Royal Infirmary of Edinburgh

OBSTETRIC EMERGENCIES HANDBOOK

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Contents

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EQUIPMENT CHECKLIST

Obstetric emergencies equipment to be found in Obstetric Emergency Box in Resus 1

Checks to be carried out daily and documented in resus checks folder

ITEM	QUANTITY
Delivery pack with disposable scalpel	1
Sterile Gown	1
Face visor/Eye protection	1
Sterile gloves (size 7 & size 8)	1 of each
Large venflons (14G & 16G)	2 of each
Blood collection tubes: (Red haematology, orange biochemistry)	1 of each
Blood collection tubes: (Green coag, blue BTS)	2 of each
ABG collection syringe	1
Fluid giving set	1
Blood giving set	1
Rampleys Sponge Holder	1
Sterile Swab Pack	2

ITEMS (OUTWITH BOX)	LOCATION
Warmed towels	Hot cabinet outside resus
Warmed fluids	Hot cabinet in Resus 1C
Emergency blood	BTS Satellite Fridge (Resus 1C)

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HOW TO GET HELP

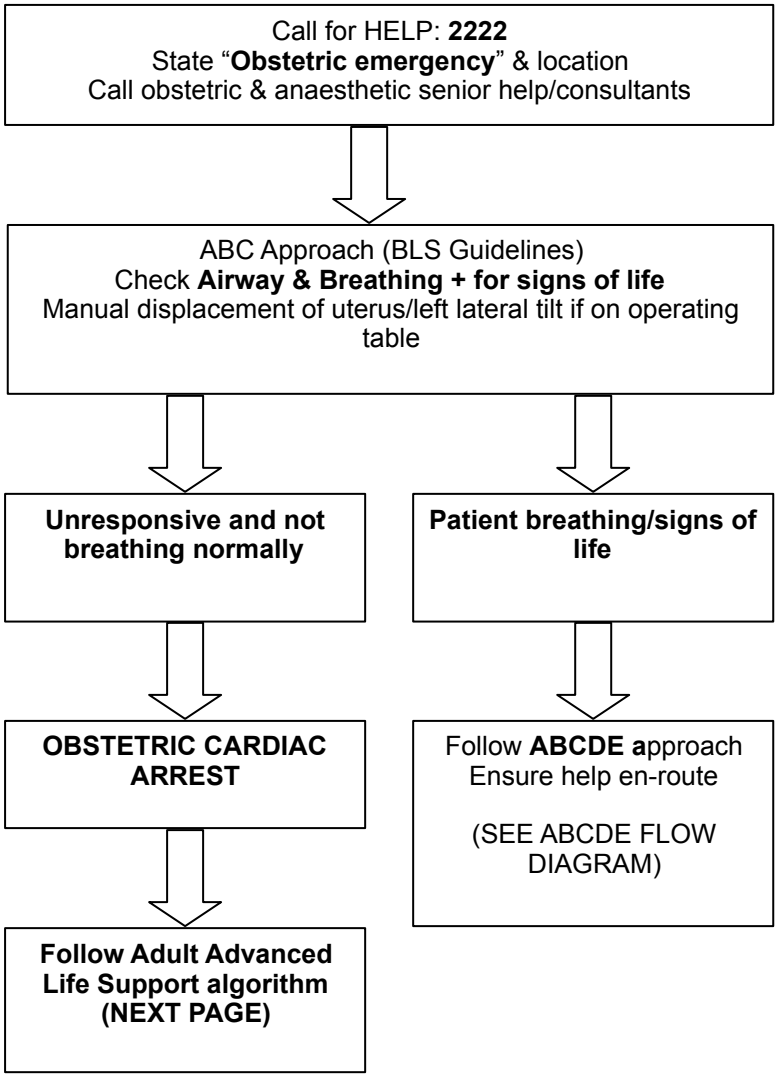
In the event of an obstetric emergency, ensure a full ED medical team including the ED resus consultant/senior registrar is in attendance.

The obstetric team can be fast-paged to resus in an emergency; this is essential (but not limited to) any of the presentations listed in this handbook.

1	Dial 2222
2	State “Obstetric Emergency, Emergency Department Resus 1 (or 2)”
3	If necessary, request the duty obstetric consultant and duty obstetric anaesthetics consultant to be called also
4	Await repeat back from operator
5	Hang up telephone
6	Inform Labour Ward co-ordinator on 22544 /22542

The obstetric registrar can also be contacted direct on bleep 1616 at RIE in any other circumstance, or if you need to discuss an unwell obstetric patient that does not currently require resuscitation.

MATERNAL COLLAPSE & CARDIAC ARREST



Potential causes (In both groups): 'BEAU-CHOPS'

- **Bleeding**
- **Embolism – coronary/pulmonary/AFE**
- **Anaesthetic**
- **Uterine atony**
- **Cardiac disease – ischaemic,/MI cardiomyopathy/aortic dissection**
- **Hypertension – preeclampsia/ eclampsia/HELLP**
- **Other – * 4Hs and 4Ts**
- **Placenta abruption/praevia**
- **Sepsis**

- ***4Hs – hypoxia, hypovolaemia, hypo/hyperkalaemia, hypothermia**
- ***4Ts – thrombus, toxins(e.g. Mg2+), tension pneumothorax, cardiac tamponade**

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OBSTETRIC CARDIAC ARREST

2222 & Location
(If not already called)

Commence ALS

- Ensure manual uterine displacement/**left lateral** tilt
- Chest compressions & breaths 30:2
- 15litres O2 to AMBU bag
- Connect patient to defibrillator
- Assess rhythm/follow AED
- Intubation by anaesthetist ASAP
- Treatment with drugs/shocks as per ALS protocol
- Consider reversible causes
- Consider specific obstetric causes ('BEAU-CHOPS')

Consider peri-mortem Caesarean section

- Consider after 3 minutes of unsuccessful resuscitation, start by 4 minutes
- Delivery relieves aortocaval compression
- Improved survival mother & fetus

