

Obstetrics & Gynaecology Protocols and Guidelines

Department of Obstetrics & Gynaecology
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Lusaka, Zambia



University of Zambia School of Medicine
Medical Education Partnership Initiative

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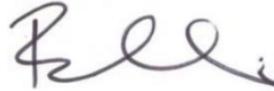
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Foreword

Instituting protocols and guidelines have been shown to improve patient safety, communication, and quality outcomes. Thus, the Department of Obstetrics and Gynaecology at the University of Zambia and the University Teaching Hospital sought to develop and formerly adopt a comprehensive set of clinical protocols and guidelines. This booklet highlights common obstetric and gynaecologic conditions in Zambia and management thereof that is pertinent to our setting. We believe the *Obstetrics & Gynaecology Protocols and Guidelines* will promote good medical decision-making, particularly for trainees, and advance standardized clinical practice not only at the University Teaching Hospital but also throughout Zambia.



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How to Use the Protocols and Guidelines

The primary aim of the *Obstetrics & Gynaecology Protocols and Guidelines* is to improve the health of our women and their newborns by standardizing the clinical care they receive at the University Teaching Hospital (UTH). The development of these protocols and guidelines was the product of numerous hours dedicated by many people from the Department of Obstetrics and Gynaecology at UTH, the Medical Education Partnership Initiative (MEPI) at University of Zambia (UNZA), and the Centre for Infectious Disease Research in Zambia (CIDRZ)/University of North Carolina at Chapel Hill (UNC). We expect no different for implementation of the same to be a success: many people will need to be involved.

The purpose of the protocols and guidelines is not to replace specialty textbooks or medical journals. They emphasize those clinical practices that are evidence-based and available in Zambia. Pocket-sized, this booklet is best used at the bedside, on hospital rounds, and in admission. We acknowledge that patients are individuals and do not always fit into premade boxes. When a doctor chooses to stray from the guidance provided in these pages, he/she should document the deviation and reason thereof in the woman's medical file.

Topics are divided into four sections: early pregnancy complications, labour ward, medical conditions in pregnancy, and gynaecology & general medical conditions. With regard to format, we hope the protocols and guidelines are self-explanatory. Each topic is divided into sections: Introduction, Definition, Diagnosis (History, Exam, Investigations), and Management.

Quality indicators are suggested for protocols so that we can track their impact on clinical care. As part of this inaugural version, only one quality indicator is listed. It is our sincere hope that in future versions, quality indicators will be expanded and/or changed because we have adhered so well to the initial standards.

We appreciate your support and usage of the *Obstetrics & Gynaecology Protocols and Guidelines* as we strive together to improve the health of our women and their newborns. Any feedback

on how to improve this booklet is welcome and should be directed to the Head of the Department of Obstetrics and Gynaecology.

Future amendments and additions will be referenced in the following manner: Version X (date) updated the table of contents and *Protocol & Guideline Number YY, date* and was activated by memo Z (date).

Abbreviations

+/-	with or without	CCF	congestive cardiac failure
↑	increased or high	CD4 ⁺	cluster of differentiation antigen 4
↓	decreased or low	CIDRZ	Centre for Infectious Disease Research in Zambia
~	approximately	cm	centimetre
°	degree	CIN	cervical intraepithelial neoplasia
>	greater than	Cr	creatinine
≥	greater than or equal to	CSF	cerebral spinal fluid
<	less than	CST	contraction stress test
≤	less than or equal to	CT	computerized tomography
% sat	percent saturation	CTG	cardiotocogram
ABC	airway, breathing, circulation	CXR	chest x-ray
AC	abdominal circumference	CV	cardiovascular
ACE	angiotensin-converting enzyme	D&E	dilation and evacuation
AMTSL	active management of third stage of labour	DBP	diastolic blood pressure
AFB	acid fast bacillus	DHEA-S	dehydroisoandrosterone sulphate
AFI	amniotic fluid index	DIC	disseminated intravascular coagulopathy
APH	antepartum haemorrhage	dL	decilitre
aPTT	activated partial thromboplastin time	DNS	5% dextrose normal saline
ALT	alanine transaminase	dpm	drops per minute
ART	antiretroviral therapy	DVT	deep vein thrombosis
AST	aspartate transaminase	EBL	estimated blood loss
βhCG	beta - human chorionic gonadotropin	ECG	electrocardiogram
BD	twice daily	EDD	estimated date of delivery
BMI	body mass index	EFV	efavirenz
BP	blood pressure	EFW	estimated fetal weight
BPD	biparietal diameter	EGA	estimated gestational age
bpm	beats per minute	EIT	examination in theatre
BPP	biophysical profile	EP	ectopic pregnancy
BS	blood sugar		
BT	blood transfusion		
BUN	blood urea nitrogen		
c+s	culture and sensitivities		

