‘PELVIMETRY’** |

***Factors influencing CPD:***

* Fetal factors:
	+ Absolute size of head
	+ Largest effective diameter depending on attitude
	+ Extent of moulding – post-term < term/preterm
* Pelvis:
	+ Absolute size of pelvis
	+ Shape
	+ Ligaments → become lax due to relaxin (released by corpus luteum in 1st TM and by placenta and dicidua basalis in 2nd TM) → Joint widening. Teenager mothers > older mothers.

***Risk factors*** – NB!!! Need to be weary in the following conditions:

* Maternal:
	+ < 150 cm tall i.e. short
	+ < size 4 shoe i.e. small feet
	+ Primip with 5/5th HAB at 37wk gestation – exclude wrong dates and OP first.
	+ Multip with previous C/S esp. where CPD was diagnosed (relative)
	+ Old primip
	+ Dystrophia-dystocia – short; plump; thick neck; wide shoulders; hirsutism; relative infertility; short/thick extremities & android pelvis
	+ Pendulous abdomen esp. multips
	+ Abnormal pelvis i.e. contracted; pronounced android
	+ Rare abnormalities:
		- Naegele’s pelvis – 1 sacral alae missing
		- Robert’s – both sacral alae missing
		- Rickets, osteomalacia, kyphosis, scoliosis & spondylolisthesis
		- Tumours
		- Assimilation pelvis: High = L6 & S1 fused; Low = Sacrum only 4 vertebrae
		- Pelvic fractures
		- Poliomyelitis
	+ Previous surgery e.g. spinal fusion
* Fetal:
	+ > 4000g
	+ Malpositions (e.g. OP with deflexion); Abnormal lie
	+ Fetal abnormalities e.g. hydrocephaly
	+ Unexplained preterm ROM or umbilical cord prolapse
	+ High fetal head at term i.e. > 5/5th HAB

***Dx:***

* During pregnancy:
	+ High-risk factors
	+ Routine pelvimetry at 36wk (not routinely done); May be given trial of labour
* During labour – adequate contractions PLUS 1 of following:
	+ 2˚ delay of cervical dilatation
	+ Delay of descent during deceleration phase (1st stage) or 2nd stage.
	+ Caput succedaneum – NB!!! Cervical caput is not CPD
	+ Moulding = grade III
	+ Poor application during contractions (also occurs in uterin hypo- and hyperactive dysfunction)
	+ Overlapping with presenting part higher than symphysis pubis when patient on back with upper body supported at 45˚
	+ Fixed cranium with Muller-Munroe-Kerr manoeuvre – Left hand pushes head down via abdomen and movement is felt with right hand via vagina. NO MOVEMENT = CPD
	+ Asynclitism – sagittal suture transverse but not equidistant between symphysis and sacrum
		- Normally: Slightly posterior at inlet (i.e. sagital suture anterior displaced with posterior parietal bone presenting); synclitism at mid-pelvis; anterior asymnclitism at outlet.
		- CDP if excessive in right direction or if in opposite direction
	+ Small or abnormal pelvis – pelvimetry assessment needed.
	+ Deflexion of fetal head
	+ Late signs: Fetal distress, maternal exhaustion & ketosis

***Mx***: Trial of labour if - ?CPD in primip with large baby or small pelvis; trial-of-scar (VBAC) → C/S if poor progress

***Cx***: 2˚ hypoactive atonia; uterus rupture (multip); Ix esp. with meconium and repeated PV; pressure necrosis → vesicovaginal fistula; maternal exhaustion, ketosis; Injuries; fetal distress; asphyxia; cord prolapse; abnomal lie & presentation

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|  **Common drug regimens & information – also see gynaecological problems in pregnancy:** |

***Induction of labour:***

**Note:**

**Side-effects of prostaglandins:**

* **N&V; diarrhea**
* **Uterine overstimulation → severe pain & fetal distress**
* **Uterine rupture**
* **Severe ↑ BP (esp. PGF2α)**

**Contra-indications:**

* **Asthma (esp. PGF2α)**
* **Ruptured membranes (vaginal/cervical)**
* **Previous C/S**
* **Grand-multipara (relative) – can give BUT STOP AS SOON AS SHE GETS CONTRACTIONS!!!**
* **Absolute contra-indications:**
	+ 2/more previous C/S
	+ 2˚ to metroplastic operations
	+ Previous myomectomy
	+ Fetal distress
	+ CPD
	+ Malpresentation/abnormal lie
	+ Placenta praevia (grade II posterior, III & IV)
	+ Invasive CA of cervix
	+ Active genital HSV Ix
	+ Transverse lie following failed ECV
* **Relative contra-indications:**
	+ 1 previous C/S
	+ Grand-multiparity
	+ Uterine overdistension
	+ Placental dysfunction
	+ Breech presentation
* **Methods:**
	+ Misoprostal (PGE2) 1 tab. in 200ml Water (see notes above)
		- 20 ml x3 PO q30min
		- 40 ml x2 PO q30min
		- 60 ml x1 PO
		- Repeat whole regimen once THEN do extended course 60ml x3 PO q30min
		- Failure – do C/S
	+ Oxytocin after cervix has been ripened with prostaglandins
	+ Vigorous PV examination
	+ Balloon catheter through cervix → inflate & apply light traction
	+ ROM

***Augmentation of labour – with abnormalities excluded @ action line:***

**Pitocin (Oxytocin) – General information:**

* **Indications**:
	+ IOL (prostaglandins are preferable)
	+ Inadequate uterine contractions during 1st and 2nd stages
	+ Post-partum atonic uterus
	+ Stimulation of milk ejection during breastfeeding
	+ Induction of uterine contractions during oxytocin stress test (NB. Now replaced by nipple stimulation)
* **Contra-indications**:
	+ Absolute: Fetal distress; upper segment uterine scar; evident CPD
	+ Relative: Placenta praevia; ? CPD; lower segment uterine scar; grande multiparity; uterine overdistension
* IV administration – **15 dropper**:
	+ Dilutent: 5% Dextrose in H­2O
	+ Dosage:
		- Multips: 1 IU In 1l 5DW; start at 15dpm → double rate q15min; Max=60dpm
		- Primips: 5 or 10IU/l; start at 3dpm or 1.5dpm respectively → double rate q15min; Max=60 & 54dpm respectively
		- Post-partum: 20-40 IU at rate of 20-25dpm
	+ Drop chamber: 15dpm → double rate q15min until 3-4contractions/10min
	+ Prevention of water intoxication: Give balanced electrolyte solution
* IV administration – **60 dropper** set:
	+ As above BUT
	+ Oxytocin 10IU in 200mL Saline with 60 dropper IV set; change dose q30min by 6dpm (start with 6dpm; Max=60dp
* If failure to augment labour → C/S

***Prevention of PPH*** – Oxytocin 10mg IMI Stat

***Preoperative medication***:

* Maxalon 10mg stat PO
* Sodium Citrate 30ml stat PO
* Urinary catheter
* Cefzol 1g q8h

***Rhesus-isoimmunization***:

* + Prophylaxis:

|  |  |
| --- | --- |
| **Time** | **Anti-D globulin** |
| 28 wk | 100μg |
| 32-34 wk | 100μg |
| Procedures/complications in 1st/2nd/3rd trimester | 100μg |
| Postpartum:* + Minimize possible transplacental bleeding
	+ Determine fetal Rh status
	+ Do maternal indirect Coomb’s test (for anti-bodies)
	+ Fetus Rh negative
	+ Fetus Rh positive and maternal antibodies absent
	+ Fetus Rh positive and maternal antibodies present

Administer anti-D globulin within a.s.a.p. (preferably within 72hr)If massive transplacental bleeding is suspected, a Kleihauer-Betke test should be done. The anti-D dose should be adjusted (20μg per ml fetal erythrocytes). Remember: Patient with anti-bodies>1:8 should be referred to tertiary institution for further tests, management and delivery. | None300μgNone (unless titre below 1:8) |

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|  **Caesarean section & external cephalic version:** |

***Aetiology*** – abnormal lie and presentation (To be excluded by US if still abnormal at 32 weeks) – see also below:

|  |  |
| --- | --- |
| * Multiple pregnancy
* Multiparity
* Premature labour
* Polyhydramnios
* Contracted pelvis
 | * IUCD
* Congenital uterine abnormalities
* Congenital fetal abnormalities
* Pelvic tumors e.g. leiomyomata
* Extra-uterine pregnancy
 |

If all of the above excluded (at 32 weeks), proceed with conservative management until 37 weeks, then attempt ECV:

* External version:
	+ Assess FHR (if distresses C/S)

**Note:**

**Contra-indications to ECV:**

* **APH**
* **Multiple pregnancy**
* **Severe PET**
* **Fetal distress**
* **Classical C/S**
* **Premature labour**
* **PROM**
* **<32 weeks**
* **Oligohydramnios**
* **2 previous C/S**
	+ Empty bladder
	+ >36 weeks give nifedipine
	+ Mother in 45˚ oblique position
	+ Powder on abdomen, use 2 hands and direct fetus in direction of FLEXION
	+ ? Vaginal bleeding – if yes do emergency C/S
	+ ? Abnormal FHR – if yes – return to original position – if still abnormal do emergency C/S
* Internal version ONLY IF:
	+ Small non-viable fetus AND
	+ Fetal distress OR cord prolapse AND
	+ Fully dilated cervix AND
	+ No available C/S facilities

***Indications for C/S:***

* Fetal distress
* CPD
* Malpresentation incl. breech
* Placenta praevia
* Previous C/S or uterine surgery
* Failure to progress despite optimal control
* Failed IOL
* Cord prolapse/Prolapsed arm
* Multi-fetal pregnancy
* Cervical cancer
* Previous surgery for incontinence
* HIV positive mothers

***Classical C/S indications:***

* Transverse lie
* Breech presentation
* Small baby
* Previous classical C/S

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|  **Abnormalities of pregnancy:** |

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| **Placental, umbilical cord, membrane & amniotic fluid abnormalities and their interpretation:** |

|  |  |  |
| --- | --- | --- |
| **Abnormality** | **Pathology** | **Clinical significance** |
| **Bilobata** | 2 or more lobes of equal size | None |
| **Bi-, tripartite** | Lobes separated by membranes | Associated with vilamentous implantation of umbilical cord → haemorrhage |
| **Fenestrata** | Focal absence of placental tissue | None |
| **Membranacea** | Thin stretched placenta with villi over whole endometrial surface | APH; PPH; Pretrm labour; Placental insufficiency |
| **Succenturiata** | Additional small lobe joined by blood vessels via membranes | PPH |
| **Monochorial twins** | 1 Amnion | High perinatal mortality rate |
| **Monochorial twins** | 2 Amnions | As for twins |
| **Dichorial twins** | 2 Chorions and amnions | As for twins |
| **Circummarginata** | Membranes implant just inside the edge of placenta |  Usually none |
| **Circumvallata** | Membranes folded back and implanted onto themselves to form a ring | Usually none |
| **Large placenta** | Weight > 600g | DM; Maternal syphilis (untreated); Multiple pregnancy; Hydrops foetalis |
| **Small placenta** | Weight < 400g | Prematurity; Placental insufficiency; Nutritional deficiency (low protein intake); Cigarette smoking; Heroin addiction; Alcoholism; Chronic UTI; Chronic systemic maternal disease. |
| **Abruptio placentae (maternal surface)** | Retroplacental clot causes a depression in placental surface | Abruptio placentae → APH |
| **Pale surface (maternal surface)** |  | Immaturity; Anaemia due to haemorrhage; Erythroblastosis fetalis; syphilis |
| **Infarctions (maternal surface)** | Dark red (fresh infarct) to yellow-white (old infarct) | Pre-eclampsia; DM; May be normal |
| **Placenta accrete (maternal surface)** | Portion or whole placenta abnormally attached to uterine surface. Dicidua baslis partially or totally absent → chorionic villi attached directly to myometrium | Mx:If manual removal fails → Hysterectomy (family complete) OR left in situ (wants more children) → Risk of necrosis.infection, therefore  |
| **Placenta increta (maternal surface)** | Penetration of villi into but not through myometrial wall | give antibiotics → if infection insues → consider hysterectomy (septic shock |
| **Placenta percreta** | Penetration through myometrium up to serosal surface of uterus → baldder penetration or uterus rupture | risk) esp. if in lower segment. Ligation of internal iliac arteries ineffective in these haemorrhages.  |
| **Battledore placenta** | Umbilical cord inserts on edge of placenta | No obstetric/fetal associations |
| **Vilamentous insertion** | Umbilical cord inserts into membranes instead of chorionic plate | Exposed blood vessels at risk for haemorrhage during amniotomy, intrauterine catheter insertion or spontaneous rupture of membranes esp. if vasa praevia. Pressure of presenting part on vessels → placental insufficiency. C/S if bleeding causes fetal distress ELSE do Apt Test |
| **Congenital absence of umbilical cord** | Fetus joined directly to placenta | IUD is common |
| **Short umbilical cord (<30cm)** |  | May lead to AP; malpresentation; delay in 2nd stage; uterine inversion; haemorrhage |
| **Long cord (≥70cm)** |  | May lead to prolapse; knows; limb amputations |
| **Only 1 umbilical artery** |  | Associated with ventricular septal defects; Oesophageal atresia; Renal abnormalities; Double ureter; Anus imperforatum; Meckel’s diverticulum |
| **Varicose veins** |  | May rupture → hematoma (harmless) |
| **True knots** | Fetus moves in loop in early pregnancy | Tighten during descent → occlusion |
| **False knots** | Kink or loop in small portion of an umbilical blood vessel | Of no clinical significance |
| **Torsion** |  | Often occurs in polyhydramnios or ↓ in Wharton’s jelly e.g. IUGR |
| **Abnormal thickness of cord** |  | Depends on Wharton’s jelly. Too thin associated with IUGR or oligohydramnios. Too thick is not abnormal (must be well clamped at birth) |
| **Red/rust colour membranes** |  | Due to haemorhage |
| **Green membranes** |  | Meconium (fresh meconium can be wiped off but old meconium cannor due to phagocytosis i.e. tattooing of membranes) |
| **Amnion nodosum** | Yellow, opaque nodules on amnion on fetal side – mixture of vernix, fibrin, desquamated epithelial cells and lanugo hair | Often seen in oligohydramnios |
| **Placental cysts** | Subchorionically but occasionally on fetal side. Vary from 0.5-10cm. Watery or bloody fluid. Occur singly but may multiply | No clinical significance |
| **Segmental constriction of arteries and veins** | On fetal surface of placenta | Associated with hypertensive disease |
| **Thrombosis of chorionic vessels** | Due to inflammatory thrombosis as seen in meconium exposure or underlying placental infarct | Prevalent in mothers with DM |
| **Amnion bands** | Thin thread or bands run across amniotic cavity | May lead to congenital amputations |

