Common Acute Medical Problems in Pregnancy - CMT

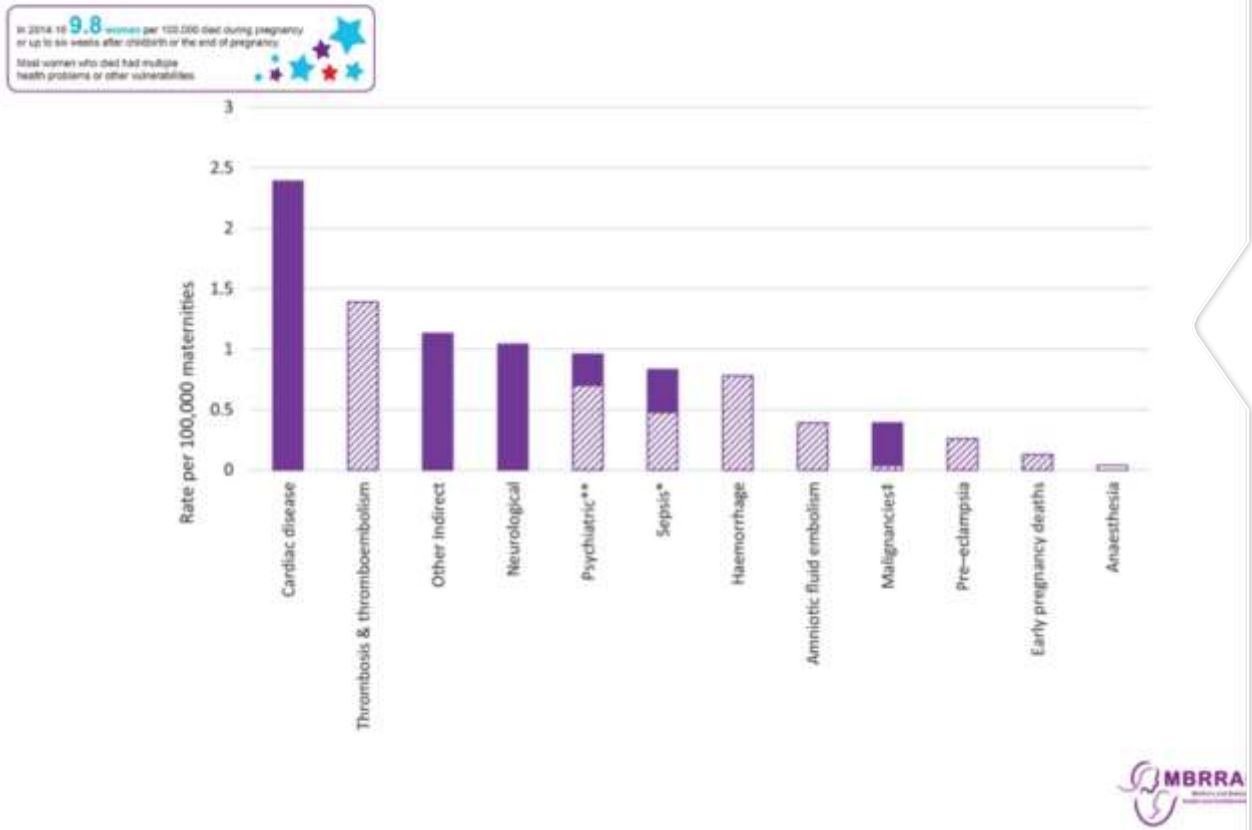
Dr Rob Parker – Acute Medicine ST5 – with special interest in Obstetric Medicine

Aims & Objectives

- Appreciate normal physiological changes in pregnancy
- Overview some cases that one might expect to encounter & looking into common medical conditions in pregnancy

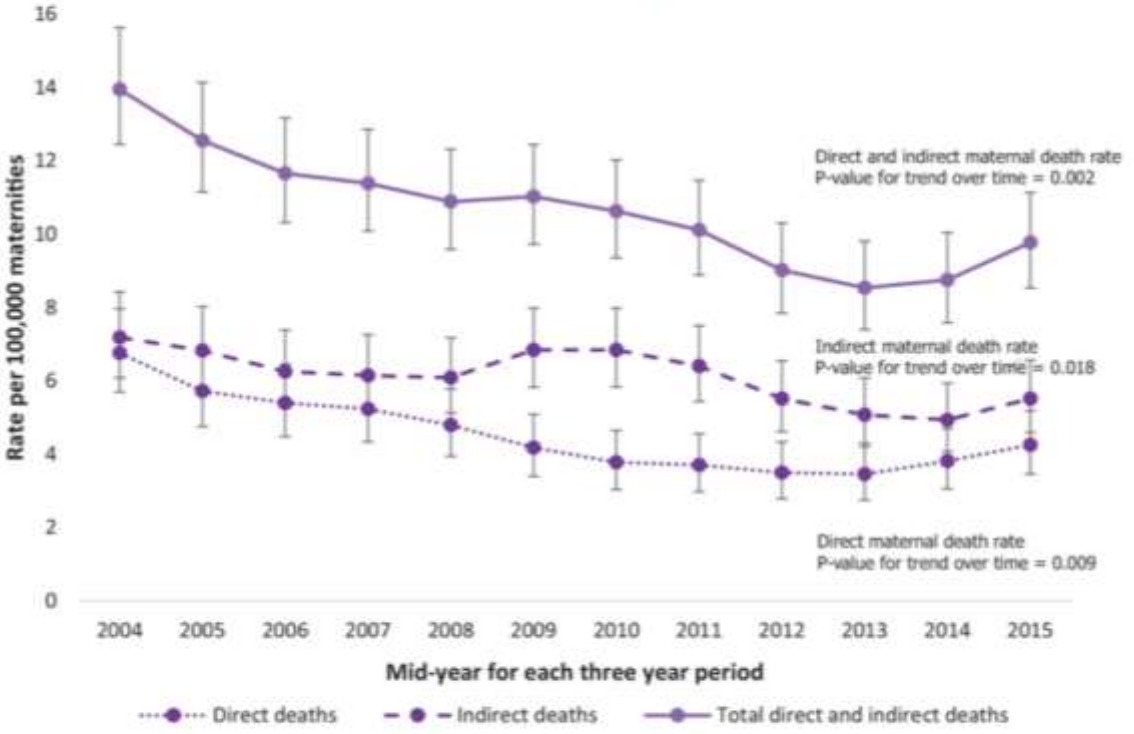
Knowledge	Assessment Methods	
Demonstrate awareness of the possibility of pregnancy in women of reproductive years	MRCP Part 2, CbD, mini-CEX	
Outline the normal physiological changes occurring during pregnancy	CbD, mini-CEX	
Demonstrate awareness of the impact of chronic or long term conditions in relation to maternal and foetal health e.g. diabetes, hypertension and obesity	MRCP Part 2, PACES, CbD, mini-CEX	
List the common medical conditions occurring in pregnancy either acutely or pre-existing; hypertension, pneumonia, asthma, abdominal pain, urinary tract infection	MRCP Part 1, MRCP Part 2, CbD, mini-CEX	
Identify the unique challenges of diagnosing medical problems in pregnancy	PACES, CbD, mini-CEX	
Recall safe prescribing practices in pregnancy	MRCP Part 1, MRCP Part 2, PACES, CbD, mini-CEX	
Demonstrate awareness of acute pregnancy related illness, e.g. venous thromboembolism, hyperemesis gravidum, peripartum cardiomyopathy, pre-eclampsia and its complications: eclampsia, HELLP, pulmonary oedema, AKI and cerebral haemorrhage	MRCP Part 2, CbD, mini-CEX	