EUA	exam under anaesthesia	HBIG	hepatitis B immunoglobulin
FBC	full blood count	HBeAg	hepatitis B envelope antigen
FBS	fasting blood sugar	HBsAg	hepatitis B surface antigen
FDP	fibrinogen degradation products	HBV	hepatitis B virus
FeSO ₄	ferrous sulphate	HC	head circumference
FEV ₁	forced expiratory volume in 1 second	HC:AC	ratio of head circumference to abdominal circumference
FFP	fresh frozen plasma	hCG	human chorionic gonadotropin
FH	fundal height	HELLP	haemolysis, elevated liver function tests, low platelets
FIGO	Fédération Internationale de Gynécologie et d'Obstétrique	Hg	mercury
FL	femur length	HIV	human immunodeficiency virus
FLM	fetal lung maturity	HPV	human papillomavirus
FMH	fetomaternal haemorrhage	hr(s)	hour(s)
FSB	fresh stillbirth	HSG	hysterosalpingogram
FSH	follicle stimulating hormone	HSV	herpes simplex virus
ft3	free triiodothyronine	HTN	hypertension / hypertensive
ft4	free thyroxine	HVS	high vaginal swab
FTA	fluorescent treponemal antibody	ICU	intensive care unit
FTI	free thyroxine index	IgG	immunoglobulin G
FVC	forced vital capacity	IgM	immunoglobulin M
g	gram(s)	IM	intramuscular
G	gauge	INR	international normalised ratio
GA	gestational age	IOL	induction of labour
GBS	Group B streptococcus	IRIS	immune reconstitution inflammatory syndrome
GC	gonococcus (gonorrhoea)	IU	international units
GCS	Glasgow coma scale	IUFD	intrauterine fetal death
GI	gastrointestinal	IUGR	intrauterine growth restriction
GnRH	gonadotropin releasing hormone	IUP	intrauterine pregnancy
Hb	haemoglobin		
Hb C	haemoglobin C		
Hb S	sickle haemoglobin		

IV	intravenous	mm Hg	millimetres of mercury
IVH	intraventricular haemorrhage	mmol	millimoles
K	potassium	mos	months
kcal	kilocalorie(s)	MPS	malaria parasite smear
KCl	potassium chloride	MRI	magnetic resonance imaging
kg	kilogram(s)	MSB	macerated stillbirth
KS	Kaposi's sarcoma	MTCT	mother to child transmission
L	litre	MTX	methotrexate
LBW	low birth weight (< 2500 g)	mU	milli-units
LEEP	loop electrosurgical excision procedure	MU	million units
LFT	liver function test	MVA	manual vacuum aspiration
LH	luteinizing hormone	MVP	mitral valve prolapse
LMP	last menstrual period	NASG	non-pneumatic anti- shock garment
LMWH	low molecular weight heparin	NEC	necrotizing enterocolitis
LP	lumbar puncture	NICU	neonatal intensive care unit
LPV/r	lopinavir/ritonavir	NS	normal saline
L:S	lecitin:sphingomyelin ratio	NSAID	non-steroidal anti- inflammatory drug
max	maximum	NST	non-stress test
mcg	microgram(s)	NVP	nevirapine
MCH	mean corpuscular haemoglobin	O ₂	oxygen
MCHC	mean corpuscular haemoglobin concentration	O ₂ sat	oxygen saturation
mcs	microscopy, culture, sensitivities	OA	occiput anterior
MCV	mean corpuscular volume	OB	obstetric / obstetrics / obstetrical
MEPI	Medical Education Partnership Initiative	OB US	obstetric ultrasound
mg	milligram(s)	OD	once daily
MgSO ₄	magnesium sulphate	OGTT	oral glucose tolerance test
min	minute(s)	OT	operating theatre
mIU	milli-international units	ox	oximetry
ml	millilitre	P2	second pulmonary heart sound
mm	millimetre	PCR	polymerase chain reaction