***Abnormalities of amniotic fluid:***

* **Polyhydramnios** (≥2000ml) – Conditions associated with:
	+ Maternal disease
		- Iso-immunization; DM; Any cause of anasarca e.g. heart failure
	+ Placental and umbilical cord abnormalities
		- Chorioangioma; Placenta circumvallata; Umbilical cord stenosis
	+ Fetal conditions
		- Mutiple pregnancy – especially twin to twin transfusion
		- Gastrointestinal obstruction – EA; diaphragmatic HH; DA; JA; Annular pancreas; omphalocele; mid-intestinal volvulus; gastroschisis
		- Central nervous system – anencephaly; hydrocephaly; spina bifida; encephalocele; microcephaly; hyrancephaly
		- Skeletal – Arthrogryposis multiplex; osteogenesis imperfecta
		- Fetal tumors – Cystic adenomatoid abnormalities of lungs; sacro-coccygeal teratoma; malignant cervical teratoma
		- Cardiac disease – VSD; arrythmias
		- Fetal renal/endocrine abnormalities – ADH deficiency; partial/complete urinary tract obstruction
		- Haematologic – Thalassaemia major; feto-maternal haemorrhage
		- Intra-uterine infections – Rubella; syphilis; toxoplasmosis
		- Other – Fetal retroperitoneal fibrosis; non-immunologic hydrops foetalis
	+ Idiopathic
* **Oligohydramnios** (<600ml) – Conditions associated with:
	+ Placental insufficiency
	+ Post-term pregnancy esp. post maturity
	+ Chronic drainage of amniotic fluid (preterm rupture of membranes)
	+ Congenital fetal abnormalities esp. renal agenesis and urinary outflow obstruction
* **Abnormal colour**:
	+ Green meconium – Fetal distress
	+ Brown meconium – Previous fetal distress
	+ Yellow – Bilirubin due to haemolysis e.g. Rh-isoimmunization (amniotic fluid should contain no bilirubin after 36wk)

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|  **Twins:** |

***Types:***

* Monozygotic
	+ Same sex
	+ <4 membranes in septum between 2 sacs
	+ Share same chorion
	+ Share amnion/separate amnion
	+ Not always identical – the earlier the division the more dissimilar the fetuses can be
	+ The earlier the embryo divides the more similar the placentas and membranes are to those of dizygotic twin:
		- Early – 2 chorions & 2 amnions
		- Intermediate – 1 chorion & 2 amnions
		- Late – 1 chorion & 1 amnion
	+ Can be discordant e.g. twin-to-twin transfusions due to vascular connections
		- Diagnosed Hb difference of >5g/dl between to fetuses)
		- Note donor, although small and pale has better chance of survival out of uterus.
		- Receiver often dies of cardiac failure
		- In sever cases donor dies in-utero and becomes amorphous & papery = “fetus papyraceus”
* Dizygotic
	+ Fertilization of 2 separate ova
	+ Can be different sexes
	+ Own chorion/amnion
	+ Own placenta each, sometime partially fused but no vascular connections in monochorionic placenta

***Dx:***

* Hx: Family history; ↑ Minor complaints; ↑ Fetal movements
* Sx: Large-for-date uterus; ↑ SF measurements; Wide transverse uterus measurements; ↑ Maternal weight gain; Polyhydramnios; Multiple fetal parts; Fetal head feels smaller when related to uterus
* Clinical: 2 Heads palpated; 3 Fetal poles palpated; 3 Fetal hearts heard
* US: See ANC
* X-ray: Only if US not available

***ANC:***

* Early diagnosis
* Determination of gestational age – dates vs. early US
* ANC Care:
	+ Increased rest
	+ More frequent visits
	+ Hb repeated at 20, 28 and 36 weeks
	+ Cautious interpretation of routine observations
	+ US @ diagnosis, 20wk
	+ PV from 28wk
	+ Antenatal fetal monitoring from 32-34wk
	+ SF above 90th centile
* Prompt hospitalization when complications occur
* Prevention of preterm labour

***Cx:***

|  |  |
| --- | --- |
| **Antepartum:** | **Intra-partum:** |
| * Prematurity
* PET
* IUGR (Twin-twin T/F; Unequal placental function)
* Spontaneous miscarriage
* Polyhydramnios & Congenital abnormalities
* Anaemia
* APH
* Cord prolapse
* Conjoint twins
 | * Abnormal lies & malpresentations
* Uterine dysfunction
* Fetal distress
* Cord prolapse
* Intrapartum haemorrhage
* Complicated deliveries
* Locked twins
 |
| **Post-partum:** |
| * PPH
* Perinatal mortality & morbidity
 |

***Mx:***

* Do amniocentesis before C/S to test lung maturity
* C/S Mostly if:
	+ Either twin’s lie is transverse
	+ EFW of 1/both 1000-1500 or >3500g
	+ Associated obstetrical complication or indication
	+ 1st baby is a breech
	+ 1st and 2nd are breech with extension of the head
	+ Previous C/S
	+ Triplet 1/more abnormalities present
	+ Siamese twins
	+ Poor progress
	+ Fetal distress

***1st Stage of labour:***

1. **Patient should lie on her side**
2. **IV with 2nd IV ready with 5-10IU oxytocin**
3. **NPO**
4. **CTG – Monitor 1st fetus internally and 2nd externally**
5. **Analgesia & sedation**
6. **Hospitalize**
7. **PV with ROM to exclude cord prolapse**
8. **Monitor progress according to 4 P’s → If can’t be corrected → C/S!!!**

***2nd Stage of labour***

1. **In theatre**
2. **In lithotomy with 15˚ lateral tilt to left**
3. **Paediatrician present**
4. **2x Resuscitation sets/incubators ready**
5. **Deliver 1st baby like singleton (since they’re often preterm/small for dates → forceps assistance)**
6. **Clamp 1st cord immediately**
7. **Examine lie of 2nd baby - As soon as in longitudinal lie → cautious oxytocin infusion may be used to restart contractions – Not done at Kalafong/PAH**
8. **Transverse – Try ECV and if it fails, do emergency C/S (if ECV results in breech, you can deliver vaginally BUT with difficulty)**
9. **Examine FHR**
10. **If Fetal distress/prolapse → emergency C/S**
11. **If both above are normal – Wait for engagement and ROM**

***3rd Stage of labour***

1. **Look for triplet first**
2. **Deliver placenta by active method**
3. **Keep bladder empty**
4. **Mx PPH & episiotomy**
5. **Rub-up uterus**
6. **Oxytocin 20-40IU/litre over 8-12hrs**
7. **Oxytocin 10IU IMI STAT**
8. **Look for complete membranes/placenta**
9. **Check both babies’ haemoglobin levels**
10. **Note which baby was born first**
11. **If locked twins → C/S!!!**

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| **Intrauterine growth restriction**: |

***Definition***: LBW<2.5kg; SGA<10th Centile; IUGR <10th centile and clinical signs

***Risk factors***:

|  |  |  |
| --- | --- | --- |
| **Fetal factors** | **Placental factors** | **Maternal factors** |
| * Multiple pregnancy
* Congenital abnormalities
* Chromosomal abnormalities
* Inborn errors of metabolism
* Extra-uterine pregnancy
 | * Decreased blood flow
* Decreased exchange area
* Placenta praevia
* Twin to twin transfusion
* Post-maturity
* Abnormal placental morphology
* Placenta accrete
* Chromosomal mosaicism of placenta
 | * PET
* Malnutrition/Undernutrition
* Decrease socio-economic status
* Intra-uterine infection
* Systemic disease
* Smoking or alcohol use
* Chronic infection or cancer
* Increased altitude
* Very young/old patients
 |

***2 Types occur:***

* Symmetrical: SGA (small for dates) for all dimensions – Indicates aetiology before 20wk
* Asymmetrical: Skull normal, body is long and emaciated – Aetiology after 20wk

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| --- | --- |
| **Symmetrical causes** | **Asymmetrical causes** |
| * Congenital infection
* Congenital abnormality
* Maternal drug abuse
* Maternal smoking
* Alcohol abuse
 | * Maternal vascular disease
* Placental insufficiency:
	+ PET & chronic HT
	+ Smoking
	+ Excessive physical excersize
	+ Severe emotional stress
	+ Drugs such as adrenalin, noradrenalin or high levels of ATII
 |

***Dx:***

* Identify IUGR risk factors
* Clinical parameters:
	+ SF below 10th centile (poor fundal growth)
	+ Advanced ripening process
	+ High-risk patient – see Wennergren’s risk score system (≥4 indicates IUGR)
	+ Poor maternal mass gain
	+ Inadequate uterine growth; small for dates
	+ ↓ Amniotic fluid; ↑ basal tone and more Braxton-Hicks contractions
	+ Fetus has large head and is hyperflexed
	+ ↑ Myometrial irritability → ↑ contractions during palpation
	+ FHR abnormalities; ↓ Fetal movements
	+ Meconium stained liquor with ROM
* US measurements and findings:
	+ ↓ BPD (relevant only in symmetrical IUGR)
	+ ↑ FL:AC or ↑ BPD:AC (asymmetrical IUGR)
	+ Advanced placental maturity grading
	+ EFW below 10th centile, calculated from abdominal circumference and BPD
* Post-natal:
	+ Assess maturity: Ballard score

***Cx:***

**Wennergren Risk Score System:**

Previous IUGR or NND 1

BP≥140/90mmHg after 34wk 1

Hx of renal disease or UTI in this preg. 1

Smoking 2

APH or preterm labour 1

Insufficient mass gain 1

↓ or no ↑ in mother’s abdominal girth 1

↓ or no ↑ in fundal height 1

* Fetal hypoxia
* Polycythaemia
* Hypothermia
* Hypoglycaemia
* Hypocalcaemia
* Decreased gastric motility
* Decreased growth and development
* Increased risk of cardiomyopathy in adult life
* Mental retardation and congenital abnormalities