Continue maternal resuscitation throughout

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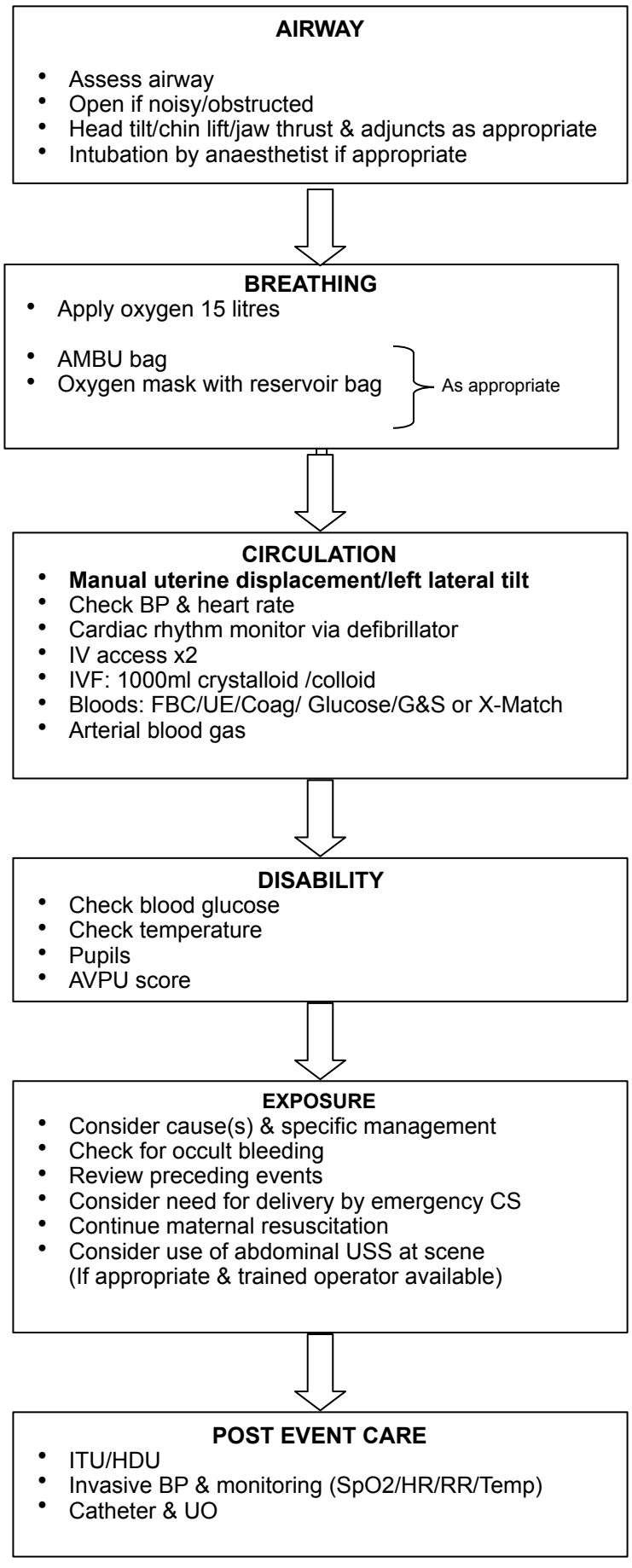
ABCDE APPROACH TO MATERNAL COLLAPSE



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SPONTANEOUS VAGINAL DELIVERY IN THE ED

Ladies presenting with regular contractions can normally be transferred to Labour ward. Inform the obstetric registrar and labour ward co-ordinator.

If a pregnant female presents to the ED and is actively labouring and the vertex is visible, delivery is imminent and she should be kept in ED. Any delivery out-with the labour suite is considered high risk.

	ACTIONS
1	Move to resus bay; call ED senior, midwife, obstetrician and paediatrics **> this is best done by making a 2222 obstetric & neonatal emergency call**
2	Request the 'Obstetric Emergencies Box' which contains a delivery pack
3	Have your assistant open the contents of the pack and lay them out on a large trolley; don a pair of sterile gloves & wear eye protection
4	Have warmed towels at the ready (obtained from the hot cabinet outside resus)
5	Apply routine monitoring (HR, NIBP, pulse oximetry)
6	Obtain IV access (14G or 16G) and send routine bloods to include FBC and G&S (inform lab patient is in labour)
7	Have fluids prepped and running if clinically indicated
8	Labour ward will send a midwife who will hopefully arrive in time to co-ordinate the delivery; if not don't panic - a precipitant labour will likely continue as nature intended
	If you are on your own, don't panic! • Support the perineum with your thumb and index finger • Allow head to deliver spontaneously • When head is delivered it will rotate 90degrees • Place hands gently on each side of the baby head to support • At next contraction use gentle traction downwards to release anterior shoulder, then gentle traction upwards to deliver posterior shoulder • Once delivered place in warm towel and hand to mum
9	Give syntocinon 10 units IM as soon as possible after delivery
10	Once delivered, assess the baby for signs of life and keep warm. The attendance of the neonatal team is essential. There is no requirement to cut the umbilical cord until they arrive unless competent to do so.

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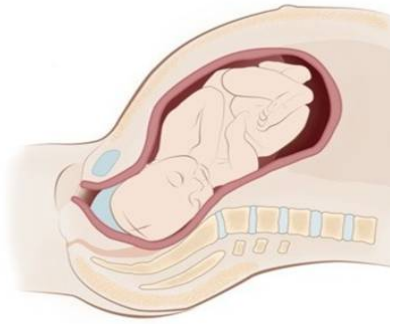
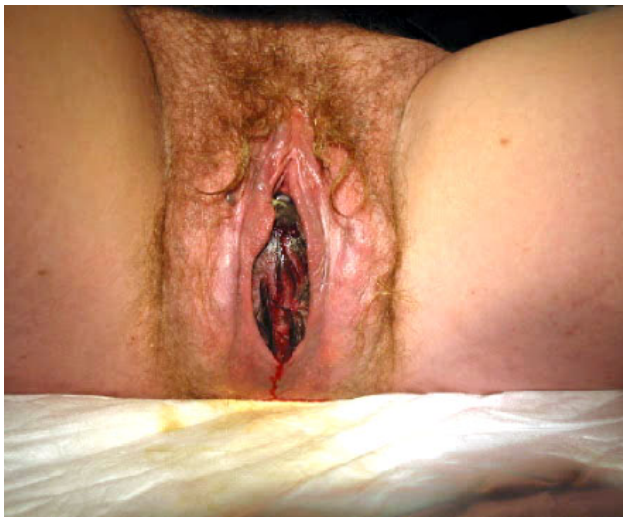
	ACTIONS
11	If there is no signs of life in the newborn, immediately clamp the cord on both sides of the intended incision site, cut the cord with scissors and immediately commence neonatal resuscitation as per NLS/SNRC guidelines
12	Do not pull on the cord to deliver the placenta if not competent to do so. Await the midwife/obstetric team. Observe closely for signs of postpartum haemorrhage.
13	Transfer the patient to labour ward as soon as safe to do so

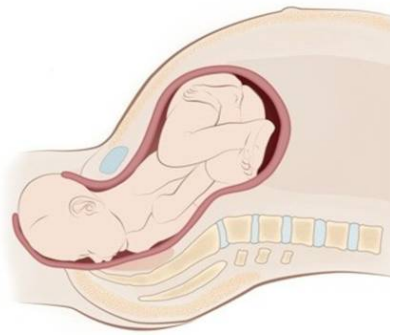
MECHANISM OF LABOUR (FOR REFERENCE)

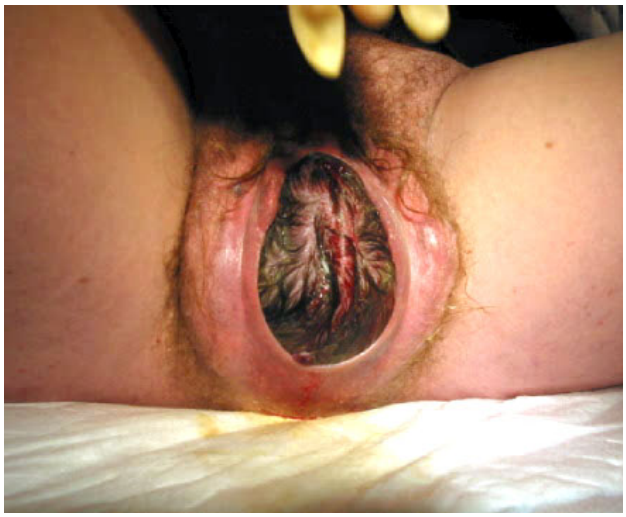
The mechanism of labour involves:

- contractions, effacement and then dilatation of the cervix to 10 cm, i.e. full dilatation (first stage of labour)
- from full dilatation to expulsion of the baby by uterine contractions and maternal effort (second stage)
- from birth of the newborn to the delivery of the placenta (third stage).