Causes of maternal death 2014-16



MBRRA

Maternal mortality UK 2003-16



MBRRACE-UK

Maternal Mortality UK – MBRRACE-UK Data

Parameter	Red	Yellow	Normal	Yellow	Red
Temperature °C	< 35.0	35.1 – 36.0	36.1 – 37.5	37.6 – 38.0	> 38.1
Heart rate /min	< 40	40 – 59	60 – 100	101 – 119	> 120
Systolic BP mmHg	< 90	91 – 100	100 – 140	141 – 149	> 150
Diastolic BP mmHg			< 90	91 – 99	> 100
Respiration rate /min	< 10		11 – 20	21 – 30	> 30
Oxygen Saturations %	< 95%		> 95%		
Urine output with catheter	< 25ml / hour		> 25ml / hour		
Urine output no catheter	Not PU in 10 hours	Not PU in 8 – 10 hours	PU within 8 hours		
Neurological Response	**U**nresponsive / Responds to **P**ain	Responds to **V**oice	**A**lert	Confused / Agitated	

MOEWS

NHS

Doncaster and Bassetlaw Teaching Hospitals
NHS Foundation Trust

NHS Number: ____________________
District Number: ____________________
Surname: ____________________
Forename(s): ____________________
Address: ____________________
____
DoB: ____________________

Modified Obstetric Early Warning Score (MOEWS) Chart

Escalate care to the oncall doctor if the patient triggers: 2 or more yellow scores OR 1 or more red scores

	Antenatal Gestation													
	Date													
	Time													
Temperature	39.0													39.0
	38.0													38.0
	37.5													37.5
	37.0													37.0
	36.0													36.0
	35.0													35.0
Heart Rate	170													170
	160													160
	150													150
	140													140
	130													130
	120													120
	110													110
	100													100
	90													90
	80													80
	70													70
	60													60
	50													50
	40													40
Systolic BP	200													200
	190													190
	180													180
	170													170
	160													160
	150													150
	140													140
	130													130
	120													120
	110													110
	100													100
	90													90
	80													80
	70													70
	60													60
	50													50
Diastolic BP	130													130
	120													120
	110													110
	100													100
	90													90
	80													80
	70													70
	60													60
	50													50
	40													40
Respiratory Rate	> 30													> 30
	21 - 29													21 - 29
	11 - 20													11 - 20
	< 10													< 10
Oxygen Saturations	95 - 100 %													95 - 100 %
	< 95%													< 95%
Oxygen Concentration	% venturi, l/min or RRM													% venturi, l/min or RRM
Urine Output	<35 ml / hr NPU in 10 hrs													<35 ml / hr NPU in 10 hrs
	NPU in 8 hrs													NPU in 8 hrs
	>35ml / hr PU in last 8 hrs													>35ml / hr PU in last 8 hrs
Neurological Response	Alert													Alert
	Voice / Confused													Voice / Confused
	Unresponsive / Pain													Unresponsive / Pain
Total RED Scores														
Total YELLOW Scores														
Have any Triggers been escalated														
Initials														

If this woman is being treated outside the Maternity Unit, Central Delivery Suite at DRI ([illegible]) or Labour Ward at Bassetlaw ([illegible]) must be informed of her attendance

Case 1

- 34 year old, 28/40 gestation, primigravida
- Mild headaches, lethargy and ankles are “puffy”
- Presents to GP and is referred to Ambulatory Care

- What further history do you want to know?
- What do you want to do next?

Case 1

- Headaches
  - Visual Symptoms
  - Not positional
- Puffy ankles worse at night, better in the morning
- Booking blood pressure was 110/70
- Booking BMI was 27, GGT done at 24 weeks NAD
- Obs: BP 145/90, HR 105, RR 18, SaO2 96%
- B – Lung bases clear. JVP normal
- C – Ejection systolic murmur throughout precordium
- D – Normal reflexes
- E – Gravidum uterus. SNT Abdo
- Urine dip: +leukocytes +nitrites +glucose ++protein