***Mx:***

* Detection
	+ High-risk factors (Wennergren)
	+ SF measurement
	+ US and accurate determination of pregnancy duration
* Antenatal
	+ Determine aetiology; treatment; timing and method of delivery
		- Placental functions: Kick chart and NST
		- Fetal lung maturity
		- Cervical status (modified Bishop’s score)
		- Fetal mass (C/S if <1500g)
		- Maternal condition that necessitates C/S
* Delivery
	+ Meticulous fetal heart monitoring (look for variable/late decelerations)
	+ Active resuscitation of neonate
* Postnatally
	+ Adequate paediatric care of neonate and associated risk factors
		- Determine duration of pregnancy (reliable dates; early US; Ballard score)
		- Confirm growth restriction (Birth weight < 10th centile)

***Delivery timing:***

* Assess cervix according to modified Bishop’s score
	+ If favourable; hard fetal head and ≥34wk → Deliver
	+ If not favourable; no fetal distress → Can wait until 37-38wk– Ask 4 questions:
		- What is aetiology
		- Is effective treatment available and can deterioration be prevented?
		- What is most feasible method of determining intra-uterine fetal well being?
		- What is optimal timing and method of delivery?
* If fetal distress → Deliver
* If fetal heart absent → Determine cause and treat as for IUD

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|  **Intrauterine demise:** |

***Definition***: Fetal death after viability has been reached i.e. ≥ 22wk and/or ≥500g

***Risk factors & Ax***:

|  |  |
| --- | --- |
| * Previous stillbirth
* Placental dysfunction →IUGR
* Maternal age: <18 or ≥35yr
* Maternal disease e.g. HT or DM
* Infections e.g. STORCH, AFIS, Chorioamnionitis
* Rhesus iso-immunization
* Poor socio-economic circumstances
* Cigarette smoking, alcohol, drug abuse
* Use of certain medications
* Multiple pregnancy
* Chromosomal abnormalities
 | * Non-chromosomal abnormalities
* Poor ANC and labour care
* APH (placenta praevia AND abruption placentae)
* Placental infarction
* Trauma & Uterine rupture
* Cord prolapse
* Post-maturity
* Fetal distress associated with distocia of labour
* Transplacental haemorrhage
* Feto-fetal transfusion
 |

***Dx:***

|  |  |  |
| --- | --- | --- |
| **History:** | **Examination:** | **Special investigations:** |
| * No fetal movements
* 20 weeks with no fetal movements
* Decreased maternal weight
* Decreased symptoms of pregnancy
* Decreased tenderness of breasts
* Brown/watery discharge
* Decreased uterine size or not ↑
 | * Small uterus or not ↑
* Feels firmer and dough-like
* Abnormal position i.e. hyperflexed
* No fetal movements felt
* Difficult to identify 2 poles and limbs
* No fetal heart-beat audible with
* Stethoscope or Doppler
 | * β-HCG decreased or negative
* CTG – No FHR
* US – No movement/FHR/Double ring sign/Skull collapse and over-riding/Gas accumulation/Sever oligohydramnios
* AXR – Gas in fetal heart; Spalding sign; Ball sign; Halo sign; Abnormal fetal limb position
 |

***Cx:***

* Infection OR sepsis
* Defibrination syndrome (DFS)
* Psychological problems

***Mx:***

* Confirm diagnosis → Tell patient result immediately → Allow her to mourn
* 3 Important steps:
	+ Thorough examination to look for cause
	+ Look for complications and act accordingly
	+ Assess relevant obstetric factor in Mx e.g. cervix condition, duration of pregnancy, nature of presenting part, possible uterine scars etc.
* General measures in vaginal delivery:
	+ Adequate emotional support
	+ Adequate pain relief e.g. Omnopon 10-20mg IM q4h
	+ Friends/Relatives welcome in ward should patient wish it
	+ Treat baby with same sensitivity as live infant
* Conservative (if patient finds active Mx unacceptable)
	+ Delivery within 3 weeks
	+ Psychological follow-up
	+ Platelet and fibrinogen tests at follow-up
* Active (if conservative Mx unacceptable; Ix; DFS; ROM; >3 weeks)
	+ Cervix favourable: Administer oxytocin without amniotomy
	+ Cervix unfavourable:
		- PGE2 tab. intracervically or vaginal gel
		- PGF2α intra-amniotically or transcervically (extra-amniotically)
		- Progesterone antagonist, Mifepristone
* C/S if:
	+ Absolute indications:
		- Major degree of placenta praevia
		- Severe CPD
		- Rupture or imminent rupture of uterus
		- 2 or more previous C/S
		- Previous classical C/S
	+ Relative indications:
		- One previous C/S – NB factors: Degree of disproportion and maceration
		- Transverse lie or shoulder presentation in advanced labour with rupture membranes
		- Fetal tumour or severe abdominal distension (e.g. hydrops foetalis)
* Post-partum care:
	+ Counseling for patient and her husband
	+ Suppression of lactation
	+ Rh prophylaxis if indicated
	+ Contraception
	+ Consider post mortem examination of baby
	+ Advise parents regarding births registration, burial etc.
	+ Future pregnancy planning
	+ Complete births-deaths notification and J88

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|  **Teenage pregnancy**: |

***Definition***: If mother <19 years (some texts say only 16 is of significance) – need more frequent ANC

***Cx:***

* Hypertension of pregnancy
* Anaemia
* SGA
* PROM
* Premature labour

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| **Old primigravida vs. Grand-multipara** |

***Cx:***

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| --- | --- |
| **Old primigravida** | **Grand multipara** |
| * Miscarriage
* Hypertension of pregnancy
* Diabetes mellitus
* Trophoblastic neoplasia
* Congenital abnormalities
* APH and PPH
* Hyperemesis gravidarum
* Leiomyomata
* PROM
* Premature labour
* Uterine dysfunction
* Malpostion (OP)
* LBW
* HBW (>4000g)
* Vaginal/Perineal tears
* Retained placenta
* Decrease breastfeeding capability
* Increase maternal mortality
* Increased perinatal mortality
 | * Obesity
* Malnutrition
* Anaemia
* Increased minor complications
* Spondylolisthesis → CPD
* Progressively larger babies → CPD
* Multiple pregnancy
* Uterine rupture (labour)
* Premature and preterm labour
* Increase maternal mortality
* Increase perinatal mortality
* Congenital abnormalities
* Abortion
* Abruptio placentae
* Abnormal lie, positions and presentations
* Umbilical cord prolapse (labour)
* Rh-isoimmunization risk ↑ with each pregnancy
* Cervical CA
* PPH
 |

***Mx:***

* NB!!! Both are high-risk patients
* 1st ½ of pregnancy:
	+ Amniocentesis (>37years)
	+ Early US
	+ Look especially for trisomy 21
	+ Look for malpresentations or abnormal fetal lie
* 2nd ½ of pregnancy:
	+ Early ANC examination
	+ Glucose tolerance @ 28 & 36 weeks
	+ Fetal welfare & growth assessment
* Labour:
	+ CTG
	+ Avoid oxytocin
	+ Manage PPH actively
* Pueperium:
	+ Breastfeeding advice
	+ Post-partum sterilization counseling

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|  **Prolonged pregnancy/Post-maturity:** |

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| ***Post-maturity*:** |

***Dx*** – made neonatally with following signs:

* No/decreased lanugo
* No/decreased vernix
* Dry, wrinkled, cracked or desquamated skin
* Decreased sub-cutaneous fat
* Increased scalp hair
* Long and thing limbs
* Long fingers
* Larger/Harder head
* Alert/Apprehensive faces
* Meconium staining

***Mx:***

* Dx: Sure dates or early US
* Exclude medical/obstetrical risk – if present assess cervix
* Assess fetal welfare/growth – if normal, manage expectantly and re-evaluate q3-4 days until 44 weeks or FD, else assess cervix
* Cervix assessment: If favourable → IOL if no C/I; If unfavourable/IOL C/I → C/S

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| **Prolonged pregnancy:** |

***Definitions:***

* **Post-mature:** Neonatal diagnosis with the above signs
* **Post-term:** Gestation ≥ 40wk as diagnosed on early US
* **Post-dates:** Gestation ≥ 42wk according to dates given by patient

***Cx:***

* Congenital abnormalities
* Anencephaly
* CPD
* Shoulder dystocia

***Post-mature syndrome*** – post-mature babies are prone to the following:

* Fetal distress
* Meconium aspiration
* Asphyxia
* Metabolic acidosis
* Hypoglycaemia
* Dehydration
* Increased perinatal mortality
* Neonatal feeding problems
* Neonatal sleep disturbances
* Decreased mental development

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|  **Pregnancy-related sepsis & shock:** |

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| **Puerperal sepsis:** |

***Definition*** - sepsis: Pyrexia ≥ 38˚C on 2 separate occasions within the first 14 days post delivery, excluding the first 24hr, if observations are taken on a 4-6 hourly basis.

***Sx*** – puerperal sepsis:

* Malaise; anorexia; headaches
* Fever
* Tachycardia
* Offensive lochia/discharge
* Lower abdominal discomfort
* Uterus not well contracted (sub-involution = endometritis)
* Dilated cervix at > 1wk post-partum
* If puerperal sepisis is associated with pelvic cellulitis:
	+ Excitation tenderness
	+ Unresponsive but tender parametria
	+ ± Abscess in pouch of Douglas
	+ ± Peritonitis & septic shock
	+ Distended abdomen (late sign) ± rebound tenderness (rare) – indicates intra-abdominal involvement
	+ Ileus & fever → search for intra-abdominal free puss/abscess

***Assessment and evaluation of severity of sepsis complicating an abortion and/or other condition:***

|  |  |  |
| --- | --- | --- |
| **Low risk abortion** | **Moderate risk unsafe abortion** | **High risk unsafe abortion** |
| Temperaure ≤ 37.2˚C | 37.3-37.9˚C | ≥ 38˚C |
| SBP unaffected | SBP unaffected | SBP < 90 mmHg |
| Pulse < 90 bpm | 91-119 bpm | ≥ 120 bpm |
| Respiratory rate < 20 breaths/min | 20-24 breaths/min | >24 breaths/min |
| Ward haemoglobin > 10g/dl |  |  |
| No clinical signs of infection | Offensive products of conception; Localized peritonitis | Peritonitis |
| No system or organ failure | - | Organ failure |
| No suspicious findings on evacuation of uterus | - | Presence of foreign body or mechanical injury, on evacuation of uterus |
| Uterus size < 12 weeks | 12-16 weeks | > 16 weeks |

***Ax*** – pathogens:

|  |
| --- |
| **Gram-positive organisms:** |
| **Aerobic cocci** | **Anaerobic cocci** | **Bacilli** |
| Group-A streptococciGroup-B streptococciGroup-D streptococci (S. Faecalis)Staphylococcus aureus  | PeptococciStreptococci | Clostridium perfringensLiteria monocytogenes |
| **Gram-negative organisms:** |
| **Cocci** | **Aerobic bacilli** | **Anaerobic bacilli** |
| Neisseria gonorrhoea | Enterobacteriaceae e.g. E. Coli; Klebsiella; Enterobacter; Proteus; Citrobacter; Gardnerella vaginalis (rare) | Bacteroides e.g. B. Fragilis; B. Melaninogenicus |