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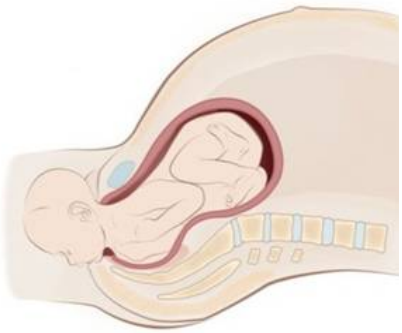

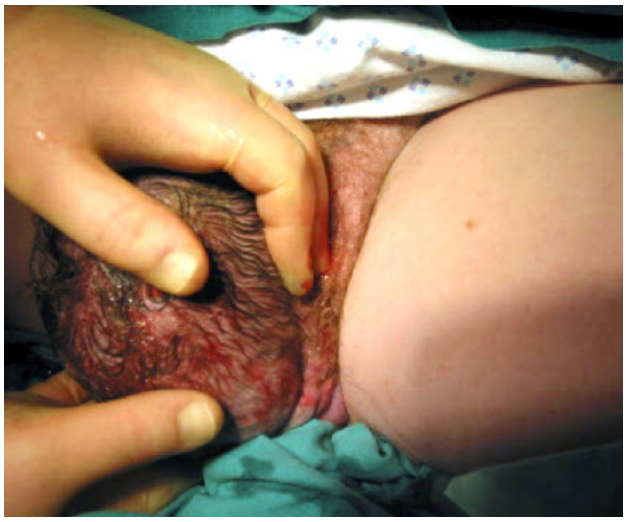

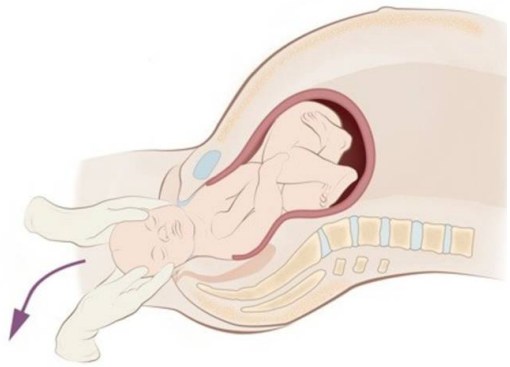

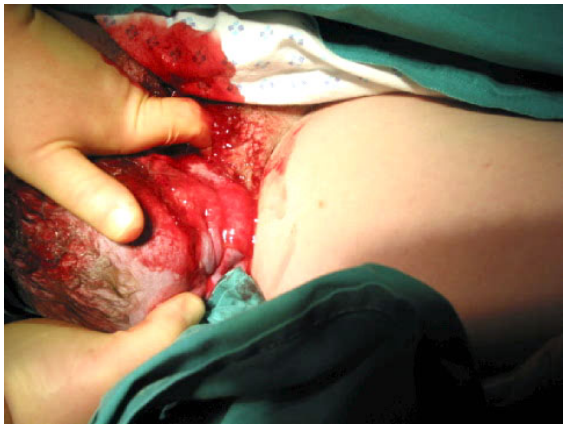

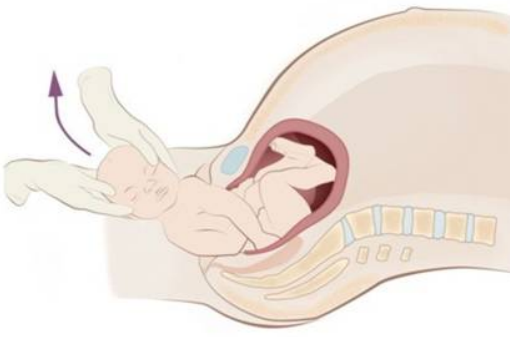

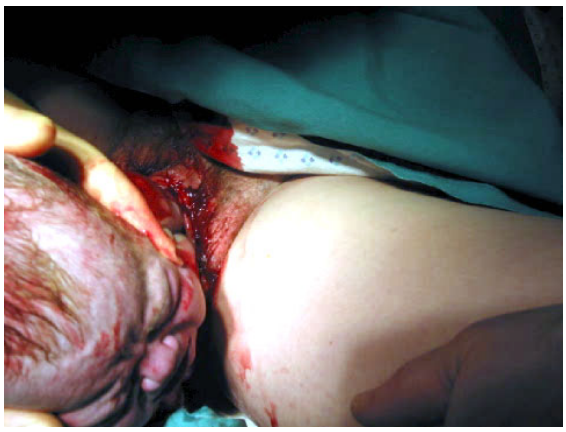

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SHOULDER DYSTOCIA

Shoulder dystocia is an obstetric emergency that can occur during delivery of the fetus. It is generally recognised as “a condition requiring special manoeuvres to deliver the shoulders following an unsuccessful attempt to apply downward traction”. Most commonly it involves impaction of the anterior fetal shoulder against the maternal symphysis pubis after delivery of the fetal head.

Shoulder dystocia is a significant cause of fetal and maternal morbidity. It occurs in approximately 1% of deliveries and is an obstetric emergency. While this type of presentation is unlikely to be experienced in the Emergency Department, identification of it in a delivering patient where the baby becomes “stuck” is essential, and the obstetric emergency team should be contacted immediately!

Although most cases of shoulder dystocia are unpredictable, there are some known risk factors which should be identified and documented antenatally:

- previous shoulder dystocia
- elevated BMI
- maternal diabetes
- post-dates pregnancy
- fetal macrosomia

Management
This is an obstetric emergency where, again, seconds count. The aim is to disimpact the anterior shoulder and allow the fetus to be delivered.

The mnemonic 'HELPERR' is useful to guide the clinician through a set of detailed manoeuvres in a calm logical way. Each manoeuvre is attempted for a maximum of 30 seconds before moving to the next:

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H	**Call for help** **2222 – Obstetric & Neonatal Emergency**
E	**Evaluate for episiotomy** (only to be considered if trained obstetric staff present)
L	**Legs – McRoberts Manoeuvre:** Bed flattened, and patients buttocks to end of the bed Both thighs flexed against the maternal abdomen – this flattens the lumbo-sacral curve and may also flex fetal spine and allow posterior shoulder to slip over sacral promontory Routine traction only should be applied to the babys head after the patients is in McRoberts *(This manoeuvre is the single most effective intervention with reported success >50%)*
P	**Pressure – "Suprapubic"** Fetal lie is determined so that pressure can be exerted on the posterior aspect of the anterior shoulder to adduct and internally rotate the shouder Pressure is applied by an assistant, using a hand position similar to the CPR resuscitation grip, over the symphysis pubis on the correct side Continuous then rocking pressure can be applied, and routine traction only should be applied to the baby's head at the same time
E	**Enter – rotational manoeuvres** **Use Pringle® manoeuvre to enter i.e. with dominant hand adopt same position used to** **retrieve final pringle from bottom of tube** These aim to change the orientation of the fetal shoulders from the AP position to the wider oblique or transverse diameter in the maternal pelvis, and also reduce bisacromial diameter of the shoulders Rubin II. Insert hand posteriorly in vagina to apply pressure to the posterior aspect of the anterior shoulder in order to encourage rotation. Suprapubic pressure can still be applied. Woodscrew manoeuvre. As above but simultaneously applying pressure on the anterior aspect of the posterior shoulder with the other hand Reverse Woodscrew. If above unsuccessful, rotation can be attempted in the opposite direction without external pressure. First hand inserted can be used to apply pressure to the posterior aspect of the posterior shoulder
R	**Remove posterior arm** The operator hand is inserted in the vagina posteriorly,at the anterior side of the fetus The fetal arm is identified and, if already flexed, the wrist is grasped so the arm can be delivered by sweeping the hand over the face. If not, 2 fingers in the cubital fossa can flex the fetal arm so the wrist can be grasped and the arm delivered. This should resolve the shoulder dystocia and enable the baby to be delivered with routine traction.
R	**Roll onto all-fours position** This is known as the Gaskin Manoeuvre. If possible, assist the mother to turn to be on all fours and attempt to deliver the fetus with posterior shoulder delivering first.