PG	prostaglandin	retic	reticulocyte
PGE2	prostaglandin E2	Rh	Rhesus
pH	power of hydrogen	RI	reticulocyte index
PID	pelvic inflammatory disease	RL	Ringer's lactate
PIH	pregnancy-induced hypertension	ROM	rupture of membranes
plt	platelet(s)	RNA	ribonucleic acid
PMTCT	prevention of mother to child transmission of HIV	RR	respiratory rate
PO	per os (oral)	SBP	systolic blood pressure
POCs	products of conception	SC	subcutaneous
PPH	postpartum haemorrhage	sec	second(s)
PPROM	preterm premature rupture of membranes	SL	sublingual
PR	pulse rate	SOU	special observation unit
PRBC(s)	packed red blood cells	SRH	sexual and reproductive health
PRL	prolactin	STAT	immediately (statim in Latin)
PROM	premature rupture of membranes	STI	sexually transmitted infection
PT	prothrombin time	T	temperature
PTU	propylthiouracil	TDF	tenofovir dinoproxil fumerate
PTD	preterm delivery	TDF/FTC	Truvada (trade name)
PTE	pulmonary thromboembolism	TDS	three times daily
PTL	preterm labour	TIBC	total iron binding capacity
PTT	partial thromboplastin time	TORCH	toxoplasmosis, other (syphilis, varicella zoster, parvovirus B19), rubella, cytomegalovirus, herpes
PUPPP	pruritic urticarial papules and plaques of pregnancy	TPHA	treponema pallidum hemagglutination assay
PV	per vagina	TPI	treponema pallidum immobilization
PVB	per vagina bleeding	TPR	temperature, pulse, respiratory rate
QID	four times daily	TSH	thyroid stimulating hormone
RBS	random blood sugar	TVS	transvaginal scan
RDS	respiratory distress syndrome	TVUS	transvaginal ultrasound units
RDT	rapid diagnostic test	U	units
RDW	red blood cell distribution width	U&Es	urea and electrolytes

UFH	unfractionated heparin	VS	vital signs
μmol	micromole(s)	VTE	venous thromboembolism
UNC	University of North Carolina	VVF	vesicovaginal fistula
UNZA	University of Zambia	VZV	varicella zoster virus
UOP	urine output	VZIG	varicella zoster immunoglobulin
UPT	urine pregnancy test	X-match	cross match
US	ultrasound	WB	whole blood
UTH	University Teaching Hospital	WBC	white blood cell
UTI	urinary tract infection	WHO	World Health Organization
VDRL	Venereal Disease Research Laboratory	WR	Wassermann reaction
VE	vaginal exam	wk(s)	week(s)
VIA	visual inspection with acetic acid	yo	year old

EARLY PREGNANCY COMPLICATIONS

Section A

Alloimmunisation

Protocol & Guideline Number A1, February 2014

Introduction/Definition

The fetus may have red blood cell antigens (i.e. ABO, Rhesus, Kell, Kid, Duffy) that the mother does not. When ≥ 0.1 ml of fetal blood enters the maternal circulation, the maternal immune system is more likely to form antibodies against the foreign antigen. This is known as alloimmunisation and can occur in pregnancy > 7 wks gestation (including induced abortion and ectopic pregnancy), chorionic villus sampling, cordocentesis, amniocentesis, APH, external cephalic version, abdominal trauma and delivery. The initial pregnancy is generally unaffected. However, maternal antibodies cross the placenta and form antigen-antibody complexes in subsequent pregnancies. Manifestations of alloimmunisation include hydrotus fetalis, icterus gravis neonatorum and congenital anaemia.

Diagnosis

History Ask about gravidity, parity, previous abortions and/or miscarriages, history of transfusions and blood group of pregnant woman and her partner

Exam/Investigations Send blood for Hb, blood group, Coombs test, syphilis test and HIV; ultrasound (US) for dating, serial US to diagnose and/or monitor

Preventive Management

Prevention of Rh alloimmunisation

- Give Rh immunoglobulin immediately after a sensitizing event (give 50 μg (250 IU) in the first trimester)
- Give Rh immunoglobulin 300 μg (1500 IU) at 28 wks gestation and within 72 hrs of delivery if infant is Rh positive OR 100 μg (500 IU) at 28 wks and 34 wks gestation and within 72 hrs of delivery if infant is Rh positive
- For excess of 30 ml of fetomaternal haemorrhage (FMH), calculate additional need using flow cytometry or Kleihauer-Betke test:
 - Per flow cytometry, FMH = % positive events x 44 ml
 - Per Kleihauer-Betke test, FMH = % fetal cells x 5000 ml