***Prevention:***

* General measures:
	+ Strict aseptic technique during deliveries
	+ Prophylactic antibiotics (Cefoxitin) in conditions with ↑ risk for sepsis e.g.
		- Prolonged rupture of membranes
		- Prolonged labour
		- Severe tissue trauma
		- Haematoma
		- Intra-uterine manipulations
	+ Prevent OR Rx anaemia (decreased incidence of Ix)
	+ Early diagnosis & Rx of puerperal Ix
* Specific measures:
	+ Abortion:
		- Antibiotic prophylaxis (Doxycycline)
		- Suction curettage under local anaesthesia
		- Evacuation within 6 hours
		- Ensure Hb > 10 g/dl
	+ Preterm prelabour ROM/Prolongued ROM
		- Antibiotics in therapeutic dosages, covering Gr. B Streptococcus, Mycoplasma and Ureaplasma
		- Sterile speculum to confirm diagnosis
		- PV only when in active labour
		- VCT and if HIV positive → more aggressive treatment (signs may be ↓)
		- Antiseptic cream for PV
	+ C/S for Puerperal sepsis
		- Antibiotic prophylaxis (single dose) before all C/S
		- Antibiotic therapeutic dose x3d IV for all emergency C/S if patient at high risk for sepsis
		- Work-up of every case of puerperal pyrexia – exclude:
			* Respiratory tract infection
			* UTI
			* Mastitis
			* Wound infection
			* Pelvic infection
		- Manage the following promptly:
			* Sub-involution of uterus
			* Lower abdominal tenderness
			* Foul smelling discharge
			* Open cervix, coupled with signs of sepsis
		- Early mobilization
		- Prophylactic anticoagulation
		- VCT and if HIV positive → more aggressive treatment
1. **Systematic evaluation of organ systems → if abnormal → prompt special investigations. If they can’t be done → refer.**
2. **Systems evaluated – as for PET**
3. **Resuscitate patient**
4. **Prophlactic antibiotics**
5. **Empty uterus**
	1. **MVA under local anaesthesia (level 1 hospital) with if safe abortion**
	2. **MVA or evacuation in theatre if needed (level 1 with theatre or level 2) if moderate unsafe**
	3. **Laparotomy (level 2/3 hospital with expertise) if 2 or more organ systems failed OR considering changing antibiotic cover**
	4. **Evacuation in theatre and evaluation for hysterectomy in high risk unsafe abortions (level 3)**
	5. **At level 3 must have high care or ICU facilities**
6. **Observations:**
	1. **Post NVD:**
		1. **Directly post delivery – BP, PR, Respiratory rate, T˚, abd. Exam., PVB**
		2. **Hb checked within 24hr**
		3. **T˚, BP, PR, RR & vaginal pads q30min for 2hr then q6h until D/C**
		4. **Education on warning signs**
	2. **Post-uncomplicated evacuation of uterus/MVA:**
		1. **BP, PR, RR, T˚ and PVB STAT**
		2. **Hb within 24hr**
		3. **Vitals & vaginal pad q1h for 2 hr then q6h until D/C**
	3. **Post-C/S or theatre evacuation**
		1. **Hb within 24hr**
		2. **Vitals, urinary output & vaginal pads q30min x1hr, then q1h x4hr, then q6h x24hr, then q12h until D/C**
	4. **Abortion or puerperal sepsis complicated by single – or multi-organ dysfunction**
		1. **Vitals q15-30min**
		2. **T˚, urinary output & CVP hourly**

***Mx*** – see also septic shock:

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|  **Septic shock:** |

***Ax*** – release of endotoxins by Gram-negatives (e.g. E.Coli) &/or Gram-positives (e.g. streptococci)

***Sx*** – 3 phases:

|  |  |
| --- | --- |
| **Early (warm) phase:** | * Rigors
* Temperature ≥ 38˚C
* Warm skin (vasodilatation)
* Glowing cheeks (vasodilatation)
* SBP ≈ 90mmHg
* CNS = Normal (± anxious; ± restlessness; ± confusion)
* CVS: ↑ Cardiac output; ↓ peripheral resistance
* RS: Tachypnoea
* GUT: Sx of genital tract Ix; Urine output still normal
 |
| **Late (cold) phase:** | * Cold & clammy (vasoconstriction)
* Hypothermia
* Peripheral cyanosis
* SBP ≈ 70mmHg
* CNS: Mental function deteriorates
* CVS: Rapid, weak & thready pulse; ↓ Cardiac output
* RS: tachypnoea becomes inconspicuous
* GUT: Oliguria
 |
| **2˚ Irreversible shock:** | * Cold & clammy
* Pale/cyanotic
* CNS: ± Coma
* CVS: Progressive ↓ in cardiac output & peripheral resistance
* RS: ARDS
* GUT: Anuria
* Hepatic: Hepatic failure (rare)
* Adrenal gland: Failure (rare)
* Haematological: DIC; Metabolic acidosis (due to cellular hypoxia)
 |

***Special investigations:***

* FBC, differential & platelet count:
	+ HcT ↓ with severe sepsis
	+ WCC ↑ with severe sepsis
	+ Platelets ↓ with DIC
* Blood/lochia culture M, C & S – before antibiotics given & during fever peaks
* ESR
* UKE, LFTs
* S-Proteins (↓ progressively with sepsis)
* S-Fibrinogen,S-FDP’s &PTT
* ABG & Acid-base balance
* Urine M, C & S
* Discharge, pus, abscess &/or infected tissue M, C & S
* CXR – to assess chest involvement; diagnose a sub-phrenic abscess
* AXR – to look for sever abdominal signs
* US/CT/MRI – of abdomen & pelvic cavity to look for abscesses; perinephric abscess (due to ureteric injury during C/S)
1. **Intravenous antibiotics empirically:**
	1. **Regime 1:**
		1. **Ampicillin 1g q6h**
		2. **Metronidazole 500mg q8h**
		3. **Gentamycin 80mg q8h**
	2. **Regime 2:**
		1. **Clindamycin 300-600mg q6h**
		2. **Gentamycin 80mg q8h**
2. **Adjust antibiotics according to M, C & S results**
3. **If there is an improvement in 24-48hr → give antibiotics PO for 10days**
4. **If there is no improvement or deterioration → Re-evaluate:**
	1. **Check dosage (is it efficient?)**
	2. **Not reaching infective nidus e.g. Retained products & severe endometritis → Consider hysterectomy**
	3. **Peritonitis ± abscess OR**
	4. **Abscess ± peritonitis**
	5. **Wound Ix**
	6. **Extragenital Ix**
	7. **Septic pelvic thrombophlebitis**
	8. **Septic shock**
	9. **Retained placenta (suspect if cervic internal os open > 1wk ± sub-involution)**
5. **If an abscess → Ø drainage**
6. **Retained products/placenta → Remove under GA**
7. **If no source found & if no response to maximal conservative Rx within 24-48hr → laparotomy:**
	1. **Vertical incision**
	2. **Explore all organs & peritoneum**
	3. **Obtain samples for microbial investigations**
	4. **Drain abscesses & removed with capsule intact if possible**
	5. **Open broad ligament**
	6. **If uterus is pale, discoloured (yellow/purple) or distinct necrosis → DO HYSTERECTOMY!!**
	7. **If no source of infection & septicaemia continues despite maximal Rx → DO HYSTERECTOMY!!!**
		1. **Retain ovaries in young patient if they appear normal & aren’t part of an abscess**
	8. **If septic-thrombophlebitis of ovarian veins → remove septic focus & ligate veins proximally to prevent septic-embolism**
	9. **Rinse thoroughly before closure**

***Mx:***

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|  **Preterm rupture of membranes vs. premature rupture of membranes:** |

***Definitions:***

* **Preterm ROM = ROM < 37 weeks**
* **Premature ROM = ROM > 1hr before labour onset**

***Ax:***

* Chorioamnionitis
* AFIS
* Multiple pregnancy
* Polyhydramnios
* Cervical incompetence
* Congenital abnormalities of uterus e.g. bicornuate
* Placenta praevia
* Asymptomatic bacteriuria

***Dx:***

* Hx
* Litmus test
* Ferning test
* Nile-blue sulphate test – fetal cells present at 36 weeks stain orange
* Pooling
* Cough test

***Indications for active management or preterm ROM:***

* 34wk gestation or more
* Fetal pulmonary maturity, irrespective of age
* Pregancy of ≤ 26 wk (outcome with conservative management is poor)
* Intra-uterine infection
* IUD or severe congenital abnormalities
* Fetal distress
* Cord prolapse
* High risk of infection
* Maternal DM; Cardiac valvular lesions; PET
* Significant IUGR
* APH, excluding placenta praevia

***Mx:***

1. **After diagnosis → Confirm FHR (CTG)**
2. **Determine duration of pregnancy as accurately as possible**
3. **If obstetric indication for C/S → Do it!!!**
4. **>34 weeks – TOP by IOL (max. 36 weeks expectantcy)**
5. **L/S <2 – postpone until fetus mature (give steroids) – deliver if FD or Ix develops**
6. **L/S >2 with no other problems – deliver at 34-36 weeks unless FD/Ix**
7. **Ix present: TOP – Symptoms:**
	1. **Fetal tachycardia**
	2. **Maternal fever**
	3. **Maternal tachycardia**
	4. **Uterine tenderness**
	5. **Foul-smelling amniotic fluid**
	6. **Pus draining through cervical os**
8. **Fetal distress present: TOP**
9. **Spontaneous sealing of membranes (with no FD/Ix) – await spontaneous labour**
10. **Remember:**
	1. **Steroids**
	2. **Bedrest**
	3. **No PV examination until onset of labour**
	4. **Actively search for signs of intra-uterine infection – monitor maternal pulse rate, T˚ and FHR q4h**
	5. **Do FHR monitoring daily**
	6. **No coitus**
	7. **Controversy: Tocolysis; Anti-biotics**
11. **If there no drainage for 2 consecutive days with no signs of fetal jeopardy or intra-uterine infection → D/C**

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|  **Preterm labour:** |

***Definition:*** Regular contractions (6-8/hr) AND cervical dilatation/effacement < 37weeks

***Risk factors/Ax:***

|  |  |
| --- | --- |
| * Low socio-economic status
* < 18yr or >35yr
* Maternal mass < 50.8kg
* Smoking in pregnancy
* Exhausting work and long work hours
* ↑ Emotional stress during 3rd TM
* ↓ Maternal zinc levels
* History of preterm labour
* Previous 2nd TM abortion
* Congenital uterine abnormalities
* Pregnancy complications e.g. APH
* Infection of maternal genital tract esp. group β-haemolitic streptococcus, STIx
* Maternal systemic infection associated with pyrexia
 | * Aspymptomatic bacteriuria
* Chronica infections e.g. TB & hepatitis
* Chorioamnionitis
* Polyhydramnios
* Multiple pregnancy
* Cervical incompetence
* PROM
* IUGR
* Retained IUCD
* Leiomyomata
* Asherman syndrome
* Fetal congenital abnormalities
* Handling of uterus intra-operatively
 |

***Mx:***

1. **Suppression of labour – C/I:**
	1. **IUCD**
	2. **Cong. Abnormalities of fetus**
	3. **>35 weeks or <20 weeks**
	4. **Intra-uterine Ix**
	5. **Cardiac disease with increased cardiac output**
	6. **Cardiomyopathies**
	7. **Fetal distress**
	8. **Maternal/fetal complications requiring delivery e.g. abruption**
	9. **Uncontrolled DM**
	10. **Severe IUGR**
	11. **Proven lung maturity**
	12. **Relative C/I:**
		1. **PROM without Ix**
		2. **Cervix > 4cm dilated**
		3. **Patient on MAO**
		4. **Patient on β-Stimulants**
		5. **Well controlled DM**
2. **Bed rest in lateral (left) position**
3. **IV Water – decreases ADH and subsequently oxytocin**
4. **Tocolysis using Nifedipine**
5. **Determine if there are maternal/fetal abnormalities which make continuation of pregnancy undesirable**
6. **Monitor maternal fluid balance; PR; Potassium; Blood-glucose**
7. **Steroids given for lung maturity – Celestone 12mg q24hr x2**
8. **Prophylactic anti-biotics e.g. Erythromycin 500mg qid x5-7 q1-2 months**

***If delivery inevitable, decide best route of delivery:***

1. **Prevent intracranial haemorrhage in fetus:**
	1. **Address hypoxia → monitor FHR**
	2. **No bearing down before full cervical dilatation**
	3. **Wide episiotomy**
	4. **? Forceps delivery**
	5. **Elective C/S for SGA/Breech (1000-1500g)**
	6. **Phenobarbitone**
2. **Epidural analgesia – relaxes pelvic floor and prevents premature bearing down**
3. **Routine wide episiotomy and ? forceps delivery (not < 32wk or 2500g)**
4. **Anti-biotics to prevent AFIS/Choriamnionitis**
5. **C/S – Indications: <1500g; Elective if <33wk; IUGR; Suspect abruptio placentae; All other obstetric indications for C/S**

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|  **Amniotic fluid infection syndrome:** |

***Predisposing factors:*** Poor antibacterial activity of amniotic fluid is race related; Coitus during pregnancy (if patients at high risk for infection); Factors which may lead to exposure of membranes e.g. cervical dilatation or over-distension of uterus

***Cx:***

* Preterm labour
* Preterm ROM
* Neonatal pneumonia &/or speticaemia
* APH of unknown origin
* IUGR
* IUD

***Dx:***

* Retrospectively
* Amniotic fluid: Serum glucose >2:1
* Smear from fetal side of membranes within 20min of delivery, then chorionic and amniotic membranes are separated and another smear smear taken of fetal side of chorionic membrane → Sent for gram staining – Polymorph leucocytes confirm diagnosis
* Placental histology