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MATERNAL SEPSIS GUIDELINE

Sepsis is one of the important causes of direct maternal death in the UK. The incidence of severe maternal sepsis has increased over the last two decades. Community acquired Group A Streptococcus Pyogenes has been identified as the most common organism postnatally associated with severe sepsis. Eschericia coli is the most common bacterium antenatally causing severe sepsis.

The onset of life-threatening sepsis at any stage of pregnancy can also be insidious and doctors and midwives must be aware of symptoms and signs and be prepared to institute immediate treatment (MBRACE 2015).

This includes our response in the emergency department.

SIRS CRITERIA
Respiratory Rate >20/min
Heart Rate >100/bpm
Temp <36 or >38
WCC <4 or > 16x10(9)/l
Altered mental state

Sepsis is identified when there are two or more SIRS criteria with a possible/suspected source of infection.

SEVERE SEPSIS
Systolic BP <90 or MAP <65 or systolic >40mmHg below patient norm
Lactate > 4mmol/L
Unexplained coagulopathy/thrombocytopenia <100x10(9)/L
INR > 1.5 or APTT > 60 secs
Creatinine > 120umol/L
Urine output < 0.5ml/kg/hr for 2 hours
Bilirubin 70umol/L
New need for oxygen to maintain SpO2 >94%
Newly altered mental status

Septic shock is diagnosed when sepsis induced hypotension or raised lactate persist despite adequate fluid resuscitation (normally at least 20ml/kg, about 1.5-2L for an average adult.

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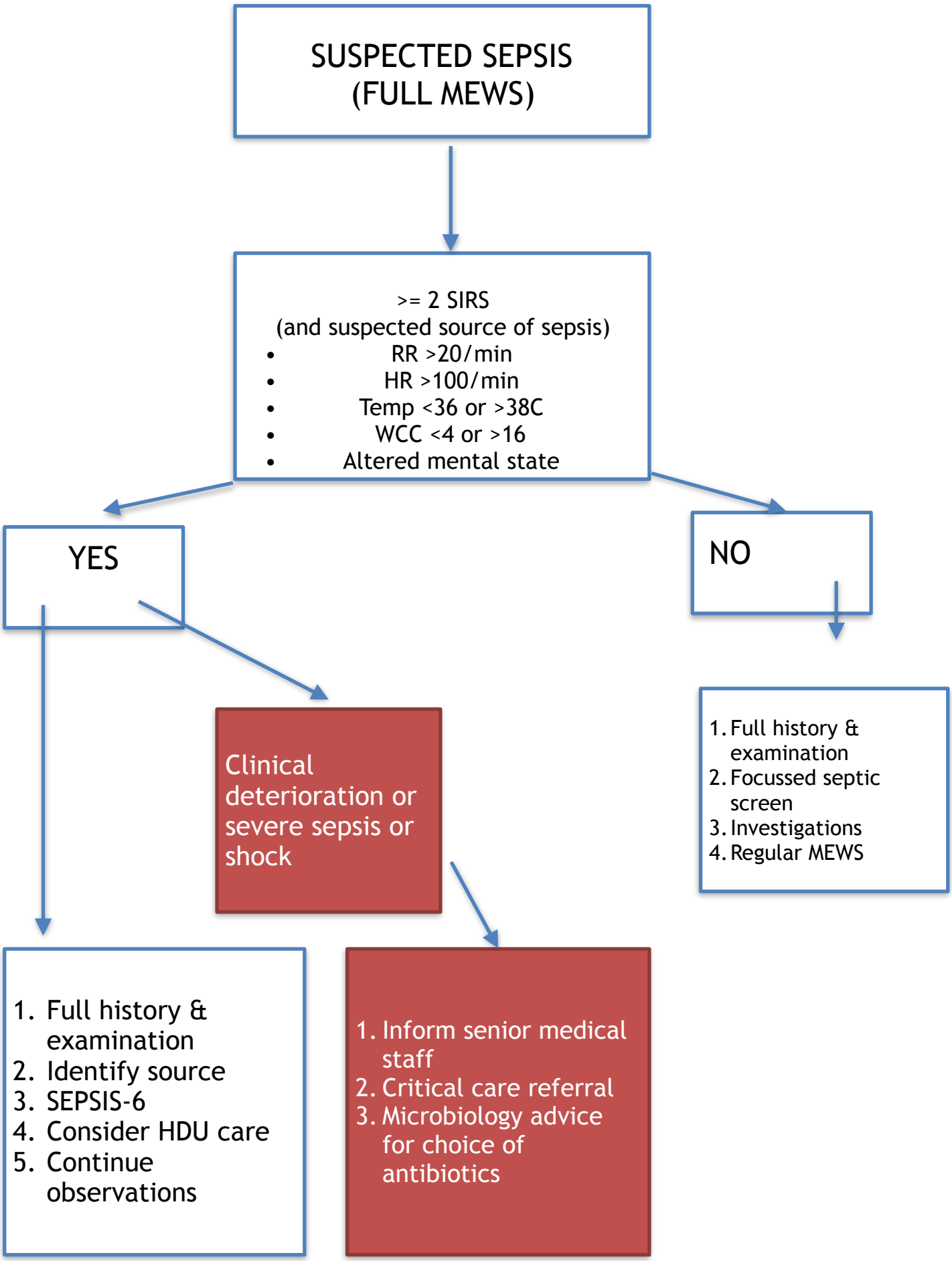

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PRE-ECLAMPSIA

Pre-eclampsia is a multi-system disorder of pregnancy characterised by new hypertension presenting after 20 weeks of gestation with significant proteinuria. Pre-eclampsia is a disorder of the vascular endothelial function specific to pregnancy and is thought to arise in the placenta as a result of ischaemia.

Key points for pregnant patients presenting to the emergency department:

- Pregnant women with a headache of sufficient severity to attend the ED, or with new epigastric pain should have their blood pressure measured urgently and their urine tested for protein
- Epigastric pain in the second half of pregnancy should be considered to be the result of pre-eclampsia until proven otherwise
- Early involvement of the obstetric registrar (Bleep 1616) is key, and patients without life-threatening features should be transferred to obstetric care without delay

Risk factors for pre-eclampsia
Age ≥ 40 years
Primigravida
Previous pre-eclampsia or severe IUGR
Family history on maternal side
Multiple pregnancy
Central obesity
Chronic hypertension

Maternal Complications of pre-eclampsia
Eclampsia (seizure)
Pulmonary oedema/aspiration
Placental abruption
Acute renal failure
DIC/HELLP syndrome
Liver failure/rupture/haemorrhage
Stroke
Death

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DIAGNOSIS IN THE ED

Pre-eclampsia is usually asymptomatic and detected at antenatal review (elevated BP and proteinuria 2+/> in automated reagent testing or 300mg in 24hr urine sample).