Case 1 – Issues & Management

Issues

Management

Case 1 – Issues & Management

Issues

Pre-eclampsia

ESM identified

Positive urine dip

Management

Admission to obstetric team

Investigations – PET bloods, Urine PCR

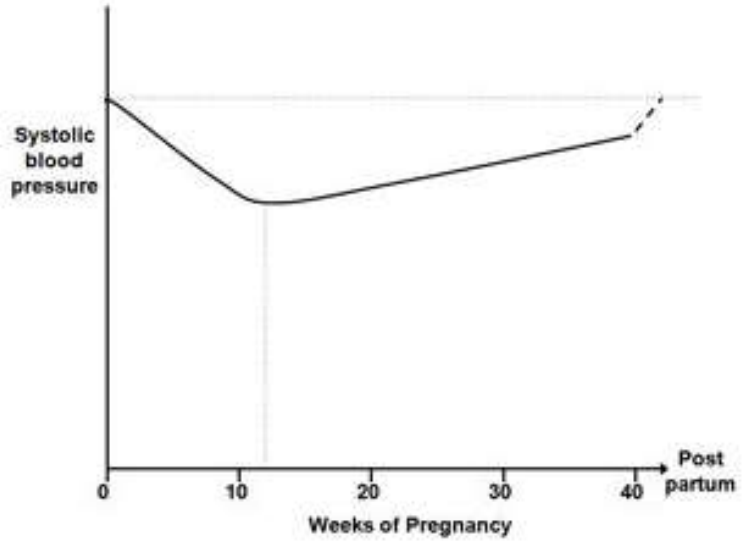
Antihypertensive Treatment & careful fluid balance

(don't give excessive IV fluid)

Antibiotics

Cardiovascular Physiology

- Cardiac Output = Stroke volume x Heart Rate
  - Stroke volume goes up in pregnancy – LV remodelling
  - HR 105-110 is normal
- SVR drops in first trimester and increases to near normal at delivery
  - (Remember BP = CO x SVR)
- Ankle oedema occurs due to hyper-dynamic state, but sudden onset is more concerning for pre-eclampsia
- ESM, loud 1st HS, 3rd HS are normal findings



Hypertensive Disease in Pregnancy

Pre-existing Hypertension

BP elevated above 140/90 prior to pregnancy/on booking

Pregnancy Induced Hypertension

Hypertension occurring after 20th week.

Needs monitoring and treating if >150/100

15% develop into pre-eclampsia

Pre-eclampsia

Multi-systems disorder of vascular-endothelial dysfunction from placentation

Traditionally present with hypertension, proteinuria & oedema.

Can develop a crisis or ARF / HELLP syndrome / DIC / intrauterine death

Eclampsia

Pre-eclampsia associated with seizures or neurological compromise

Drug Management of hypertension in pregnancy

Drug	Indication	Doses	Cautions
Labetolol	1st Line	100mg BD – 500mg QDS	Asthma
Nifedipine MR	2nd Line	10 mg – 40 mg BD	MR prep only
Methyl-dopa	2nd Line	250mg BD – 1g TDS	Depression
Other beta-blockers	3rd Line	As per non-pregnancy	Safe, but less evidence
Alpha-blockers (Doxazosin)	3rd Line	1mg OD – 8mg BD	Not safe in breast feeding
Hydralazine	3rd Line	25mg TDS – 75mg QDS	

- Drugs not safe in pregnancy
  - ACEi and ARBs
  - Diuretics†
- Drugs safe in breastfeeding mums
  - Labetolol, atenolol, metoprolol
  - Enalapril, captopril, nifedipine

† Except in exceptional circumstances: pulmonary oedema and cardiomyopathy

NICE guidelines for UTI

- Pregnant women with symptoms of UTI should:
  - Have a urine sent off for culture
  - Antibiotics
  - Repeat urine culture to check for cure
- Pregnant women with asymptomatic bacteria
  - Needs confirmation with repeat culture
  - Always needs treating
  - Will need repeat culture to check for cure

1st choice

Nitrofurantoin
(avoid near term)

2nd choice

Amoxicillin
Cefalexin

7 day course

Case 2

- Urgent call to resus
  - 2/7 post-partum
  - Headaches, visual disturbance
  - Collapses & having a seizure

- How to assess / approach this patient?
- What are the differential diagnoses?
- What are the immediate managements?

Case 2

Assessment	ABCDE MDT approach – physicians, anaesthetics and obstetricians
Differential Diagnoses	Eclampsia Epilepsy Intracranial haemorrhage / catastrophe / venous sinus thrombosis
Management	Airway stabilisation / critical care support Magnesium sulphate(4g IV bolus) CT(+venogram if no haemorrhage)

Case 3

- GP refers a patient to ACU
  - 24 year old, 34/40
  - 3/7 SOB, at rest and more on exertion
  - No pain
  - Feeling tired
  - Minor leg swelling
- Assessment?
- Investigations?