***Mx:***

* Adequate, balanced diet to improve maternal nutrition
* Advice against coitus, or condom use in high risk individuals (for infection), poor obstetric history e.g. multiple pregnancy, preterm cervical dilatation, incompetent cervical os
* Prophylactic anti-biotic use during surgery
* If confirmed postpartum → antibiotics to mother and neonate

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| **Antepartum haemorrhage**: |

***Definition:*** PV Bleeding after 28 weeks gestation (+/- 3%):

***Differential Dx:***

* Placenta Praevia – ass. with multigravidity; previous C/S; advanced maternal age – majority after 36 weeks
* Abruptio placenta – ass with HT & PET; Poor socio-economic status; IUGR; Smoking; Coitus in late preg.
* Vasa praeviae
* Uterus rupture
* Local lesions
* Show

***Grade of placenta praevia:***

|  |  |
| --- | --- |
| **I.** | Implanted in lower segment; doesn’t reach os (also known as PP lateralis) |
| **II.** | Reaches internal os; does not cover os (also known as PP marginalis) |
| **III.** | Covers the internal os, but not to such an extent that the whole os would be covered at full dilatation |
| **IV.** | Placenta covers the whole internal os even at full dilatation; (also known as PP centralis) |

***Sx:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Placenta Praevia** | **Small abruption** | **Large Abruption** | **Local lesions** |
| **External bleeding** | Slight to so severe that it may be life threatening; painless | Usually none | None to slight or moderate. In some cases the external bleeding may be more than the retroplacental bleeding | Usually relatively little; often history of intermenstrual or intercoital bleeding |
| **Internal bleeding** | Little or none | Little | Severe (retroplacental); with/without coagulation defects – if ass. with IUD | None |
| **Colour of blood** | Bright red | Dark red | Dark red with clots | Bright red |
| **Abdominal pain** | Absent except in labour | Absent or slight | Sever and sudden onset | Absent |
| **Backache** | Absent | Sometimes esp. posterior placenta | Often present | Absent |
| **Pulse rate and BP** | Proportionate | Normal | Disproportionate to blood loss | Usually normal |
| **Clinical signs of PET** | Incidence not increased | Incidence increased | Incidence increased | No increased |
| **Abdominal examination** | High presenting part/oblique lie; abnormal lie; non-tender; uterine tone normal | Local tenderness; often no clinical signs | Hard, tender, blue uterus (Couvelaire uterus) or atonic uterus ass. with PPH; signs of fetal distress or IUD; frequent, fibrillary contractions |  |

***Dx:***

* Placenta praevia:
	+ Clinical picture (see above)
	+ Careful speculum and cervical smear when bleeding has stopped – assess local lesions
	+ US – placenta praevia and grade (C/I in life-threatening/active haemorrhage); can’t Dx location before 30 wk
	+ PV – Examination in theatre – if no US and patient **already in labour** OR when **delivery planned**
	+ Apt test for fetal Hb
* Abruptio Placenta – 2 or more of following: Note – Abruptio is clinical diagnosis; No role for US
	+ Significant, unexplained PV bleeding after 20 weeks gestation
	+ Irritability of uterus (Contractions > 5/10min OR hypertonic uterus)
	+ Tenderness of uterus OR abdominal pain

***Classification of abruption:***

* APH of unknown origin – diagnosis by exclusion; consider IOL if ≥ 38wk; C/S if indicated
* Abruptio placentae with live fetus
* Abruptio placentae with IUD

***Mx:***

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| **Placenta Praevia** |
| ***>38 Weeks***1. **Resus (gr. III/IV)**

**Severe bleeding:**1. **Emergency C/S on sever bleeding**

**Mild to moderate bleeding, already in labour; with or without US**1. **PV in theatre READY FOR E-C/S (sterile; trays & packs open); Anaesthetist ready for induction/intubation – 1 finger → no thickening between presenting part and finger (bogginess) → feel for placenta (360˚ sweep) – If placental edge felt do E-C/S**
2. **11. Can be omitted if previous US done BUT only if:**
	1. **Examined by experienced ultrasonographer**
	2. **Major degree (III or IV) diagnosed on US**
	3. **Pt. Complies clinically with major degree of PP**
3. **If no placenta felt & Cx favourable → ROM & IOL**
4. **If no placenta felt & Cx unfavourable → intracervical prostaglandins until ripe THEN repeat examination (low amniotomy can be done)**

**Not life threatening gr. I or II anterior – Dx on US (not in labour)**1. **Bed rest (hospital)**
2. **Home if fetal welfare/growth and maternal Hct/Hb normal**
3. **Rest at home/no coitus & F/U (as for high risk)**
4. **Mother informed about warning signs**
5. **NVD (no severe bleeding or FD) else C/S**
6. **If abnormal lie → C/S @38weeks**

**Not life threatening gr. II posterior, III or IV – Dx on US (not in labour)**1. **As above but blood cross-match & hold**
2. **Steroids administered**
3. **Elective C/S @ 38weeks or with lung maturity; test for lung maturity can be done earlier if recurrent bleeding occurs**
4. **Emergency C/S if severe bleeding occurs or FD AND do baby’s Hb after delivery**

***34-38 weeks*****Risks – Immature baby****Don’t hesitate to deliver if:**1. **Preterm labour**
2. **Recurrent slight haemorrhage**
3. **Moderate haemorrhage needing delivery**

**Else:**1. **Bed Rest & Hopitalization with:**
	1. **Fetal lung maturity – do amniocentesis – if mature and major degree of PP then C/S. Amniocentesis not needed in minor degrees**
	2. **Placental insufficiency with FD – Do regular kick charts; CTG; fundal growth; amniotic fluid volume – if any abnormality hospitalize with bed rest**

**Note: Any PV bleeding needs hospitalization** **Note: >3 pads/hr = Severe bleeding and need active intervention*****28-34 weeks*****Risks – Immature baby**1. **Postpone delivery**
2. **Betamathasone 12mg q12h x2**
3. **Strict bed rest**
4. **D/C if grade I or II and bleeding stopped if:**
	1. **Communication & transport available**
	2. **No coitus**
5. **Severe haemorrhage after 28wk do C/S**

***Before 28 weeks*****Conservative Mx unless life-threatening risk to mother; THEN do E-C/S unless near fully dilated; low amniotomy or continuous traction on presenting part may temporarily control bleeding.** |

|  |
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| **Abruptio Placenta** |
| **Prevention – None except slow release of amniotic fluid in polyhydramnios****Warning signs:*** **Fetal movements decrease – precedes IUD more than 24hr before**
* **IOL – Admit if pt. gets contractions**
* **Abdominal pain – late sign > hospitalize**
* **Haemorrhage – late sign**
* **Antepartum CTG – if suspected abruptio with late deceleration > DELIVER!!!**

***The 4 important questions:**** **Is the fetus alive? – if not see 13: Confirmed only by Doppler or US. Auscultation may be impeded by thick layer of blood between anterior placenta or abdominal wall or bradycardia – if so then do resus and repeat auscultation**
* **Can fetus survive (mass and gest.)? – 28wk (1000g) – 32wk (1600g). US very important for assessment. Also cut-off is dependant on NN Care – if good can do C/S for 750-1500g.**
* **What is maternal condition? – Take Hb; HcT and clinical signs into consideration.**
* **What is the quickest way to deliver baby? – See 11. and 12.**

***Abruptio if fetus alive:***1. **Vaginal delivery only if cervical dilatation and engagement indicate delivery faster than C/S. If so do the following:**
	1. **ROM**
	2. **Oxytocin**
	3. **Monitor fetal heart**
	4. **Assisted delivery**
	5. **Maintain optimum fluid balance**
	6. **CVP**
2. **C/S – poor progress; indication; imminent renal failure; worsening clot. Profile. If planned then:**
	1. **O2 to mother**
	2. **Side lying position until induction**
	3. **15˚ Left lateral tilt after induction**

***Abruptio if fetus dead:***1. **IUD indicates blood loss of ~ 1000ml, therefore:**
	1. **Correct hypovolaemia**
	2. **Beware clotting defect**
2. **Correct hypovolaemia (2l then according to UO/CVP and clotting profile)**
3. **Analgesia (↓ Dose – Poor peripheral tissue perfusion → decreased delayed absorption)**
4. **Amniotomy**
5. **Monitor urinary output > 50ml/hr. If poor or none – CVP to be kept at 10mmH2O. With continuing poor output give Furosemide 20mg IV q10min (max = 160mg/4hr)**
6. **CVP/PWP measured**
7. **Determine coagulation profile – at admission and regularly afterwards**
	1. **Fresh blood if available – contains all elements needed for clotting. ELSE:**
	2. **Fibrinogen low (<2g/l) & Hb normal → FFP**
	3. **Fibrinogen low & Hb low → Placked cells and plasma**
	4. **Platelet count low (<50 000/dl) → Packed platelets**
	5. **Coagulation factors normal & Hb low → Packed cells**
8. **UCE and ABG**
9. **Oxytocin to augment poor uterine contractions with accurate IU pressure monitoring**
10. **Atraumatic delivery – episiotomy; C/S only for obstetric cause of where clotting profile deteriorates quickly despite adequate treatment.**
11. **Normal labour if progress and recovering or normal coagulation profile.**
12. **Dilatation of unfavourable cervix can be delayed by 6-8hrs**
13. **Be careful of uterine rupture, renal failure, ARDS and DIC**
14. **PPH managed actively – FDP → inhibit uterine contractions → atonic uterus → PPH**
15. **Heparin**
16. **Apotinine → ↓ FDPs → Better uterine contractions**
17. **Epidural anaesthesia – Only if no coagulation defects**
 |

**Things to remember:**

* Counseling of parents
* Future pregnancies
* Recurrence & preventative measures – No smoking; Avoid late pregnancy coitus; Rx of HT; Hospitalize high risk patients after 36 weeks; Induce labour not later than 38 weeks; Deliver if lungs mature (& 2/more prior AP)

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|  **Postpartum haemorrhage:** |

***Definition:*** Blood loss in 3rd stage ≥ 500ml OR Hb ↓ ≥ 3g/dl OR any bleeding that appears more than normal and following the 3rd stage of labour:

***Preventative measures:***

* Permanent contraception in grand-multipara or ≥35yr
* Routine iron supplementation
* Deliver at level 2 hospital
	+ Hb < 8 g/dl
	+ Multiple pregnancies
	+ Polyhydramnios
	+ Grand-multiparas
	+ Previous PPH that required blood transfusion
* Education about:
	+ Rubbing-up uterus after placenta delivery
	+ To call for help if bleeding ↑
* Active management of 3rd stage; Oxytocin 5IU IM
* Don’t augment labour in multigravid patients if in active phase
* Stop oxytocin following IOL once in established labour
* Don’t discharge patients early
* Examine for well contracted uterus before D/C
* Iron supplementation x1 month if Hb <10 g/dl

***Mx:***

1. **Rub up uterus and call for help**
2. **Oxytocin 20IU in 1l IV run in rapidly (2 lines if patient is, or becomes shocked)**
3. **Empty bladder**
4. **Look for retained products**
5. **If uterus atonic → bimanual compression while patient is transferred to next level of care**

***Majority will be contracted by now:***

1. **Observations every 15 min and check if uterus contracted continuously**

***If still bleeding:***

1. **Refer to next level of care if unable to manage further OR no 24hr theatre facilities AND patient is stable**
2. **Venesection for cross-match and hold**
3. **Oxytocin 30-40IU IV (1l 5%DW) over 8 hrs**
4. **Misoprostal 5 tab. PR**
5. **F2α 1amp (5mg) in 20ml sterile water IJ 4ml directly into myometrium (repeat with 1-2mg)**
6. **Bimanual compression until further steps can be taken**
7. **Operative – clear products ELSE evacuation**
8. **Uterus packing with warm, sterile swabs**
9. **Still no control – Systemic devascularisation**
	1. **Uterine arteries**
	2. **Ovarian arteries**
	3. **Internal iliac arteries**
10. **Still no control – B-Lynch**
11. **Still no control – Hysterectomy (remember to get consent)**

|  |
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|  **Cord prolapse:** |

***Definition:*** Cord closer to cervical os than presenting fetal part

***Ax:***

* Presenting part doesn’t fit pelvis e.g. CPD
* Fetal (Abnormal lie/presentation):
	+ Prematurity
	+ Multiple pregnancy
	+ Polihydramnios
	+ PROM
* Maternal:
	+ CPD
	+ Pelvic tumors
* Cord/Placenta:
	+ Long cord
	+ Placenta praevia
	+ Battledore placenta
* Iatrogenic:

***Dx:***

* Index of suspicion
* Clinical examination
* CTG changes i.e. early decelerations
* US findings

***Mx:***

1. **GET HELP!!!**
2. **Stop the contractions with Nifedipine 10mg IMI/IVI**
3. **Mother:**
	1. **O2**
	2. **Informed consent for C/S AND need for co-operation**
4. **Relieve pressure on the cord:**
	1. **Manually – flat hand or fist**
	2. **Fit bladder with 500ml 0.9% NaCl & clamp catheter**
	3. **Mother in knee-chest position (actually chest to bed)**
5. **Book C/S A.S.A.P.**
6. **If cord outside vagaina – cover with damp cloth (don’t replace into uterus)**
7. **Take extra assistant to theatre to remove clamp from catheter when abdomen is opened (Not before)**
8. **Post-partum:**
	1. **Prophylactic oxytocin 10IU IMI stat**
	2. **Antibiotics (triple therapy)**

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|  **Shoulder dystocia** |

***Definition:*** Inability to deliver fetal shoulder with normal obstetric maneuvers

***Mechanism:*** Shoulders don’t descend in oblique diameter of pelvis but instead it descends in AP and the anterior shoulder gets caught behind the symphysis pubis.