Minimisation of fetomaternal haemorrhage

- Pack abdomen during caesarean delivery to prevent spilling of blood into peritoneum

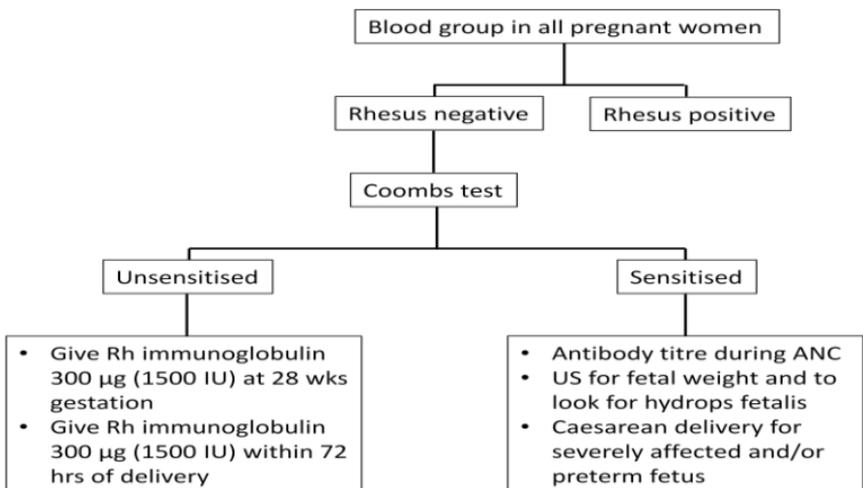
- Avoid manual removal of placenta
- Immediate clamping of cord and keep cord long, up to 7 cm (for possible umbilical vessel catheterization for blood transfusion)

Management

Treatment for sensitised maternal patient (positive Coombs test in Rh negative woman; clinically affected pregnancy)

- Send blood for antibody titre
 - Critical titre is usually between 8 and 32 (check with UTH Laboratory regarding local threshold for critical titre)
 - If titre is not critical, then repeat titre every 4 wks
 - For serum antibody level > 10 IU/ml, intervention (i.e. delivery) is warranted
 - For serum antibody level 4-8 IU/ml, there is risk of mild fetal haemolysis
- Conservative management: perform US for fetal weight and to look for features of hydrops fetalis; if features of hydrops fetalis are present, then deliver
- Perform caesarean delivery for severely affected and/or preterm fetus
 - Transfuse newborn with Hb \leq 12 g/dL and/or positive direct Coombs and/or bilirubin \geq 5 mg

Algorithm for Prevention and Management of Alloimmunisation



Cervical Insufficiency and Cervical Cerclage

Protocol & Guideline Number A2, February 2014

Introduction/ Definition

Cervical insufficiency is a clinical diagnosis characterized by painless cervical dilatation and spontaneous mid trimester pregnancy loss.

Diagnosis

History

- Prior history of recurrent mid trimester pregnancy losses, D&E in second trimester, cervical surgery (i.e. cone biopsy, cauterization, amputation) and/or short labours or progressively earlier deliveries in subsequent pregnancies, or cervical cerclage
- Current history of vaginal fullness or pressure, vaginal spotting, increased volume of brown watery discharge and vague low back/abdominal pains

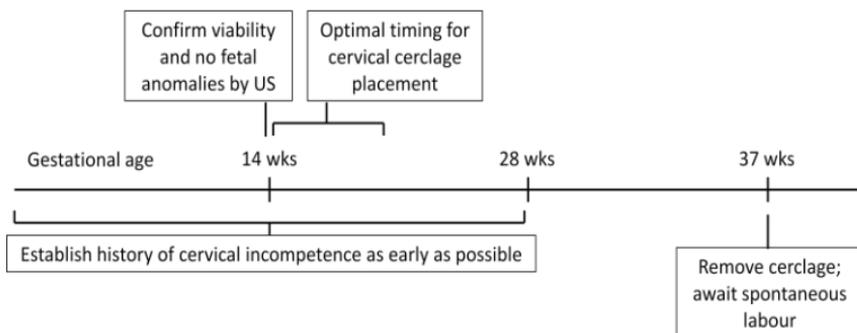
Exam/Investigations

- Transvaginal ultrasound (TVUS) showing open internal os (i.e. funnelling) or cervical length < 25 mm
- Index pregnancy: sterile speculum exam to assess for vaginitis, dilatation of cervix and bulging membranes and to exclude rupture of membranes
- Between pregnancies: hysterosalpingogram (HSG) and test with Hegar dilators (number 8 passes without resistance)

Management

Conservative management is always an option, while surgical intervention is done by cerclage. A cerclage is ideally placed at 14-16 wks, but can be done up to 24 wks.