Diagnosis of severe pre-eclampsia in the ED should be considered in the following circumstances:

- Severe hypertension (BP ≥ 160/110 mmHg) and proteinuria (PCR > 30 mg/mmol)
- Mild/moderate hypertension (BP ≥ 140/90 - 159/109 mmHg) and proteinuria with at lease one of the following:

Concerning symptoms & signs					
Cerebral	Headache	Blurred vision	Altered GCS	Clonus	Papilloedema
Respiratory	SOB	Pulmonary Oedema	Cyanosis		
Liver	Epigastric pain	RUQ pain	Vomiting		
Renal	Oliguria				
Bloods	Raised urate	Raised creatinine	Raised urea	Impaired LFTs	HELLP

TREATMENT

	ACTION
1	Contact obstetric registrar (Bleep 1616) +/- obstetric anaesthetist
2	Move the patient to resus if unable to transfer immediately to obstetrics
3	Start MEWS chart, BP every 15 mins, continuous pulse oximetry
4	Obtain wide-bore venous access
5	Take FBC, U&Es, urate, LFTs, coag, G&S
6	Administer ranitidine 150mg orally then fast patient
7	Insert urinary catheter & commence fluid balance chart
8	Fluid restrict to 80mls/hr
9	Treat hypertension (see below) - ideally in obstetrics for fetal monitoring
10	Obstetric team will consider steroids if gestation <34 weeks, commence CTG, discuss magnesium and plan mode of delivery

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HYPERTENSION IN SEVERE PRE-ECLAMPSIA

First Line: Labetalol orally

- 200mg stat, repeated once after 30 mins if necessary
- If on labetolol or no response at 30 mins consider nifedipine
- *Contraindicated in patients with AV block or bradycardia (<60bpm). Caution in asthmatics*

Second Line: Nifedipine Orally (if labetalol contraindicated)

- 10mg orally. NOT sublingual
- Wait 30 min, repeat ONCE if necessary

Third Line: Labetolol infusion (when oral therapy inadequate)

- Irrespective of oral antihypertensive medication
- Bolus 50 mg over 5 mins. Repeat to a maximum of 200 mg in 10 min intervals
- Ampoules are 100 mg labetalol HCl in 20 mls (i.e. 5mg/ml) - draw up 50 ml
- Start at 4ml/hr
- Double rate every 30 min to max rate of 32ml/hr or target BP of 150/95 achieved

Fourth line: Hydralazine infusion (consider when labetolol unsuitable)

- Hydralazine 40mg (2 ampoules) made up to 40ml with 0.9% saline
- Can give slow bolus of 5mls
- Start at 2.5ml/hr
- Double rate every 30 mins to max 10ml/hr or until BP of 150/95 achieved

Epidural anaesthesia may also be helpful in reducing BP

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ECLAMPSIA

Eclampsia is defined as one or more convulsions in association with pre-eclampsia. This is a time critical obstetric emergency. It should be considered the working diagnosis in any pregnant female presenting with seizures.

It typically presents in 3rd trimester but can also be seen up to 48 hours after delivery.

It is confirmed if the patient is hypertensive with proteinuria (catheterise & check)

	ACTIONS
1	Move patient to resus immediately
2	2222 call - Obstetric Emergency
3	ABCDE management with senior EM involvement
	Manually displace the uterus or place in left lateral position
	Support airway and deliver high-flow O2
4	Commence Magnesium Sulphate (protocol below) *Do not use diazepam, phenytoin of lytic cocktail as an alternative to magnesium sulphate in women with eclampsia*
5	Control BP if systolic > 150, diastolic >110, MAP > 125 (protocol below) with involvement of senior obstetric personnel
6	Fluid restrict to 1ml/kg/hr (inclusive of infusions)
7	Catheterise and obtain urgent WTU analysis if not already done
8	Aim urine output ~25 ml/hr
9	Arrange early obstetric anaesthesia/critical care involvement
10	Monitor closely for signs of toxicity (absence of deep tendon relfexes)

MAGNESIUM SULPHATE EMERGENCY REGIMEN

Loading dose: 4g $MgSO_4$ over 15 minutes

- Draw up 8 ml of 50% magnesium sulphate solution from 10ml vial and add to 100ml bag of NaCl
- IVI via Braun pump at 400ml/hr

Maintenance dose: 1 g/hr

- Maintenance for 24hrs post last seizure or post delivery
- Draw up 10 ml of 50% magnesium sulphate solution (5g) and add to 40ml NaCl (total volume = 50ml)
- Administer via syringe driver at rate of 10ml/hr

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Recurrent seizures while on Magnesium Sulphate
➤ Critical emergency
➤ Draw up 4 ml of 50% magnesium sulphate solution (2g) and make up to 10ml with NaCl
➤ Give as IV bolus over 5 minutes
➤ If booking weight >70kg, draw up 8ml of 50% magnesium sulphate (4g) and make up to 10ml with NaCl and administer as above
➤ If possible, take blood for magnesium level prior to giving bolus dose

MONITORING ON MAGNESIUM SULPHATE INFUSION

- RR, reflexes and O2 saturations should be measured every 10 minute for two hours and then half hourly. Urine volumes hourly.

MEASUREMENT	ACTION
Pulse oximetry	If <95%, stop infusion and inform senior doctor
Patella/arm reflexes	If absent, stop infusion and inform senior doctor
Respiratory rate	If <12, stop infusion and inform senior doctor
Urine volumes	If <20ml/hr, half infusion. If <10ml/hr, stop infusion

CARDIOPULMONARY ARREST ON MAGNESIUM SULPHATE

STOP MAGNESIUM SULPHATE INFUSION
COMMENCE LIFE SUPPORT
GIVE 1G CALCIUM GLUCONATE (10ml of 10% solution)
INTUBATE EARLY AND VENTILATE UNTIL RESPIRATION RESUMES

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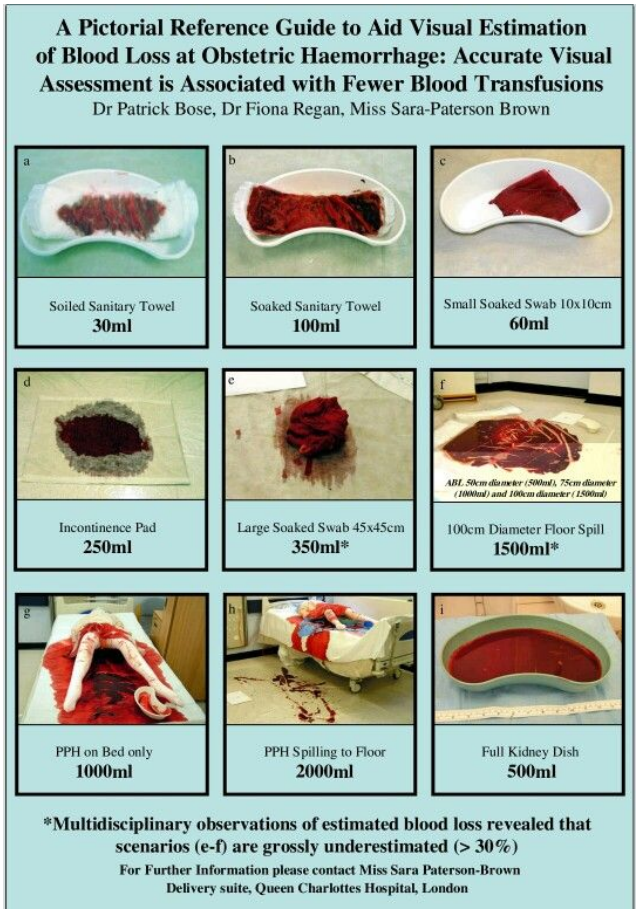
OBSTETRIC HAEMORRHAGE

Haemorrhage may be rapid. It is important to recognise its severity promptly, institute effective therapy **and keep ahead of the loss**.