***Predisposing factors:***

* Macrosomia
* Previous SD
* Prolongued first stage of labour (i.e. > 5-6 hours)
* Maternal obesity
* Increased weight gain in pregnancy
* Gestational DM (or uncontrolled DM)
* Anencephaly

***Cx:***

* Fetal:
	+ Death
	+ HIE
	+ Erb’s palsy (C5-6)
	+ Kumpke paralysis
	+ Fractures
* Maternal:
	+ Lacerations
	+ PPH
	+ Post-partum endometritis

***Mx:***

1. **Anticipation**
2. **Bladder empty**
3. **Suction baby’s airways**
4. **Make sure no cord around the neck**
5. **“HELPER” approach**
	1. **H – HELP**
	2. **E – EPISIOTOMY**
	3. **L – LEGS (MacRobert’s maneuver – knees to chest while on back)**
	4. **P – PRESSURE (Suprapubic pressure on anterior shoulder)**
	5. **E – ENTER PELVIS (Rotation of posterior shoulder through 180˚**
		1. **Wood=posterior direction**
		2. **Rubin=anterior direction**
	6. **R – REMOVE POSTERIOR ARM (Hand in curve of sacrum; flex elbow; grasp wrist & fold outside)**
6. **All-fours maneuvre**
7. **Zavanelli maneuver – Fetal head pushed back into uterus followed by C/S**
8. **Symphysiotomy**

|  |
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|  **Hypertension in pregnancy:** |

***Definition:***

* 140/90mmHg X2 (q6h)
* DBP increased by 15mmHg compared to DBP before pregnancy
* SBP increased by 30mmHg compared to SBP before pregnancy
* According to Australasian classification:
	+ Gestational HT (>20weeks gestation – majority in 3rd TM; resolves in 6-12wk postpartum; No signs of PET)
	+ PET (HT with proteinuria and/or oedema > 20wk gestation) divided into mild and severe (see below)
	+ Chronic HT (<20weeks gestation; doesn’t resolve within 3mo)
		- Essential
		- Secordary (see below for causes)
	+ Chronic HT with superimposed PET (Can develop < 20wk gestation)
		- Causes of chronic HT upon which PET may be superimposed:
			* Essential HT
			* Renal causes:
				+ Acute glomerulonephritis
				+ Chronic nephritis
				+ Lupus nephritis
				+ Diabetic nephropathy
			* Endocrine
				+ Cushing’s syndrome
				+ 1˚ Aldosteronism
				+ Phaeochromocytoma
				+ Thyrotoxicosis
			* Neurogenic
				+ Quadriplegia
		- If developing < 20wk gestation MUST EXCLUDE:
			* Hydatiform mole
			* Triploidy of fetus
		- Associated with following complications if mid-trimester:
			* Abruptio placentae
			* Thrombocytopenia with or without HELLP syndrome
			* Eclampsia
			* DIC
			* Acute renal failure
* Complications of HT in pregnancy:
	+ Maternal: Renal failure; Stroke; Eclampsia; Left ventricular failure; Liver failure; Abruptio Placentae
	+ Fetal: Placental insufficiency; Placental infarctions; IUGR; IUD

***Differences between chronic HT, pre-eclampsia and superimposed PET:***

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Chronic hypertension** | **Pre-eclampsia** | **Superimposed PET** |
| **Age** | Usually > 30yr | Young or >35 | Usually > 30yr |
| **Gravidity** | Multigravida | Primigravida | MUltigravida |
| **Signs (in order):** | Falls pregnant while HT | Mass gain → HT → Oedema → Proteinuria | Already HT → Develops severe HT → Proteinuria → Eclampsia |
| **Gestational age:** | Throughout pregnancy | After 20wk gestation esp. 3rd TM | Late 2nd and 3rd TM |
| **Risk:** | Low to mild | Mild to high | High |
| **Recurrence risk (other pregnancies):** | High | Small | High |
| **Renal functions:** | Relatively unaffected | Early ↑ urea, creatinine and urate | ↑ Urea & creatinine but urate can rise disproportionately due to pre-eclapmsia |
| **Retina:** | Hypertensive changes | Segmental spasm | Hypertensive changes |
| **Hospitalisation:** | In severe cases | Necessary | Necessary |
| **Cure:** | Delivery will not affect cure | Delivery of fetus and placenta | Delivery of fetus and placenta |

|  |
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| **Pre-eclampsia (PET):** |

***Definition:***

* BP >140/90 mmHg after 20 weeks gestation with 1/more of the following:
	+ Risk factors:
		- Previous underlying HT
		- Primigravidae (vs. primip and multip in super-imposed PET)
		- Patient < 16yr or > 35yr
		- Multiple pregnancies; Hydrops foetalis; Diabetes Mellitus
		- Linked to males (sometimes)
	+ Proteinuria
		- ≥300mg/24hr or >0.3g/l
		- Spot protein:creatinine ≥30mg/mmol
			* Note: An index of 300 or more correlates well with 24hr protein excretion
		- Approximate urine concentrations in urine if using dipstix:
			* 1+ 0.1g/l
			* 2+ 0.3g/l
			* 3+ 1.0g/l
			* 4+ >20.0g/l
			* False positive if specific gravity > 1030 OR Contaminated
			* False negative if specific gravity < 1010
	+ Criteria for severe pre-eclampsia:
		- With patient at bed rest, BP readings of atleast 160mmHg SBP or 110mmHg DBP, on 2 occasions at least 6 hours apart
		- Proteinuria ≥ 5g/24hr urine collection
		- Oliguria (≤ 400ml/24hr); Cerebral or visual disturbances e.g. altered consciousness, headache, scotoma, or blurred vision
		- Pulmonary oedema or cyanosis
		- Epigastric or right upper quadrant pain
		- Impaired liver function of unclear aetiology
		- Thrombocytopenia
	+ Renal insufficiency
		- Serum:plasma creatinine ≥0.09mmol/L
		- Oliguria
	+ Liver disease
		- AST increased
		- Epigastric/RUQ pain (subcapsular hepatic haematoma)
	+ Neurological problems
		- Convulsions (PET + Convulsions = Eclampsia)
		- Hyperreflexia/Clonus
		- Severe headache with hyperreflexia
		- Persistent visual disturbances
	+ Haematological disturbances
		- Thrombocytopenia
		- DIC
		- Haemolysis
	+ Fetal growth restriction

***PET Work-up:***

* Maternal:
	+ BP
	+ Urine output
	+ 24hr protein
	+ UCE (Urea, Creatinine & uric acid)
		- Uric acid (Early indicator of PET – tissue breakdown and necrosis)
	+ LFT (AST)
	+ FBC & Peripheral blood smear (HcT; Platelets)
	+ Coagulation profile (PTT)
* Fetal:
	+ Gestational age
	+ Fetal activity
	+ Non-stress test
	+ Ultrasound for fetal size and amniotic fluid volume

***Mx overview (See protocol for detailed management):***

1. **Prevention of PET (High risk patients)**
	1. **Aspirin 75mg/day after 12 weeks gestation**
	2. **Calcium supplementation 2g after 12 weeks gestation**
	3. **Vitamin C & E supplementation**
2. **Admit to hospital**
3. **Control BP**
	1. **Start active treatment if DBP>110mmHg (earlier treatment has risk of more SGA babies)**
	2. **Ringer’s lactate bolus 300mL (“opens placental perfusion”)**
	3. **To keep DBP<110mmHg**
		1. **Alpha methyldopa**
		2. **Nifedipine**
		3. **Prozosine**
4. **Control hyper-reflexia:**
	1. **MgSO4 if indicated (signs of neurological involvement)**
5. **Evaluate mother AND fetus**
6. **Delivery (based on gestation and maternal/fetal evaluation)**
	1. **Gestational HT @ 38weeks expectantly**
	2. **PET @ 34weeks OR Fetal weight>2kg**

***Management according to clinical group (overview):***

* Prevention:
	+ Timely (planned) delivery
	+ Improving socio-economic status
	+ Adequate ANC at appropriate sites
	+ Providing sufficient number of beds for bed rest and special investigation to be done
	+ Promoting health education and appropriate family size
	+ Aspirin 75mg/d after 12 weeks gestation
	+ Calcium supplementation 2g after 12 weeks gestation
	+ Vitamin C & E supplementation
* Before 36 weeks
	+ Continuous bed rest
	+ Aldomet if DBP > 100mmHg
	+ Monitoring of maternal and fetal conditions
	+ Termination of pregnancy if:
		- Maternal condition deteriorates
		- Fetal distress develops
		- Fetus is mature (determined clinically or by special investigation)
* After 36 weeks
	+ Bed rest for 6 or more hours
	+ Nifedipine (or Nepresol if not available) if DBP remain > 100mmHg
	+ Evaluate Cx:
		- Favourable → IOL
		- Unfavourable → FHR monitoring and evaluation of maternal condition
			* Fetal distress → C/S
			* Maternal deterioration → Usually C/S
			* No immediate and/or maternal risk → Wait until cervix becomes favourable or induce labour prior to ripening of cervix, depending on circumstances e.g. oligohydraminios
* Hypertensive emergencies:
	+ Imminent eclampsia:
		- Evaluate mother and fetus – both clinically and by special investigations
			* Headache
			* Nausea
			* Vomiting
			* Epigastric pain
			* Mental confusion
		- Do C/S if fetal distress is diagnosed
		- Nifedipine (or Neprosol if not available) if DBP > 100mmHg
		- Evaluate cervix:
			* Favourable → IOL
			* Unfavourable → C/S
		- Postpartum: Avoid Ergots – Use only Oxytocin 5IU IM and 5IU slow IV
	+ Eclampsia: See Eclampsia
* Post partum management:
	+ Contraception (avoid in older patient – stroke/atherosclerosis)
	+ Assess in medical clinic 2-6 weeks after delivery
	+ If DBP ≥ 90mmHg → Full HT work-up and urography
	+ If DBP < 90mmHg with no treatment → No action BUT:
		- Supervise next pregnancy carefully
		- Consider using low dose aspirin in next pregnancy

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| **PET Protocol (PAH & Kalafong):** |

1. ***Stabilization (admit to High Care Obstetrics Unit)***
	1. Ringer’s lactate 100ml IVI over 20min
	2. MgSO4
		1. 4g in 200ml 0.9% NaCl over 20min IVI
		2. 5g with 1ml lignocaine in each buttock
		3. Maintenance:

**If any of these abnormal delay next dose by 4hrs or half of dose given.**

**If signs of overdose give Calcium gluconate**

* + - * 5g q4h BUT check the following before each new dose:
			* Urine output>30ml/hr
			* Tendon reflexes present
			* Respiratory rate>16/min
1. ***Fluid management***
	1. Insert urinary catheter
	2. Ringer’s lactate 125ml/hr IVI
	3. Start fluid balance sheet
	4. If urine output <30ml/hr give 200ml Ringer’s bolus
	5. If urine output still <30ml/hr check fluid balance
	6. If in positive fluid balance give Dopamine (low dose infusion)
		1. 200mg in 200ml 5% Dextrose
		2. Start at 1μg/kg
		3. Increase hourly until max. of 5μg/kg
		4. If urine output >30ml/hr continue dopamine at that dosage
		5. Taper after 2 hours
2. ***Blood pressure control***
	1. Repeat BP after 20min
	2. If DBP>110mmHg OR SBP>160mmHg
		1. Nifedipine - Check BP after 20min
			* 10mg PO
			* Contra-indications – Use labetalol:
				+ HR>120bpm
				+ Cardiac lesion
				+ Unable to swallow
		2. Labetalol – Check BP after 20min
			* Start with 1x20mg; 2x40mg; 3x80mg (max. 300mg)
			* Give bolus q10min until BP<160/110mmHg
			* Contra-indications:
				+ Asthma
				+ IHD
	3. If DBP<110mmHg AND SBP<16mmHg continue with Neurological evaluation
3. ***Neurological status evaluation*** – Check ABG (or saturation) AND BP if confused:
	1. Abnormal – Correct abnormality
	2. Normal – Give Haloperidol
4. ***Full clinical evaluation***
	1. **CNS** – if abnormal consider CT scan
		1. GCS
		2. Lateralizing signs
		3. Reflexes
		4. Pupil reflexes
	2. **Respiratory system** – if abnormal do ABG and CXR
		1. RR
		2. Saturation
		3. Dullness on percussion
		4. Crepitations or wheezes
	3. **CVS**
		1. HR
		2. BP
		3. Heart sounds
		4. Heart size
		5. R-F delay
	4. **GIT** – Check AST (and s-glucose q4h if AST abnormal)
		1. Epigastric tenderness
		2. Hepatomegaly
		3. Jaundice
	5. **Renal** – Check creatinine and fluid balance (include kidney function if signs of dysfunction)
		1. Renal angle tenderness
		2. Murmurs over renal artery
		3. Macroscopic haematuria
	6. **Haematological** – Check haematocrit and platelets)
		1. Anaemia
		2. Purpura
		3. Bleeding tendency
	7. **Immune** **system**
		1. Temperature
		2. Generalized lymphadenopathy
		3. Splenomegaly
		4. HIV status
	8. **Musculoskeletal** **system**
		1. Signs of DVT
		2. Spinal problems that might influence anaesthesia
	9. **Gynaecological** **system**
		1. As usual
5. ***Special investigations:***
	1. Routine (as above)
		1. Hct
		2. Platelets
		3. Creatinine
		4. AST
		5. 24 Protein clearance
	2. Special circumstance
		1. ABG
		2. 4 Hourly s-Glucose if AST raised
		3. CT
6. ***Fetal monitoring***
	1. US
		1. EFW
		2. Abnormalities
		3. AFI
		4. Doppler of umbilical artery
		5. Transcerebellar diameter
		6. Mid cerebral artery Doppler
		7. Ductus venosus waveform
	2. CTG – q6h if fetus deemed viable
7. ***Decision of delivery:***
	1. Delivery:
		1. Fetal distress
		2. IUD
		3. Weight>2kg or sure gestations >34weeks
		4. Signs of maternal organ involvement
			* Platelets<100
			* AST>80
			* Creatinine>100
		5. Uncontrollable HT
		6. Eclampsia
		7. Proven fetal lung maturity
		8. Fetal abnormality
	2. Expectant management:
		1. Mother and fetus stable
		2. High care/high risk
		3. Silver white firm (at hospital)
		4. Daily full clinical evaluation
		5. CTG q6h
		6. Bloods 2x/week
		7. Aspirin 75mg/d
		8. Calcium 2g/day

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|  **Eclampsia (the end result of PET):** |

***Definition:*** PET + Convulsions

***Prediction - usually by signs of imminent eclampsia:***

* Sever headaches
* Visual disturbances
* Epigastric/RUQ pain

**Note: Complications of eclampsia:**

* **Cerebral haemorrhage**
* **Paresis**
* **Temporary blindness**
* **Aspiration pneumonia**
* **Cardiac failure**
* **Subcapsular liver haematoma**
* **Renal failure**
* **Coagulation defect – DIC**
* **Puerperal psychosis**
* **Abruptio placentae**
* **IUD**
* Hyperreflexia/agitation
* Grand-mal type convulsions (eclampsia)

Differential diagnosis and important differences (NB):

* Epilepsy
	+ History
	+ Normotensive
	+ No proteinuria
	+ Uric acid normal
* Thrombotic thrombocytopenia purpura
	+ Thrombocytopenia
	+ Hemolysis ++
	+ Acute neurologaical events
	+ Fever
	+ BP Normal
	+ Renal involvement
* Cerebral haemorrhage
	+ Severe headache
	+ Localising signs
	+ May be hypertensive
	+ Normal uric acid
	+ No proteinuria
	+ Rigid neck
* Cerebral vein thrombosis
	+ Headache
	+ Normotensive
	+ Rapid papilloedema
	+ Paresis
* Menigitis
* Acute porphyria
* Cerebral aneurysms/malformations
* Hysteria

***Mx:***

1. **ABCs**
2. **Prevent maternal injury**
3. **MgSO4 – as above**
4. **Assess GCS**
5. **Ringer’s lactate IVI and 2nd IV line**
6. **CVP – keep at 5mmH­2O**
7. **Catheter – monitor urine output**
8. **If convulsions recur:**
	1. **As above – give 2g repeat doses stat x2**
	2. **If not controlled – Phenobarbitone 200mg IVI slowly**
	3. **Reconsider diagnosis**
9. **Correct maternal acidosis**
10. **Stablize BP and airways**
	1. **If DBP ≥ 95-100mmHg give 10mg Nifedipine STAT sublingually**
11. **Determine maternal organ involvement**
12. **Determine fetal viability (only if mother stable)**
13. **Deliver (by C/S if unlikely to deliver in 6-8hr)**
14. **MgSO4 maintenance for at least 24hrs PP**
	1. **As above**
15. **Intensive monitoring of mother**
16. **Consider ICU ventilation if:**
	1. **Poor blood gases**
	2. **Aspiration**
	3. **Pulmonary oedema**
	4. **Extremely restless**
	5. **Laryngeal or excessive oedema of tongue**
17. **GCS (score ≤ 4 has poor progress)**

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|  **General medical problems in pregnancy:** |

|  |
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| **Diabetes in pregnancy:** |

***Pathphysiology:***

* 1st trimester
	+ Estrogen and progesterone casue β-cell hyperplasia with insulin increase
	+ Decreased glucose and hypoglycaemia
	+ Decreased liver glucose
	+ Decreased glconeogenesis
	+ Increased triglycerides, FFAs and ketones
* 2nd trimester
	+ Increased HPL, prolactin and cortisol
	+ Increase lipolysis with increased FFAs, TGs and ketone bodies
	+ Decreased insulin sensitivity
	+ Increased fat production
	+ Increased glucose

***Suspect if:***

* Positive signs and symptoms
* 2x Glucosuria (random) OR 1 x Glucosuria (fasting)
* Previous baby > 4000g
* History of gestational DM
* Family history of DM or gestational DM
* >20% Ideal maternal body weight
* Previous unexplained congenital abnormalities of fetus
* Previous unexplained neonatal death
* Polyhydramnios
* US – Macrosomia
* Positive screening test i.e. S-Glucose > 8 1hr after 50g Dextrose PO

***Fetal problems:***

* Macrosomia
	+ Shoulder dystocia and associated complications
	+ CPD
* Congenital abnormalities
	+ CNS: Microcephaly; anencephaly; spina bifida
	+ CVS: ASD; VSD; cardiac agenesis; hydrops fetalis
	+ Hepatic: Immature liver THUS hyperbilirubinaemia
	+ Renal: Agenesis; polycystic; double kidney
	+ Bone: Sacral agenesis
	+ GIT: Duodenal atresia; GIT fistula; anus imperforatum
* Sudden fetal death
	+ Poor heart conduction (glycogen deposits; electrolyte imbalances)
	+ Chronic hypoxia
	+ Increase metabolism, O2 requirements, hypoxia and THUS IUD
	+ Microvascular disease THUS IUGR and ultimately DEATH
* RDS
	+ Decreased surfactant production due to increased cortisol production
* Hypoglycaemia post delivery – due to increased insulin production without constant placental blood glucose
* General
	+ Feeding problems
	+ Hypocalcaemia
	+ Polycythaemia due to osmotic diuresis

***Maternal problems:***

* Nephropathy
	+ Worse with HT/PET and kidney disease
	+ Increased risk of UTIx
* Retinopathy
	+ Worse with HT/Atherosclerosis
* Vascular
	+ Increased risk of PET; IUGR and coronary heart disease
* Neuropathy
	+ Can lead to ileus formation
	+ Delayed gastric emptying
	+ Mendelson syndrome – anaesthetic risk

***ANC surveillance***

* Maternal
	+ BP
	+ Glusose
	+ Urine dipsticks
* Fetal
	+ Kick chart
	+ CTG (false reassuring)
	+ BPP
* Uterine artery doppler
	+ Normal or low with IUGR has poor prognosis
* US
	+ @20-24 weeks for anatomical evaluation
	+ Every 4 weeks for signs of macrosomia (AC)

***When to deliver*** – At 38 weeks WITH confirmed lung maturity (PG not LS)

***Dx:***

* Screening:
	+ Test for gycosuria – if positive:
		- Random blood glucose
			* <6 = Normal
			* <8
				+ If <28weeks – 4 weekly blood glucose
				+ If >28 weeks – 2 weekly blood glucose
			* 8.1-10.9
				+ Fasting blood glucose

<8 = Diet modification (Glucose intolerance)

>8 = Diabetes

* + - * >11 = Diabetes Mellitus
* Glucose control evaluation:
	+ Ideal: 5.6-6.7
	+ Practical:
		- <6 before a meal
		- <8 2hrs post prandially

***ANC Mx:***

* Diet
* Oral hypogycaemics – controversial:
	+ Glibenclamide
	+ Metformin
* SC Insulin at home (see insulin sliding scale)

***NOTE: Do not use glucose tolerance test for diagnosis – it is not standardized and non-reproducible.***

***Diabetic work-up*** – at delivery OR admission criteria:

* Hospital admission criteria:
	+ Poor control
	+ Excessive weight gain
	+ PET
	+ Abnormal renal function
	+ Abnormal fetal growth
	+ Abnormal fetal welfare
* Take full history to identify problems relating to DM
* Clinical examination
* Do glucose profile and manage accordingly – Insulin sliding scale
* Diabetic diet
* Special investigations
	+ Glucose control
		- HbA1c >8.5 indicates poor control
		- UCE
		- S-Glucose
	+ Organ involvement
		- CXR
		- 24hr protein/creatinine clearance
		- Fundoscopy
		- U-MCS
	+ Fetal assessment
		- US
			* EFW
			* RI
			* AFI
			* Anatomy
			* Nuchal translucency

***Glucose-insulin regimes:***

* Insulin dosage according to a sliding scale(s)

|  |  |  |
| --- | --- | --- |
| **Finger-prick glucose** | **IV Soluble insulin** | **SC insulin** |
| **<2** | None (50% Dextrose IVI) | None (50% Dextrose IVI) |
| **2-5** | No insulin | No insulin |
| **5-10** | 1u/h | 2u/h |
| **10-15** | 2u/h | 5u/h |
| **15-20** | 3u/h | 7u/h |
| **>20** | 6u/h – consult diabetologist | Admit on IVI insulin |

|  |  |
| --- | --- |
| **Finger-prick glucose (30min before meal)** | **SC insulin** |
| **6.1-8** | 4u short-acting insulin  |
| **8.1-10** | 8u short-acting insulin |
| **10.1-12** | 12u short-acting insulin |
| **12.1 and higher** | 16u short acting insulin |

* 1/3 Short-acting insulin & 2/3 long-acting insulin (=”Actraphane”)
* 1/3 of Actraphane mane according to total dose required per day
* 2/3 of Actraphane nocte according to total dose required per day
* Monitor blood glucose 2 hours before and after each meal
	+ Fasting <4-5.5; Post-prandial (after 2 hrs) <6

***Delivery Mx:***

1. **5% Dextrose IV**
2. **Short insulin infusion pump @ 1U/hr**
3. **Hourly blood-glucose (4-6.5) and urinary ketones (neg.)**
4. **If BG increased give more insulin, if ketones present give dextrose**
5. **Monitor FHR (CTG)**
6. **Lithotomy position (decreases risk of shoulder dystocia)**