Management for Cervical Cerclage by Gestational Age



Pre-operative assessment

- Ultrasound (US): confirm pregnancy viability and gestational age (GA), exclude major fetal anomalies, assess for uterine anomalies (i.e. bicornuate uterus, leiomyomas)
- Endocervical swab: assess for infection (gonorrhoea and Chlamydia), treat any infection and advise the patient to abstain from intercourse for one week while her partner is treated
- Review risks with patient: PROM, chorioamnionitis, fibrous scarring of cervix
- Common indications for cervical cerclage (elective or emergency)
 - Two or more consecutive prior second trimester pregnancy losses or three or more early (<34 wks gestation) preterm births
 - Risk factors for cervical insufficiency (see history above)
 - Exclude infection, placental bleeding, and multiple gestation

Procedure	Details	Technique
McDonald cerclage	Commonly performed and usually recommended	<ul style="list-style-type: none">• Place circumferential purse-string suture around the cervix at the vesicocervical junction in 4 separate suture bites• Use non-absorbable sutures (i.e. mersilene)• Tie knot anterior or posterior; document location• Avoid vessels at 3 and 9 o'clock
Shirodkar cerclage	Reserved for very short cervix	<ul style="list-style-type: none">• Similar to McDonald but suture is submucosal• Expect more blood loss• Use mersilene tape• Make 2-3 cm anterior transverse submucosal incision at the vesicocervical junction• Reflect bladder superiorly by 1-2 cm; make similar incision posteriorly and do rectal dissection superiorly (continued)

<i>Procedure</i>	<i>Details</i>	<i>Technique</i>
Shirodkar cerclage (continued)		<ul style="list-style-type: none"> • Place suture anterior to posterior or vice versa • Close mucosa
Abdominal cerclage	Reserved for women with hypoplastic cervix and where vaginal procedure is not feasible	<ul style="list-style-type: none"> • Requires a lot of expertise • Risk of excessive haemorrhage from branches of uterine artery • Laparotomy for access • Done at 13-15 wks • Dissect bladder inferiorly • Place mersilene tape through the tissues of the lateral cervix at the internal os • Caesarean delivery is required

Post-operative management

- Immediate care includes analgesia, antibiotics, and antispasmodics
- Consider advising no sexual intercourse for 2 weeks post procedure
- Routine ANC unless otherwise indicated with repeated counselling re: infection, labour, and PROM
- If no antenatal problems, then remove cerclage as outpatient at 37 wks
- If labour, severe or persistent APH, ROM or chorioamnionitis, then remove cerclage immediately

Quality Indicator % of women undergoing cerclage placement with clear and appropriate indications in the medical file

Ectopic Pregnancy

Protocol & Guideline Number A3, February 2014

Introduction/Definition

Ectopic pregnancy is a pregnancy that occurs outside of the uterus. The most common location is the fallopian tube.

Diagnosis (largely based on clinical history and exam)