Case 3

Assessment

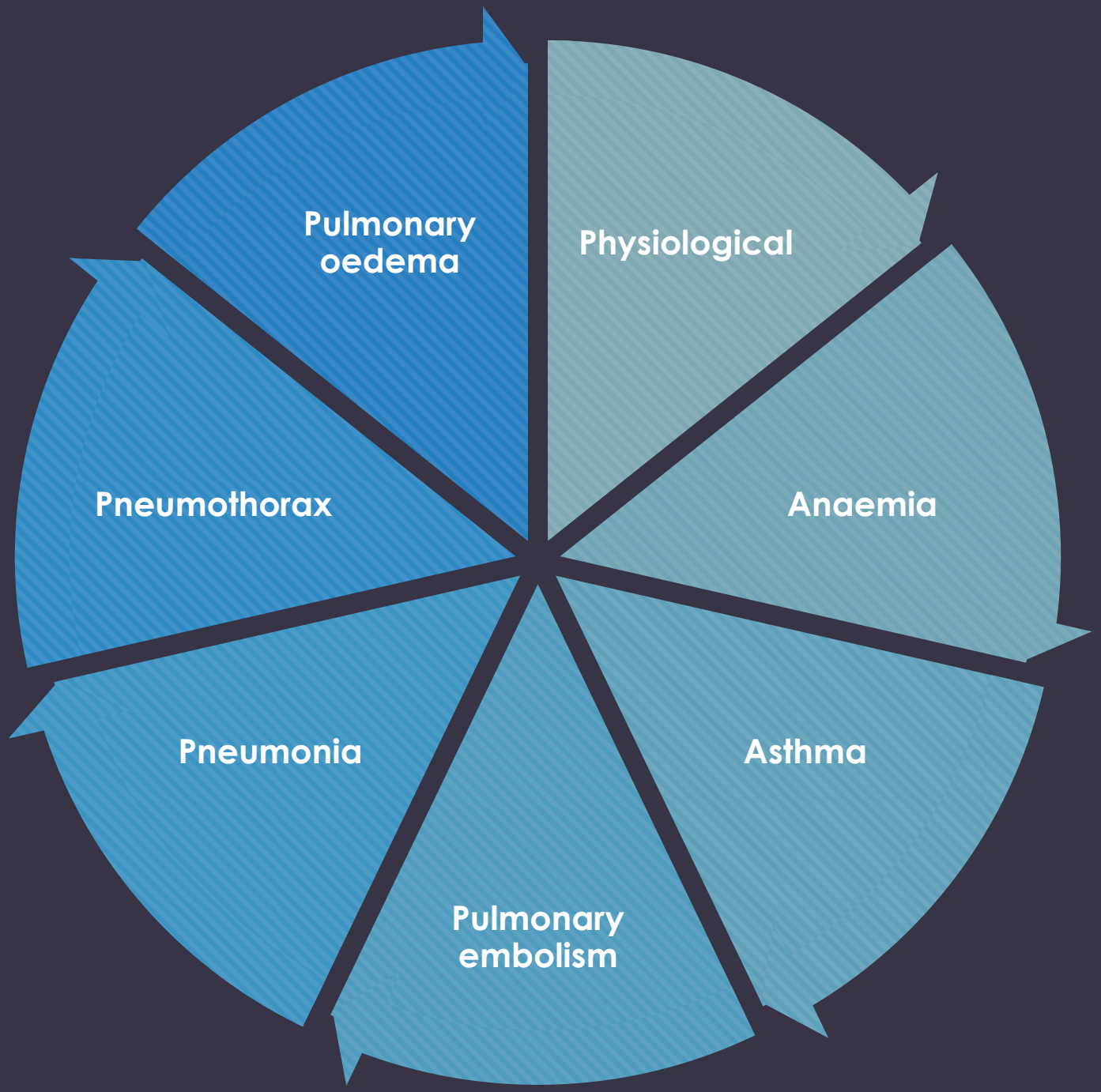
- No LOC or palpitations
- Previous pregnancy – no complication

- BP 115/75, HR 95, SaO2 96%, RR18, T 37.2
- B – clear lung fields
- C – HS normal, no murmurs. JVP not elevated
- E – b/l pitting oedema

Investigations

- Bloods
  - Hb 102, MCV 82, Plts 120, WCC 11, CRP 10
- ECG
  - NSR with lead III T wave inversion
- CXR
  - Splinted diaphragm, no consolidation/failure
- Ambulatory SaO2
  - No dip in SaO2 on exertion