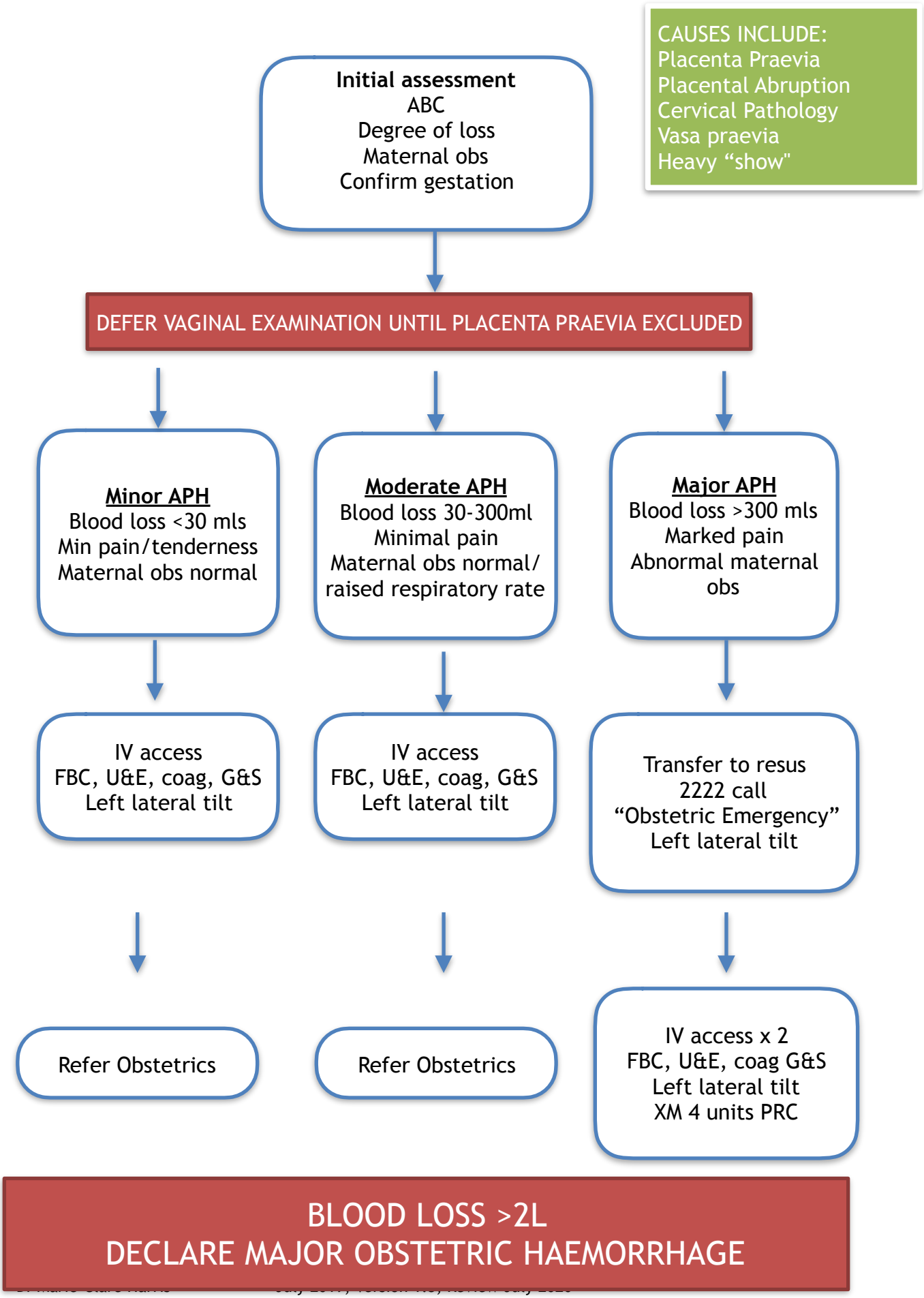
A vaginal examination should never be performed in the presence of vaginal bleeding without first excluding placenta praevia - "No PV until no PP".



Vaginal bleeding associated with intrauterine pregnancy is divided into the following categories:

DEFINITIONS	
Threatened miscarriage	up to 24 weeks' gestation
Antepartum haemorrhage (APH)	from 24 weeks' gestation until the onset of labour
Intrapartum haemorrhage	from the onset of labour until the end of the second stage
Postpartum haemorrhage (PPH)	from the third stage of labour until the end of the puerperium

ANTEPARTUM HAEMORRHAGE



POST-PARTUM HAEMORRHAGE

CAUSES INCLUDE:
TONE - fundus
TISSUE - placenta
TRAUMA - tears
THROMBINS - DIC
TOXINS - sepsis

Initial Assessment
ABC
Weigh loss
Inspect perineum

CALL 2222 - "OBSTETRIC EMERGENCY"

Moderate: 1000-1500mls, normal obs
- Large bore access x 2
- FBC, coag, U&Es, XM
- Emergency request 2 units PRC
- Fluid resuscitation

Major >1500mls or abnormal obs
- Large bore access x 2
- FBC, coag, U&Es, XM
- Emergency request 4 units PRC
- Fluid resuscitation

Consider urinary catheter
Consider invasive monitoring

BLOOD LOSS >2L
DECLARE MAJOR OBSTETRIC HAEMORRHAGE
ENSURE OBSTETRIC & OBSTETRIC ANAESTHESIA CONSULTANTS CONTACTED

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SECONCONDARY POST-PARTUM HAEMORRHAGE

This is defined as bleeding between 24 hours and 6 weeks postnatally.

It can be due to infection or retained products of conception, rarely to a vulval haematoma, very rarely to caesarean scar dehiscence and only exceptionally to trophoblastic disease. Commonly the cause is unknown.

Manage as per PPH protocol above and refer urgently to obstetrics for arrangement of USS scanning.

MAJOR POST-PARTUM HAEMORRHAGE

Call **2222** "**Obstetric Emergency and Major Haemorrhage"** and state location
STAY ON LINE while transferred to BTS

↓

Inform BTS "**Obstetric Haemorrhage**"
Request: **6 units RCC**
4 packs FFP
2 packs platelets

↓

ABC
L lateral tilt if ante natal
2x large bore access
FBC, coag, U&Es, XM
Fluid Resuscitation
Catheterise

PPH Causes include:
TONE – fundus
TISSUE – placenta
TRAUMA – tears
THROMBINS – DIC
TOXINS - sepsis

↓

OOH contact **obstetric consultant** and **obstetric anaesthetic consultant**

THROMBOEMBOLISM

Venous thromboembolism (VTE) remains an important and potentially preventable cause of maternal death in the UK. It is up to 10 times more common than in non-pregnant women of the same age and the traditional subjective clinical assessment of deep vein thrombosis (DVT) and pulmonary embolism (PE) is particularly unreliable in pregnancy.

Acute VTE should be suspected during pregnancy in any woman with signs & symptoms consistent with possible VTE, particularly if there are other risk factors present.