***Contraception and DM*** – due to significant risk to mother and poor pregnancy outcome, consider:

* Tubal ligation
* IUCD
* POP – Do lipogram as progesterone can alter cholesterol profile
* Contraceptive injection
* Hysterectomy (elective)

|  |
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| **Hyperemesis** **gravidarum**: |

***Definition:*** Severe vomiting usually before 16wk – A more severe for of emesis gravidarum. If after 16wk think of surgical causes:

***Ax:***

* Thiamine deficiency
* GIT causes and liver pathology:
	+ Hepatitis
	+ Gastroenteritis
	+ Volvulus
	+ Intestinal obstruction
	+ Drug reaction
* Thyrotoxicosis
* Cerebral tumor
* Less severe recurrent vomiting:
	+ Torsion of ovarian cyst
	+ Acute hydramnios
	+ PET
	+ Sever anaemia
	+ Hiatus hernia
	+ Peptic ulcer
	+ Pyelonephritis
	+ Multiple pregnancy
	+ Hydatiform mole

***Dx:***

* Signs of dehydration
* ↑ HR
* Rachades
* Intra-ocular pressure ↓ → Impaired vision
* Episgastric discomfort & pain
* Blood stained vomiting (later)
* Insomnia & muscle cramps
* THE ABOVE MAY PROGRESS TO “TERMINAL TOXIC PHASE:
	+ Jaundice
	+ Tachycardia
	+ Hypertension or hypotension
	+ Retinal haemorrhage
	+ Blindness
	+ Apathy/Drowsiness
	+ Amnesia
	+ Convulsions
	+ Coma

***Mx:***

1. **Exclude other aetiology**
2. **Vitamin B1**
3. **Address fluid/electrolyte/nutrition:**
	1. **Hospitalize → No fluids/solids PO for 48hr → then try re-introducing fluids/food → if vomiting recurs → stop for another 24hr.**
	2. **Monitor intake/output (remember insensible losses)**
	3. **If obvious dehydration is present → CVP**
	4. **Daily urine examination: Ketones & Chloride (better indicator of pre-renal failure than sodium); Use 3g/l Potchlor in normal saline to correct chloride to 10-15mmol/l and to ↑ urine output**
4. **Drugs**
	1. **Hydoxizine 50mg q3h x8 IVI**
	2. **Buscopan 20mg q3h x8**
	3. **Metochlopramide 10mg after 30min if still vomiting after Hydroxizine and buscopan**
	4. **Droperidol 5mg q4h IVI if still vomiting after 30min**
5. **Special investigations: UKE; LFT; FBC; Hct every day**
6. **Parenteral alimentation if unable to feed**
7. **Psychological support**
8. **TOP if all else fails (radical approach)**
9. **Resumption of oral feeding can occur 48-72hrs after admission – small portions, dry carbohydrates**
10. **Danger signs NB!!!:**
	1. **No improvement after 1 week**
	2. **Jaundice**
	3. **Persistent tachycardia > 100bpm**
	4. **Persistent proteinuria**
	5. **Persistent hyperthermia > 38.5˚C**
	6. **Persistent hypotension**
	7. **Retinal haemorrhages/Optic neuritis**

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| **Asymptomatic bacteriuria:** |

***Definition:*** >100000 org/mL in MSU with no Sx

***Cx:***

* Pyelonephritis
* Cystitis
* PROM
* Premature labour
* AFIS

Mx:

* Antibiotics:
	+ Ampicillin
	+ Cepalosporin
	+ Nitrofurantoin (not inlate pregnancy – can lead to neonatal haemolysis)
	+ Sulphonamides (can lead to neonatal hyperbilirubinaemia)
* Excretory urogram 6 weeks post-delivery if:
	+ Difficult eradication
	+ Acute UTIx before/during pregnancy
	+ Asymptomatic bacteriuria in puerperium i.e. up to 6 weeks post-delivery

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| **Pyelonephritis:** |

***Ax:*** Mostly due to E. Coli

***Dx:***

* Fever & flushing
* Patient ill, rigors, vomiting
* Tachycardia
* Urinary frequency & dysuria
* Renal angle tenderness
* Pyuria
* >100000org/mL in MSU

***Mx:***

* Admit to hospital
* Address dehydration
* Address premature labour
* Address septic shockl
* IV FLUIDS
* IV antibiotics e.g. ampicillin/cephalosporins empirically
* MSU MC&S and adapt antibiotic cover accordingly
* Anti-pyretics Rx and tepid-sponging
* Monitor BP, PR, fluid intake and urinary output
* Once stable for 48hrs d/c F/U MSU-MC&S @ ANC until 3 negative results in a row
* If recurrent give bactrim for remainder of pregnancy – 100mg bd
* If recurrent after pregnancy → refer for urological assessment

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| **Epilpesy:** |

***Cx:*** Increased risk of APH; PET; Still birth; Premature labour; Congenital abnormalities; NN-epilepsy

1. **Phenytoin & barbiturates – add 1mg Vit. K IM to NN to prevent bleeding (may need FFP)**
2. **Benzodiazepines – Withdrawal in NN**
3. **Status epilepticus:**
	1. **Open airway, O2 if needed and insert urinary catheter**
	2. **IV Infusion: 0.9% NaCl. Bolus 50ml 50% Dextrose + 100mg thiamine IM**
	3. **Diazepam (DZP) 2mg/min IV until conulsions stop (max = 20mg)**
	4. **Simultaneously, phenytoin 50mg/min (total 18mg/kg) IV in 100ml 0.9% NaCl**
	5. **If convulsions continue, 2 options:**
		1. **Phenobarbitone 100mg/min (total 20mg/kg)**
		2. **Diazepam infusion 100mg in 500ml 5% dextrose @ 40ml/hr. NB. Don’t give both as there is a risk of respiratory suppression**
	6. **If convulsions continue:**
		1. **ICU**
		2. **GA with Na-thiopentone/Propofol induction with halothane maintenance plus ventilation**

***Mx*** – Smallest effective dose of 1 drug:

***NOTE: Don’t use DZP, phenytoin or glucose in same IV line***

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|  **Malaria:** |

***Prophyllaxis:***

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| **Area visiting** | **Drug recommended** | **Dosage**  |
| Kruger Park; Swaziland | Chloroquine + Folic acid 5mg/d | 2 tab. q1wk 1 week before, every week there and for 6 weeks after |
| Zimbabwe; Madagascar | Maloprim + Folic acid 5mg/d | As for chloroquine BUT only 1 tab. instead of 2. |
| Mauritius; Seychelles; Reunion; Northern KwaZulu Natal; Malawi; Mozambique; Northern Namibia; Botswana | Maloprim + Chloroquine + Folic acid 5mg/d | As above |

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| **Immunizations in pregnancy:** |

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| **No contra-indications** | **With caution** | **Contra-indicated** |
| * Influenza
* Tetanus-diptheria
* Tetanus Ig & toxoid
* Rabies
* VZV
 | * Yellow fever
* Typhoid
* Polio
* Cholera
* Pasturella
 | * Rubella
* Measles
* Mumps
* BCG
* Smallpox
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| **Thromboembolism & PTE esp. 7 days postpartum** |

***Risk-factors:***

* Previous TE/PTE
* C/S
* Overweighht
* >35yrs
* Cardiac lesions
* Prolonged bed rest
* Positive lupus anticoagulant
* Hereditary thrombotic disease e.g. AT III deficiency
* Oestrogen Rx to suppress lactation

***Dx:***

* Calf pain and classical signs
* PTE: Dyspnoea; Haemoptysis; Pleuritic pain; Bronchospasm; Fever; Tachycardia; Shock

***Special investigations:***

* Clotting profile and D-dimers
* Doppler
* Venography
* Lung scintigram

***Mx:***

1. **If PTE: 100% O2**
2. **Heparin 5000-20000IU (i.e. ≈70IU/KG) stat and PTT @ 6 hrs**
3. **Heparin 18-20IU/kg/hr with 6hrly PTT**
4. **Start Warfarin 3 days later and monitor INR**
5. **If INR 2-3 stop heparin**
6. **Can also consider thrombolectomy – solid clots**
7. **Thrombolyics – Contraversial**
8. **Pressure stockings**
9. **Bed rest with raised feet**

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|  **Gynaecological problems in pregnancy:** |

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| **Candida & sexually transmitted diseases:** |

***Canidida:***

* Dx: Hypae & yeast cells on K­­-OH smear
* Rx: Nistatin/Coltrimazole cream 10-14days

***Trichomonas:***

* Associated with PROM
* Dx: Seen on 0.9% NaCl smear
* Rx: Metronidazole 400mg bd for 5 days AND 2g STAT for partner

***Gardenerella:***

* Associated with PROM
* Whiff test on K-OH smear
* Rx: Ampicillin 500mg q6h PC x5d (1st TM); 2nd TM can use Metronidazole (see above)

***Condylomata* *accuminata*** (HPV 11 & 16) – C/S if very large to obstruct NVD

* Rx: 50% Trichloacetic acid/lazer OR
* Small warts left until after pregnancy
* Larger ones may be excised under GA

***Rule of 500’s in obstetric and gynaecology antibiotics – by George Bennie***

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| **Condition:** | **Drug name:** | **Dose:** | **Route** |
| **Candidiasis** | Gentian Violet | 500mg (in 100ml) H2O | PV |
|  | Clotrimazole | 500mg tab. stat | PV |
|  | Clotrimazole | 500mg(5g) cream stat | PV |
|  | Econazole | 500mg cream stat | PV |
| **STDs (& other infections)** | Amoxicillin | 500mg q6h x #days | PO |
|  | Erythromycin | 500mg q6h x #days | PO |
|  | Ceftriaxone | 500-2000mg/d stat or dd(125mg in pregnancy) | IM |
|  | Metronidazole | 500mg q8h (200mg bd in pregnancy) | IV (PO) |
|  | Tetracycline | 500mg q6h x #days | PO |
|  | Ciprofloxacin | 500mg stat | IM |
|  | Vancomycin | 500mg q6h x #days | IM/IV |
| **Anti-helminthic** | Mebendazole | 500mg stat | PO |

***Varicosities of vulva*** – Avoid episiotomy

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| **Myomata – Increase because of oedema and hypertrophy:** |

***Cx:***

* Spontaneous miscarriage
* Malpresentaions
* Abnormal uterine muscle contractions
* Obstructed labour
* Retained placenta
* Risk of abortion, preterm labour or IUGR ↑ when placenta planted over or adjacent myoma
* Red degeneration – Rx: Bed rest, sedation & analgesia
* Resist myomectomy in pregnancy – ONLY do one at C/S if it is pedunculated and can be easily clamped and ligated ELSE could have severe haemorrhage

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| **CIN & Cervix CA:** |

***CIN lesions:***

* All pregnant woman should have PAP smear
* If abnormal → Colposcopy for localization and biopsy (punch) – if abnormal → REFER!!!
* If invasion is histologically inconclusive → Consider cone biopsy (only early pregnancy) or do if:
	+ Suspicious micro-infiltration or infiltration
* A CIN lesion is followed-up with a smear in every trimester and treated 3 months after delivery
* Laser evaporation or cryotherapy used in exceptional cases (progression) but limited to 1st or early 2nd TM

***Cervix CA:***

* Speculum mandatory in all patients with vaginal bleeding (exclude p. praevia first by US)
* C/S indicated primarily to prevent haemorrhage
* REFER!!!
	+ Stages Ib and IIa can be treated surgically/radiotherapy
		- 1st & early 2nd TM: Radical hysterectomy & bilateral pelvic lymphadenectomy with fetus in-utero
		- Late 2nd TM: After proven fetal maturity → classical C/S → and then as above. If fetus is only reaching maturity, patient’s wishes need to be respected with regards to waiting for the fetus to mature.
		- 3rd TM with fetal maturity: C/S → and then as above.
		- Post-partum: As above
	+ Stages IIb, IIIa, IIIb, IV – Radiotherapy:
		- 1st and 2nd TM & non-viable fetus: External X-ray → spontaneous abortion → then do local X-ray. Risk of intra-uterine infection is high.
		- 3rd TM & fetal maturity: Classical C/S → external X-ray → local X-ray
		- Post-partum: External X-ray → local X-ray
	+ If infiltrating and already in labour:
		- Emergency C/S → treatment as above
		- If cervix fully dilated → surgery or radiotherapy
		- If uncontrollable bleeding → might need radical hysterectomy.
	+ Cx - refer if:
		- Haemorrhage
		- Miscarriage
		- Premature labour
		- Infection
		- Stenosis of cervix
		- Cervical tears