Differential Diagnoses

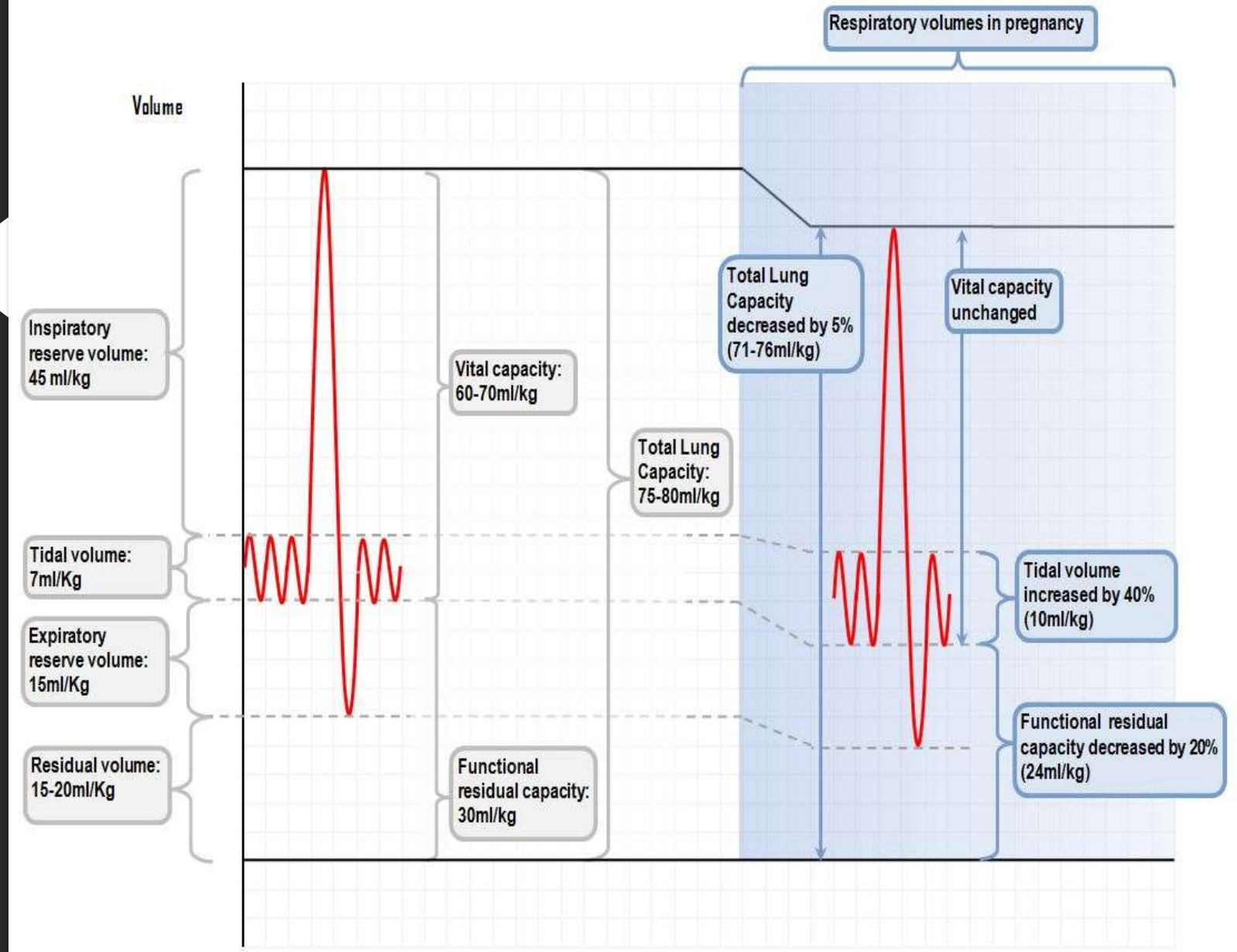


Respiratory Physiology

- Tidal volume increases
- Resp rate is unchanged
- Peak flows stay the same

- Relative hyperventilation
- Compensated respiratory alkalosis

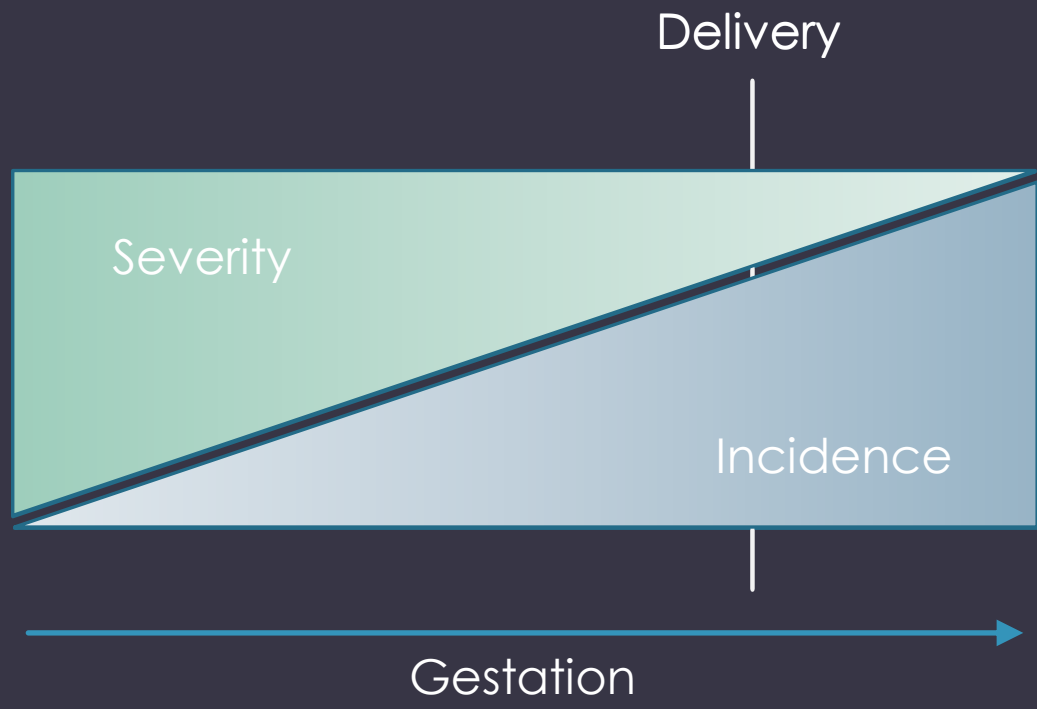
	Pregnant	Non-pregnant
pH	7.40-7.47	7.35-7.45
pCO_2	3.6-4.3	4.7-6.0
pO_2	12.6-14.0	10.6-14.0
BE	No change	+2 to -2
HCO3	18-22	20-28



VTE in pregnancy

- Most common direct cause of maternal mortality
- Pregnancy increases risk of VTE x6
- DVT 75%, PE 25%

- WELLS scores – not valid
- D-Dimer … just don't



Appendix I: Obstetric thromboprophylaxis risk assessment and management

Antenatal assessment and management (to be assessed at booking and repeated if admitted)

- Any previous VTE except a single event related to major surgery

→ **HIGH RISK**
Requires antenatal prophylaxis with LMWH
Refer to trust-nominated thrombosis in pregnancy expert/team

- Hospital admission
- Single previous VTE related to major surgery
- High-risk thrombophilia + no VTE
- Medical comorbidities e.g. cancer, heart failure, active SLE, IBD or inflammatory polyarthropathy, nephrotic syndrome, type I DM with nephropathy, sickle cell disease, current IVDU
- Any surgical procedure e.g. appendicectomy
- OHSS (first trimester only)

→ **INTERMEDIATE RISK**
Consider antenatal prophylaxis with LMWH

- Obesity (BMI > 30 kg/m²)
- Age > 35
- Parity ≥ 3
- Smoker
- Gross varicose veins
- Current pre-eclampsia
- Immobility, e.g. paraplegia, PGP
- Family history of unprovoked or estrogen-provoked VTE in first-degree relative
- Low-risk thrombophilia
- Multiple pregnancy
- IVF/ART

→ **Four or more risk factors: prophylaxis from first trimester**

Three risk factors: prophylaxis from 28 weeks

Fewer than three risk factors →

Transient risk factors: Dehydration/hyperemesis; current systemic infection; long-distance travel

→ **LOWER RISK**
Mobilisation and avoidance of dehydration

Postnatal assessment and management (to be assessed on delivery suite)

- Any previous VTE
- Anyone requiring antenatal LMWH
- High-risk thrombophilia
- Low-risk thrombophilia + FHx

→ **HIGH RISK**
At least 6 weeks' postnatal prophylactic LMWH

- Caesarean section in labour
- BMI ≥ 40 kg/m²
- Readmission or prolonged admission (≥ 3 days) in the puerperium
- Any surgical procedure in the puerperium except immediate repair of the perineum
- Medical comorbidities e.g. cancer, heart failure, active SLE, IBD or inflammatory polyarthropathy; nephrotic syndrome, type I DM with nephropathy, sickle cell disease, current IVDU