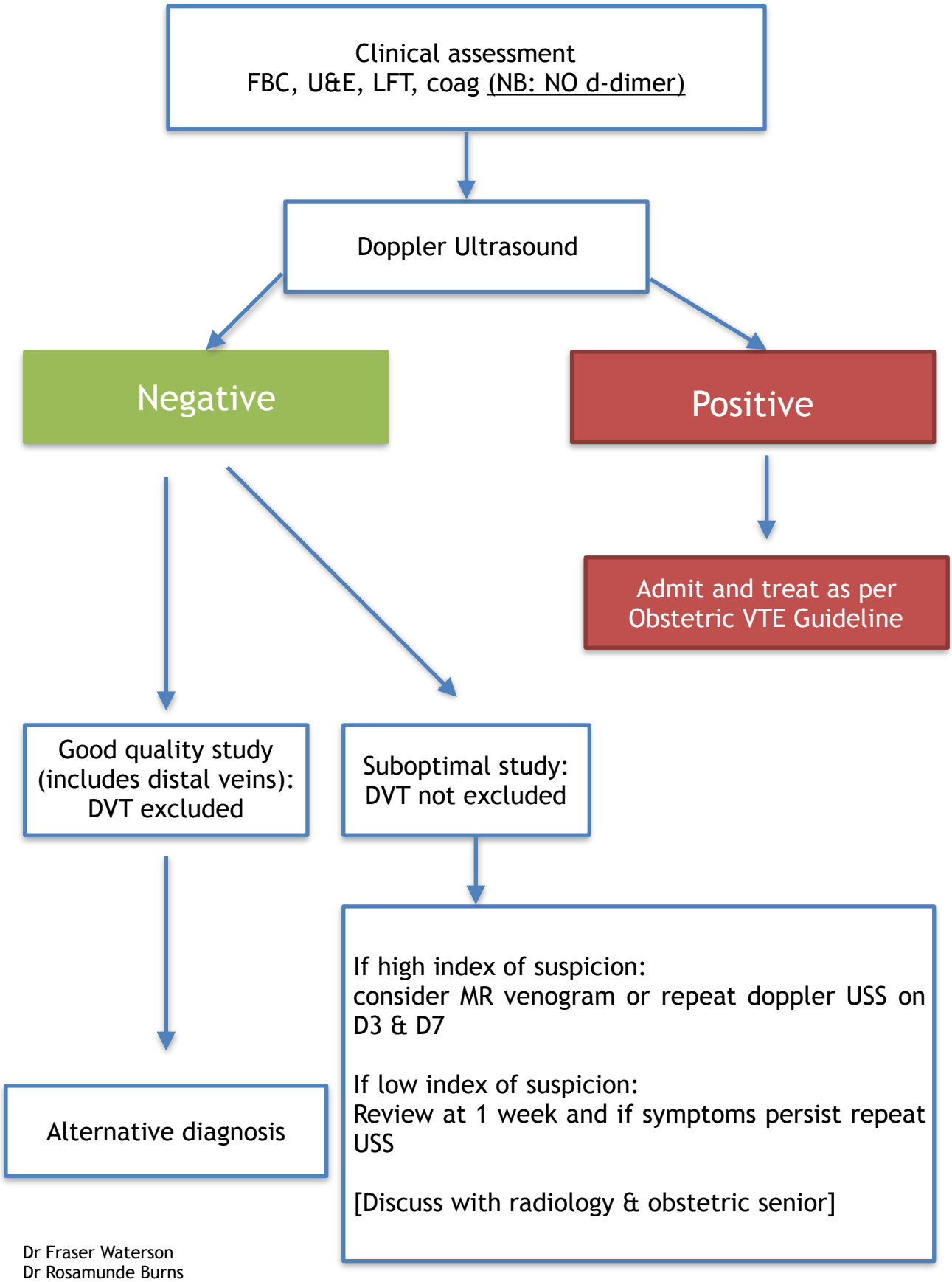
The symptoms of VTE include leg pain and swelling (usually unilateral), lower abdominal pain, low grade pyrexia, dyspnoea, chest pain, haemoptysis and collapse. It can occur at any stage of pregnancy but women are most at risk in the puerperium (the period of ~ six weeks after childbirth).

Pregnant/recently post-natal women presenting to the ED, in whom VTE is suspected, should be discussed with the obstetric team and have objective testing performed promptly. Decisions will then be made regarding the commencement of LMWH until the diagnosis is excluded.

Investigation:

- There is no evidence to support the use of pretest probability assessment in the management of VTE in pregnancy
- D-dimer testing should not be performed in pregnancy to diagnose acute VTE. It can be elevated in normal pregnancy due to physiological changes in the clotting system and levels are also increased if there is a concomitant problem such as pre-eclampsia.
- The investigation of choice for DVT is doppler ultrasound (please see flow chart overleaf).
- The investigation of choice for PE is initially CXR and then either Q scan or CTPA following discussion with a consultant radiologist.
- Please refer to NHS Lothian Maternity Guidelines for additional information, consultation with senior obstetric staff is indicated during assessment of pregnant patients in this category.

INVESTIGATION OF SUSPECTED DVT IN PREGNANCY



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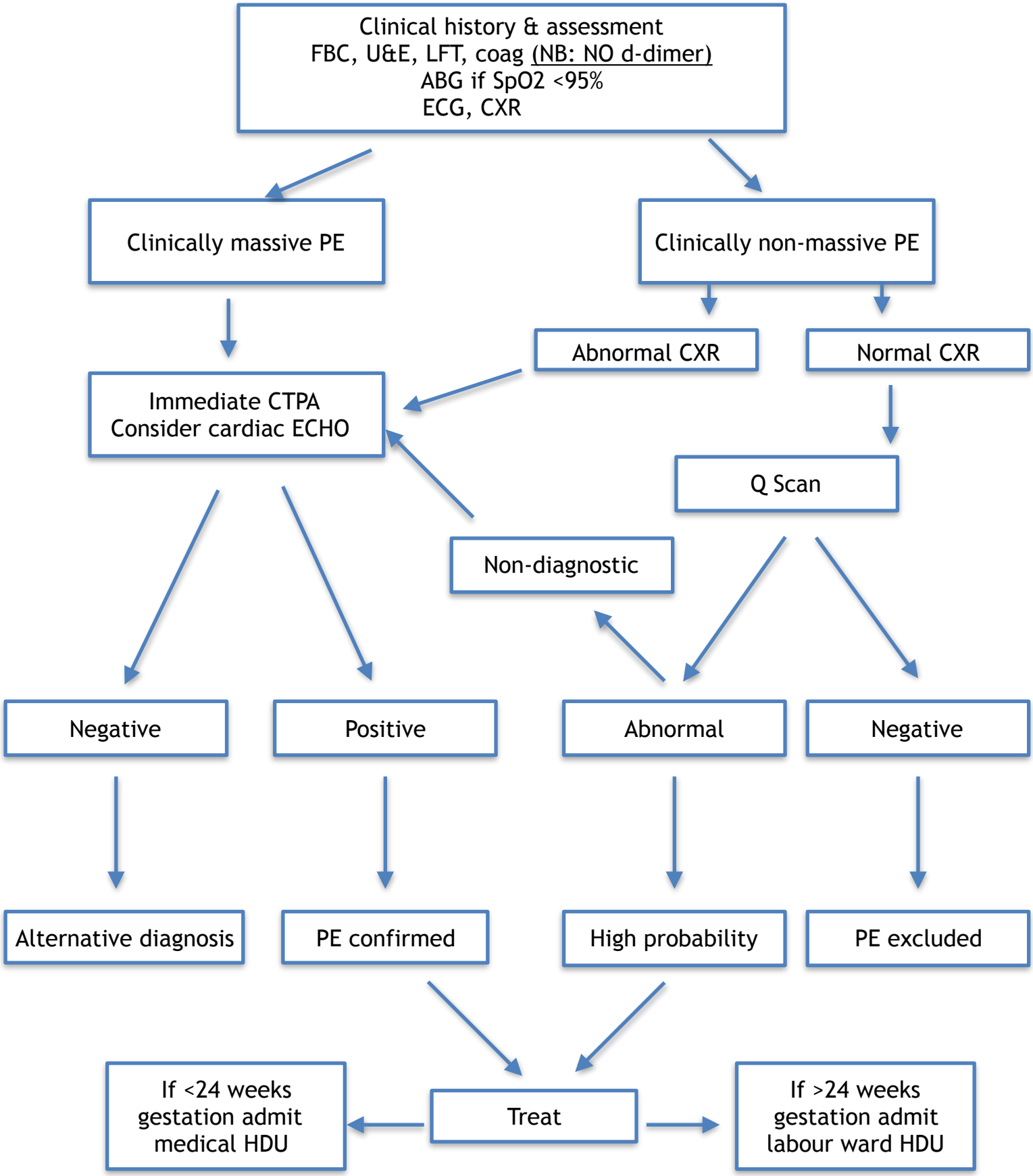
INVESTIGATION OF SUSPECTED PE IN PREGNANCY