History Classic triad of abdominal pain, amenorrhea and vaginal bleeding

Exam +/- Tenderness, +/- adnexal mass, +/- shock if ruptured

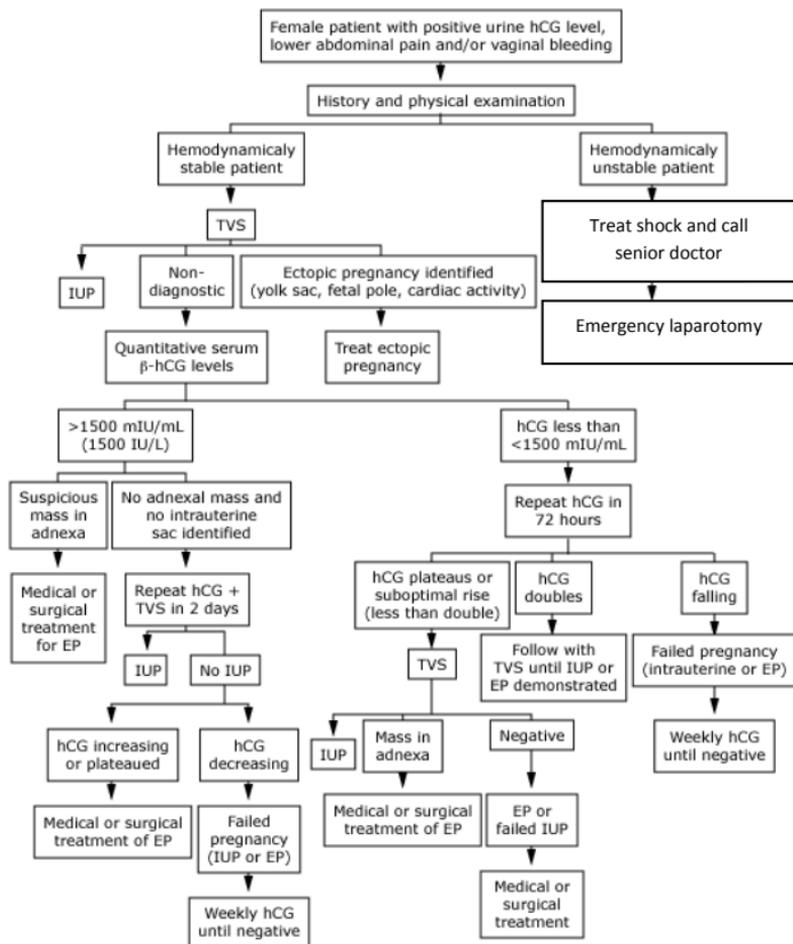
Investigations Urine pregnancy test, US (transvaginal is preferred), culdocentesis and/or paracentesis if ruptured ectopic pregnancy suspected, send blood for X-match, send blood for hCG if conservative management and/or methotrexate (MTX) available

Management

- Obtain IV access with 2 large-bore cannulae (i.e. 16G)
- If shock, then resuscitate with IV fluids and/or BT while organising emergency laparotomy
- If not in shock and:
 - If ruptured, then perform emergency laparotomy with possible blood transfusion
 - If not ruptured, then consider urgent laparoscopy or laparotomy
- If patient is hemodynamically stable, reliable and compliant; ectopic pregnancy is ≤ 3.5 cm; and there is no evidence of rupture or significant bleeding, then consider conservative management and/or MTX (see algorithm on next page) after reviewing with Consultant
 - Patient must be able to comply with multiple revisits. If there is any concern for loss to follow up, then patient is candidate for hospitalization only
 - MTX is most commonly given as an IM injection, but oral formulations are possible and effective
 - Local injection of MTX has been associated with higher treatment success than systemic MTX (no significant difference) and with similar rates of subsequent intrauterine pregnancies or repeat ectopic pregnancies

Quality Indicator % of ruptured ectopic pregnancies undergoing laparotomy within 2 hrs of diagnosis

Tests for suspected ectopic pregnancy



EP = ectopic pregnancy; IUP = intrauterine pregnancy; TVS = transvaginal (ultrasound) scan

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Gestational Trophoblastic Disease

Protocol & Guideline Number A4, February 2014

Introduction/Definition

Gestational trophoblastic disease (GTD) includes hydatidiform mole (complete or partial), persistent or invasive gestational trophoblastic neoplasia, choriocarcinoma, and placental site tumours. Following molar pregnancy, the following characteristics are high risk for choriocarcinoma: age < 20 or > 40 years old, high initial hCG, persistent high hCG after 6 wks, and plateau/rise in hCG during follow up.

Diagnosis

History/Exam/Investigations Send blood for quantitative β hCG, "snowstorm" on ultrasound (US)

FIGO Stage	Description
I	Confined to the uterus
II	Extends outside of the uterus, but is limited to the genital structures (adnexa, vagina, broad ligament)
III	Extends to the lungs, with or without known genital tract involvement
IV	All other metastatic sites

Modified WHO Prognostic Scoring System as Adapted by FIGO

Scores	0	1	2	4
Age	<40	≥ 40	–	–
Antecedent pregnancy	mole	abortion	Term	–
Interval months from index pregnancy	<4	4–6	7–12	>12
Pre-treatment serum hCG	$<10^3$	10^3-10^4	10^4-10^5	$>10^5$
Largest tumour size (incl. uterus)	<3	3–4 cm	≥ 5 cm	–
Site of metastases	lung	spleen, kidney	gastrointestinal	liver, brain
Number of metastases	–	1–4	5–8	>8
Previous failed chemotherapy	–	–	single drug	≥ 2 drugs