→ **INTERMEDIATE RISK**
At least 10 days' postnatal prophylactic LMWH

NB If persisting or > 3 risk factors consider extending thromboprophylaxis with LMWH

- Age > 35 years
- Obesity (BMI ≥ 30 kg/m²)
- Parity ≥ 3
- Smoker
- Elective caesarean section
- Family history of VTE
- Low-risk thrombophilia
- Gross varicose veins
- Current systemic infection
- Immobility, e.g. paraplegia, PGP, long-distance travel
- Current pre-eclampsia
- Multiple pregnancy
- Preterm delivery in this pregnancy (< 37+0 weeks)
- Stillbirth in this pregnancy
- Mid-cavity rotational or operative delivery
- Prolonged labour (> 24 hours)
- PPH > 1 litre or blood transfusion

Two or more risk factors →

Fewer than two risk factors →

→ **LOWER RISK**
Early mobilisation and avoidance of dehydration

DVT

- Left leg more common (9:1)
- Iliofemoral > femoropopliteal
- Unilateral oedema common without DVT
- Clinical assessment unreliable to predict DVT
- Do US dopplers in any patient with suspicion
- Rescan needed in negative scans with high clinical suspicion
- Treat with LMWH – BD dosing
  - Until 3 months post-partum
  - Following pregnancies get prophylaxis

PE

- Most CP or SOB is not a PE
- History and examination help to assess risk
- Syncope and haemoptysis give high index of suspicion
- Ix: ECG, if hypoxic - ABG & A-a gradient, Ambulatory SaO2, CXR
- USS Doppler only if unilateral leg swelling
- Lung scan
- Treatment with LMWH – again until 3 months post-partum & prophylaxis in subsequent pregnancy
- If massive PE / shocked – strongly consider thrombolysis & surgical therapies

Lung Scans

CTPA

- Neg pred value: 99%
- More readily available
- Higher breast radiation exposure
  - (increases 0.0136% risk on average)
- Diagnose other conditions
  - Pulmonary oedema, pneumonia, aortic pathology

V/Q (conventional planar)

- Neg pred value: 100%
- Perfusion scan (V from CXR)
- Higher fetal radiation exposure
  - (increases 0.003% risk childhood cancer)
- Needs a normal CXR

SPECT V/Q

- More accurate than V/Q – low dose CT

Handy tips on other respiratory disease

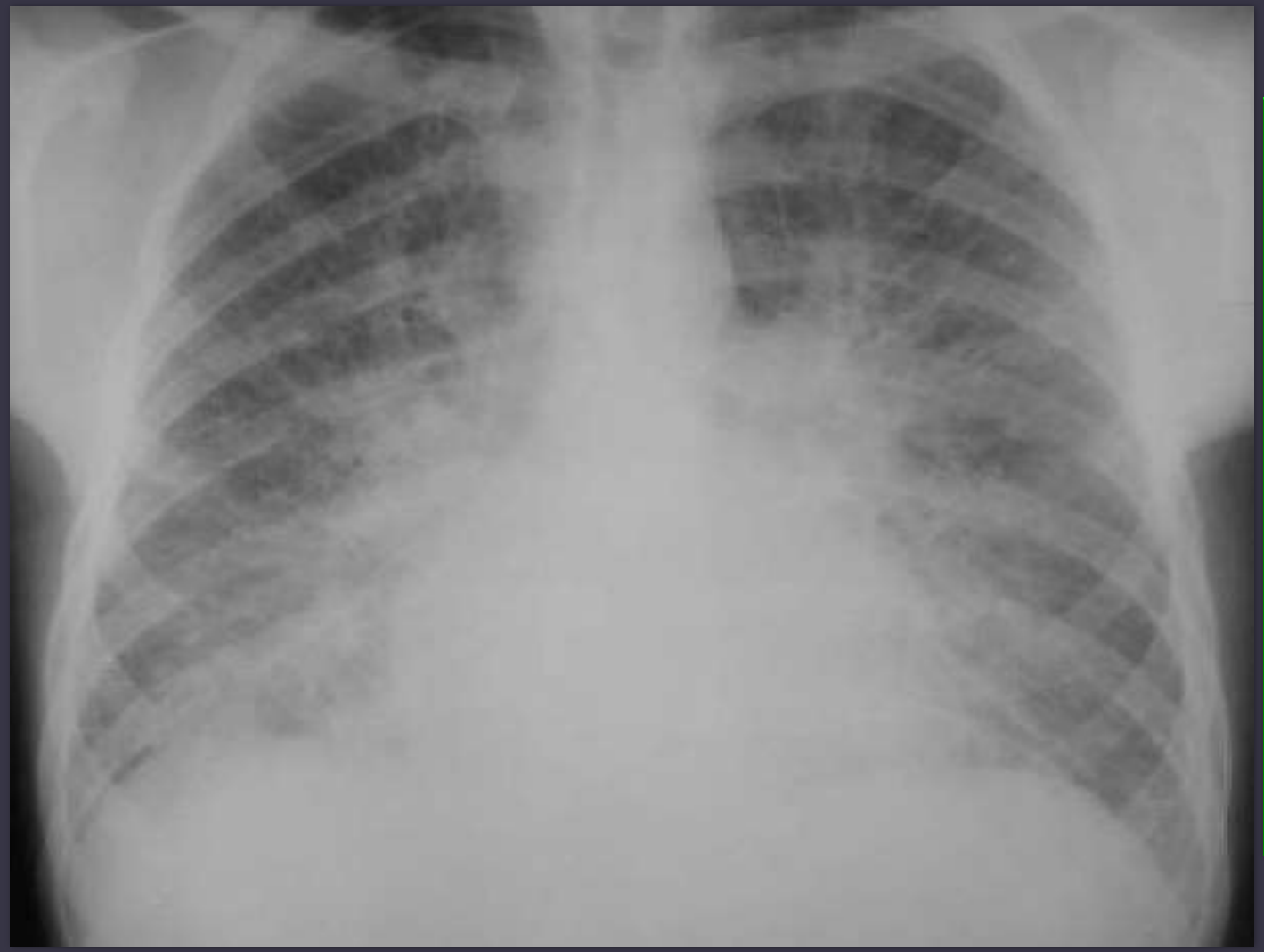
- Pneumonia
  - ↓ Total lung capacity
  - Antibiotics of choice
    - Amoxicillin / Benpen / Cefuroxime
    - Erythromycin
  - Antibiotics to avoid
    - Co-amoxiclav
    - Doxycycline
  - Escalate early