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APPENDIX 1: NORMAL LABORATORY VALUES IN PREGNANCY

Normal Laboratory Values in Pregnancy				
	Non-pregnant	1st trimester	2nd trimester	3rd trimester
Hb (g/L)	120-158	116-139	97-148	95-150
MCV (fL)	79-93	81-96	82-97	81-99
WCC ($x10^9$/L)	3.5-9.1	5.7-13.6	5.6-14.8	5.9-16.9
Platelets ($x10^9$/L)	165-415	174-391	155-409	146-429
Ferritin (µg/L)	10-150	6-130	2-230	0-116
CRP (mg/L)	<5	<5	<5	<5
**mild elevations in CRP may be normal in pregnancy*				
Urea (µmol/L)	2.5-7.1	2.5-4.3	1.1-4.6	1.1-3.9
Creatinine (µmol/L)	44-80	35-62	35-71	35-80
Na+ (mmol/L)	136-146	133-148	129-148	130-148
K+ (mmol/L)	3.5-5.0	3.6-5.0	3.3-5.0	3.3-5.1
Uric acid (mmol/L)	0.15-0.33	0.12-0.25	0.14-0.29	0.18-0.38
Urine ACR (mg/mmol)		<30	<30	<30
Bicarbonate (mmol/L)	22-30	20-24	20-24	20-24
Bilirubin (µmol/L)	5.1-22.2	1.7-6.8	1.7-13.7	1.7-18.8
ALT (U/L)	7-41	3-30	2-33	2-25
Alk Phos (U/L)	33-96	17-88	25-126	38-229
GGT (U/L)	9-58	2-23	4-22	3-26
Amylase (U/L)	20-96	24-83	16-73	15-81
Albumin (g/L)	41-53	31-51	26-45	23-42
Bile acids (µmol/L)	0.3-4.8	0-4.9	0-9.1	0-11.3
H+ (nmol/L)	38-42 (arterial)	30-44 (venous)	30-40(venous)	30-39 (venous) 35-41 (arterial)
pO2 (kPa)	12.0-13.3	12.4-13.3	12.0-13.1	12.3-14.3
pCO2(kPa)	5.1-5.6	Not reported	Not reported	3.3-4.4
HCO_3 (mEq/L)	22-26	Not reported	Not reported	16-22

pH	7.38-7.42 (arterial)	7.36-7.52 (venous)	7.40-7.52 (venous)	7.41-7.53 (venous) 7.39-7.45 (arterial)
INR	0.90-1.04	0.86-1.08	0.83-1.02	0.80-1.09
APTT (secs)	26.3-39.4	23.0-38.9	22.9-38.1	22.6-35.0
Fibrinogen (g/L)	2.1-5.0	2.4-5.1	2.9-5.4	3.0-7.0
Prothrombin Time (secs)	12.7-15.4	9.7-13.5	9.5-13.4	9.6-12.9
fT4 (pmol/L)	10.3-21.9	10.3-15.5	7.7-12.9	6.4-10.3
fT3 (pmol/L)	3.7-6.5	6.3-6.8	6.2-6.5	Not reported
TSH (mu/L)	0.34-4.25	0.6-3.40	0.37-3.60	0.38-4.04

APPENDIX 2: SAFE PRESCRIBING FOR OBSTETRIC PATIENTS IN ED

ANTIMICORBIALS

Please refer to NHS Lothian current antimicrobial guidelines

ANALGESICS

DRUG	RISK	CONCLUDE	ALTERNATIVES	BREAST-FEEDING
NSAIDs	Closure of fetal ductus arteriosus, fetal oliguria, possible cerebral haemorrhage	Contraindicated antenatally Caution (avoid for analgesia)	Paracetamol	Safe
Aspirin	Limited information	Use as indicated in ACS, otherwise avoid	N/A	Safe
Paracetamol	Nil known	Safe	N/A	Safe
Opiates	Maternal/fetal dependency	Only severe pain or drug dependence DHC & co-codamol OK	Methadone if opiate addict	Beware accumulation

ANTICOAGULANTS

DRUG	RISK	CONCLUDE	ALTERNATIVES	BREAST-FEEDING
Warfarin	Teratogenic Fetal haemorrhage	Only if artificial heart valves (seek specialist advice)	LMWH	Safe
LMWH	Maternal bleeding in OD Safe for fetus	If indicated	N/A	Safe
Anticoagulation is probably underused in pregnancy, warfarin only in exceptional circumstances				

PSYCHIATRIC MEDICATIONS

DRUG	RISK	CONCLUDE	ALTERNATIVES	BREAST-FEEDING
Tricyclics	Largely safe	Use if high risk of relapse	Fluoxetine	Safe
SSRIs	Paroxetine teratogenic Others probably safe	Use if high risk of relapse (avoid paroxetine)	Fluoxetine	Safe
Lithium	Teratogenic (cardiac)	Use only if high risk of relapse	Difficult	Watch for toxicity
Neuroleptics	Possible very mild teratogenicity Largely unknown (avoid clozapine)	Usually continue because of risk of relapse	Difficult	Probably safe

STEROIDS & B2-AGONISTS

DRUG	RISK	CONCLUDE	ALTERNATIVES	BREAST-FEEDING
Prednisolone	Nil known with single course	Use if high risk for preterm delivery	N/A	Safe
Beta-agonists	Nil known at anti-asthmatic doses	Use if indicated, e.g. asthma	N/A	Safe

While we are experienced in the management of medical & surgical emergencies, obstetric emergencies out with the obstetric environment can prove particularly tricky and EM physicians often find this area a particular challenge.

The aim of this handbook is to provide support to EM clinicians in the management of obstetric emergencies presenting or occurring within the Emergency Department.

The guidelines contained are relevant across NHS Lothian and have been checked and agreed by Dr Marie-Clare Harris (EM Consultant Lead for Obstetrics) and Dr Rosamunde Burns (Obstetric Anaesthetist, RIE).

Use of this handbook does not negate the need to involve senior EM personnel in these cases and it is an essential requirement to contact and discuss/request immediate attendance from the duty obstetric and obstetric anaesthetic & critical care teams.

I would like to thank Dr Marie-Clare Harris, Dr Rosamunde Burns and Dr Audrey Jeffrey for their assistance in the completion of this guideline; they have provided their expertise, directed me to available resources and specific protocols already in existence, and taken the time to proof and check EM specific adjustments to the protocols and guidelines contained herein. I would also like to thank the team at SMMDP for their provision of images and support in the production of this guideline.

Please direct any questions, comments or updates to fraser.waterson@nhs.net

Many thanks,
Dr Fraser Waterson