Management

- If asymptomatic, then schedule D&E under GA with oxytocin IV ready (infuse at 10-20 mU/min; adjust as needed to maintain low risk of excessive bleeding)
 - If closed cervix, then insert PG pessary into the cervix 2-3 hours before procedure
 - If > 40 years old, then consider hysterectomy as an option (will still need follow up)
- If actively aborting, then oxytocin 5-10 IU IV, ergometrine 0.2 mg IM (unless hypertensive), antibiotics and D&E
- If at high risk for choriocarcinoma, then methotrexate (MTX) 1 mg/kg IM on days 1, 3, 5, 7 with leucovorin (folinic rescue) 0.1 mg/kg IM on days 2, 4, 6, 8. Check for normal Hb and WBC prior to starting prophylactic chemotherapy.

Follow up of molar pregnancy

- Follow up all cases for 2 years
 - Monthly follow up until hCG is negative
 - Then follow up every 3 mos in 1st year and every 6 mos in 2nd year
 - Conduct speculum exam of vagina and suburethral area for metastases
 - Conduct bimanual pelvic exam
- Send blood for serial β hCG (should disappear by 6 wks post D&E)
- Order US to monitor ovarian cyst and residual/invasive mole
- CXR for metastasis
- Prescribe family planning, i.e. combined oral contraceptives and condoms, after β hCG have normalized (disappeared) and stabilized
- In subsequent pregnancy, order early US to look for recurrent mole

Management of choriocarcinoma

- Chemotherapy is first choice, especially in women who want to bear children (family planning for at least one year post chemotherapy)
- If older and multiparous woman, placental site choriocarcinoma, uterine perforation or failed chemotherapy, then perform hysterectomy

- Preoperative chemotherapy for 5 days prevents dissemination
- Postoperative chemotherapy treats residual and disseminated tissue
- Chemotherapy regimen
 - MTX 50 mg IV on days 1, 3, 5, 7 with leucovorin 15 mg IM on days 2, 4, 6, 8
 - Repeat every 3 wks until negative hCG (maintain Hb > 9 g/dL)
 - If liver dysfunction or severe side effects to MTX, then treat with actinomycin D, bleomycin, etoposide, or 5-fluorouracil
 - Combined chemotherapy (i.e. MAC (MTX, actinomycin, chlorambucil) or MTX, actinomycin, adriamycin) for high risk cases

Quality Indicator % of patients with molar pregnancies who are seen monthly until β hCG is negative

LABOUR WARD

Section B

Antepartum Haemorrhage

Protocol & Guideline Number B1, February 2014

Introduction/Definition

APH refers to vaginal bleeding that occurs at ≥ 24 wks gestation at any time prior to delivery. Some use as low a threshold as 20 weeks gestation, while others as high as 28 weeks gestation.

Diagnosis	History/Exam
Abruptio placentae	<ul style="list-style-type: none">• Shock• Tense/tender uterus• Decreased/absent fetal movements• Fetal distress or absent fetal heart sounds
Uterine rupture	<ul style="list-style-type: none">• Shock• Abdominal pain or free fluid• Abnormal contour• Tender abdomen• Easily palpable fetal parts• Absent fetal movements• Absent fetal heart sounds
Placenta praevia	<ul style="list-style-type: none">• +/- Shock• Painless PVB• Relaxed uterus• Abnormal lie or high presenting part• Fetal heart sounds usually present

Management (initial actions)

- Immediately call for help, urgently mobilize available staff and initiate resuscitation
 - Evaluate patient's general condition quickly, including vital signs (VS)
 - Obtain IV access with 2 large-bore cannulae (i.e. 16G)
 - Maintain SBP > 100 mm Hg and urine output (UOP) > 30 ml/hr (give minimum of 0.9% NS 1 L rapid infusion while awaiting blood products)
 - Send blood for FBC, U&Es, Cr, clotting time and X-match
- No manual vaginal examination until aetiology of APH is determined
- Inform most senior doctor available
- Further management depends on the aetiology of APH, per following table