- Asthma
  - Peak flows tend to be consistent
  - All acute asthma drugs can be given
  - Aminophylline can be used monitor levels closely
  - Acute severe asthma is an emergency
  - Escalate early to HDU

Case 4

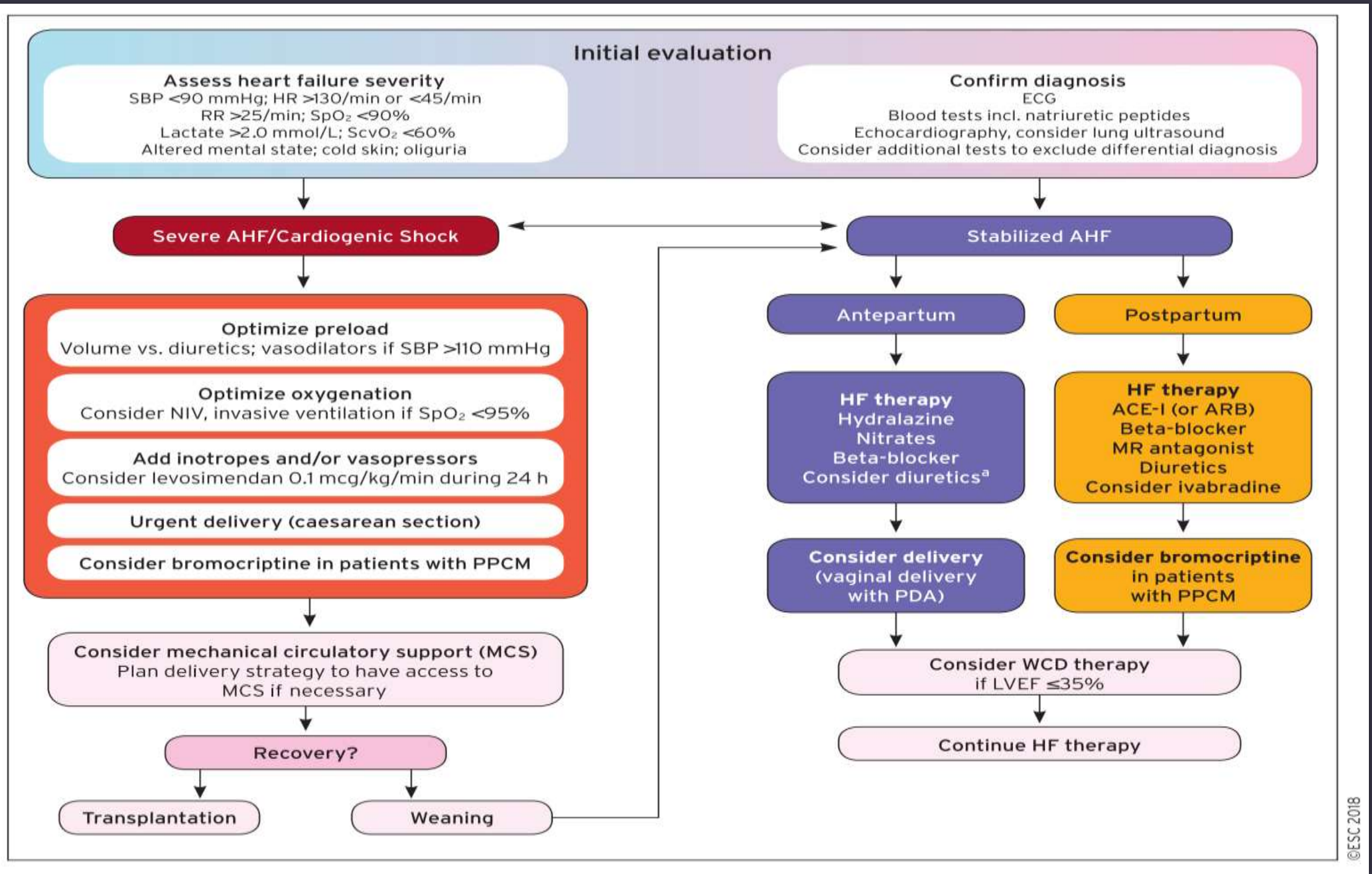
- 36/40 pregnant
- 1/52 SOB & orthopnoea
- Ankle swelling
- Dry cough

- BP 150/90, HR 130 SR, RR 30, SaO2 91% air
- A – Alert
- B – crackles bilaterally
- C – HS I II III, flow murmur, elevated JVP
- D – Alert
- E – ankle oedema ++



Peripartum cardiomyopathy

- Heart failure associated with tail end of pregnancy or post-partum
- Risks: multiple pregnancy, multiparity, afro-Caribbean race, maternal age
- Presents typical heart failure features: LVEF <45%
- LV assist device or transplantation used in most serious cases
- 50% make a full recovery
- 95% 5 year survival, cardiomyopathy causes 25% of maternal cardiac death
- Counselling for subsequent pregnancies if poor recovery of LV function


Initial evaluation
Assess heart failure severity
SBP <90 mmHg; HR >130/min or <45/min
RR >25/min; SpO2 <90%
Lactate >2.0 mmol/L; ScvO2 <60%
Altered mental state; cold skin; oliguria
Confirm diagnosis
ECG
Blood tests incl. natriuretic peptides
Echocardiography, consider lung ultrasound
Consider additional tests to exclude differential diagnosis
Severe AHF/Cardiogenic Shock
Stabilized AHF
Optimize preload
Volume vs. diuretics; vasodilators if SBP >110 mmHg
Optimize oxygenation
Consider NIV, invasive ventilation if SpO2 <95%
Add inotropes and/or vasopressors
Consider levosimendan 0.1 mcg/kg/min during 24 h
Urgent delivery (caesarean section)
Consider bromocriptine in patients with PPCM
Consider mechanical circulatory support (MCS)
Plan delivery strategy to have access to MCS if necessary
Recovery?
Transplantation
Weaning
Antepartum
Postpartum
HF therapy
Hydralazine
Nitrates
Beta-blocker
Consider diuretics[a]
HF therapy
ACE-I (or ARB)
Beta-blocker
MR antagonist
Diuretics
Consider ivabradine
Consider delivery
(vaginal delivery with PDA)
Consider bromocriptine
in patients with PPCM
Consider WCD therapy
if LVEF ≤35%
Continue HF therapy
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Case 5

- 16/40 pregnant
- 1/52 SOB & orthopnoea
- Ankle swelling
- Dry cough
- Facial rash
- Previous miscarriages

SLE

- SLE flares tend to occur and worsen in pregnancy
- Difficult to assess: many symptoms “normal” in pregnancy
- Increased risk of miscarriage, IUD, fetal growth restriction in:
  - Patient with lupus anticoagulant
  - Lupus nephritis
  - Active disease at time of conception
- SLE can mimic conditions: preeclampsia, HELLP, AFLP, PPCM, Sepsis, DIC
- Acute flares: steroids, immunosuppressants inc MMF or Tacrolimus
- Aspirin

SLE flare	Preeclampsia
Low complement level	Normal complement level
Increased double-stranded DNA	Unchanged double-stranded DNA
Leukopenia	Leukocytosis
Cellular casts/hematuria	Acellular urine
Low uric acid level	High uric acid
Thrombocytopenia	Thrombocytopenia
	Abnormal liver function tests
	Schistocytes

How to differentiate SLE vs Preeclampsia

Case 6

- A 31/40 woman develops abdominal pain, vomiting, subtle yellowing and abnormal LFTs
- She has been referred to ACU for review with mainly abnormal LFTs

- LFTs
  - ALT 450, AST 300, GGT 120, ALP 405, Bili 60, Glu 3.8
  - INR 1.8, Plts 135

- What further investigations do you need?

Hepatic Physiology

- Some common signs associated with liver disease can be seen in pregnancy: spider naevia and palmar erythema (due to high oestrogen)
- Haemodilution causes a drop in albumin
- ALP can 2-4 x normal range – placental ALP production
- AST & ALT stay within normal limits; GGT tends to stay normal / slight low
- PT remains stable, but fibrinogen goes up in late pregnancy

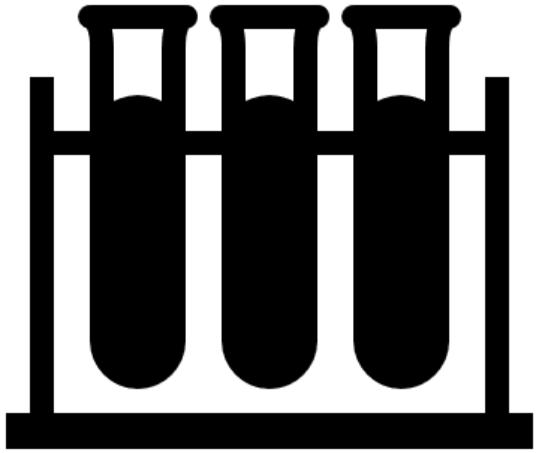
Important Pregnancy Liver Diseases

Hyperemesis gravidarum	Viral hepatitis	Intrahepatic cholestasis of pregnancy	Acute fatty liver
1st trimester	HBV – Rx often needed	3rd trimester	3rd trimester
Significant vomiting causes abnormal LFT	HCV – usually stable	Pruritus, malaise, insomnia	Severe vomiting Abdominal pain
	HDV – prevent HBV	Cholestasis 2° Oestrogens	Jaundice & ascites may develop
	HEV – Failure 20%, 2% mortality	All LFTs may ↑ Bile acids: ↑10-100 x	DIC, AKI and lactic acidosis on Ix
	HSV – rare but high mortality	R/O other causes: USS, virology, Abs	High mortality

Don't forget surgical causes: gallstones and pancreatitis
Don't forget about HELLP syndrome.

Intrahepatic cholestasis of pregnancy

- Oestrogens cause reduced hepatocyte bile excretion
- Itching without a rash, deranged LFTs and r/o other causes
- Risks
  - Vit K deficiency, PPH, fetal distress, spontaneous preterm delivery, intrauterine death, fetal intracranial haemorrhage
- Treatment
  - Monitor LFTs and coagulation
  - Give Vitamin K orally for INR correction (water soluble prep menandiol sodium phosphate)
  - Antihistamines
  - Ursodeoxycholic acid / cholestyramine
  - Dexamethasone
  - Delivery with neonatal vitamin K
  - Counselling re 90% recurrence in subsequent pregnanct



Acute fatty liver of pregnancy (AFLP)

- 3rd trimester, rare but can be severe (2 – 12 % mortality)
- Abdo pain, severe vomiting, mild pre-eclampsia and jaundice
- Direct hepatocyte damage from fetal fatty acids and maternal fatty acid oxidation failure
- Often develop AKI, hypoglycaemia, DIC
- Imaging helps with Δ, biopsy with statin stain is gold standard – high risk
- Treatment
  - Delivery, MDT care and high level care
  - Correction of liver failure: fluid, coagulopathy, gut flora, sepsis, NAC, glucose,
  - Referral to liver unit / transplant

Summary

- Medics need to me aware of the acute medical problems woman can present with
- The principles for treatment are mostly the same, with emphasis on early escalation
- Beware some drugs are not suitable in pregnancy. If in doubt – check!
- Remember to check MOEWS score for pregnant and post-partum women