Aetiology	Management (including <i>Investigations</i>)
Abruptio placentae	<ul style="list-style-type: none"> • Check fetal heart and cervical exam: <ul style="list-style-type: none"> ○ If fetal heart present and fully dilated cervix, then vacuum extraction ○ If fetal heart present, viable fetus (EGA \geq 28 wks or EFW \geq 1000 g) and non-imminent vaginal delivery, then caesarean delivery ○ If absent fetal heart, then vaginal delivery (see <i>Induction of Labour</i> if applicable) ○ If heavy bleeding, high risk of maternal mortality and non-imminent vaginal delivery, then caesarean delivery regardless of fetal status • Be prepared for PPH • If concomitant hypertension, then manage fluid balance with care (risk of pulmonary oedema if renal failure) • Do bedside clotting time (if > 10 min, then organise FFP) due to risk of coagulopathy
Uterine rupture	<p>Emergency laparotomy. Repair the rupture if possible. If not possible, then subtotal hysterectomy.</p> <p>In cases of uterine repair, counsel the patient that all subsequent deliveries are to be caesarean deliveries.</p>
Placenta praevia	<p>Depends on gestational age (GA), severity of APH and the type of placenta praevia:</p> <ul style="list-style-type: none"> • If heavy APH, then emergency examination in theatre (EIT). Conduct a cautious digital exam and palpate for boggy in the vaginal fornices. Double set up for caesarean delivery, especially if GA \geq 28 wks. If complete praevia, then caesarean delivery. If partial praevia, then consider induction. • If minimal/moderate APH and preterm, then admit to antenatal ward, keep X-matched, keep IV access with large-bore cannulae at all times and do OB ultrasound (US). Steroids if GA 26-34 wks: dexamethasone 6 mg IM every 12 hrs x 4 doses.* If stable, consider delaying delivery until 24 hrs after the second dose of steroids. If no heavy bleeding, then wait and do elective caesarean delivery at 37 wks gestation. (continued)

Aetiology	Management (including <i>Investigations</i>)
Placenta praevia (continued)	<ul style="list-style-type: none"> • If no APH and placenta praevia found on routine US, then admit to antenatal ward at GA \geq 28 wks. Treat as above. • Be prepared for PPH (AMTSL and administer additional oxytocin 20 IU in 1 litre) and placenta accreta/increta if previous uterine scar

Quality Indicator % of patients with APH who are seen by Consultant or senior registrar

* Nurse/midwife may give first dose without doctor if patient meets eligibility criteria

Augmentation of Labour

Protocol & Guideline Number B2, February 2014

Introduction/ Definition

Augmentation of labour is accomplished with a variety of interventions that accelerate labour. Indications include prolonged labour and arrest disorders. Contraindications include:

- Abnormal lie and presentation (see *Malpresentation*)
- Obstructed labour
- Features suggestive of a compromised baby
- Placenta praevia
- Limb deformities with contracted pelvis
- Previous VVF repair
- Previous transfundal uterine surgery or myomectomy that compromises the myometrium

Diagnosis

History/Exam/Investigations Protraction or arrest disorders should be well-documented on the partograph and/or in the notes prior to labour augmentation

Management

Characteristic	Management*
No previous uterine surgery	<ul style="list-style-type: none">• Amniotomy• Oxytocin
Previous uterine surgery	<ul style="list-style-type: none">• Amniotomy• Oxytocin only if close monitoring of woman and fetus is possible
HIV-infected	No difference in management of augmentation if obstetrically indicated

*Use oxytocin with caution due to risk of uterine rupture; see *Oxytocin Infusion Rate*

**May use half the amount of oxytocin in 500 ml NS or RL

- Reassess the cervical dilation after 2 hrs (i.e. 2 hrs of strong contractions with oxytocin) to see if labour has progressed satisfactorily.
- If labour has not progressed well and there are no signs of fetal distress or maternal compromise, oxytocin can be continued for 6 hours before making diagnosis of failed labour augmentation.
- Proceed to caesarean delivery.

Oxytocin Infusion

The use of oxytocin has been associated with increased maternal pain, fetal distress, and risk of uterine rupture.

- Starting oxytocin
 - Start oxytocin at ≤ 5 mU/min in nulliparous women, ≤ 2.5 mU/min in multiparous women, and only with cautious, close monitoring of mother and fetus in grandmultiparous women (P5 and above)
 - Oxytocin should be diluted in normal saline or Ringers Lactate. Note that IVF come in 1 litre (1000 ml) or 500 ml containers.
 - Check the oxytocin ampoule as to whether it is 5 U/mL or 10 U/mL
- In the absence of infusion pumps, intravenous giving sets are used with estimates of drops per minute (dpm) equating to millilitres per minute (mU/min). See below for more details.
- Closely monitor the woman and fetus while using oxytocin
- Progressively increase the infusion rate every 30 minutes until satisfactory contractions are achieved, defined as 3 moderate to strong contractions in 10 minutes, at which time the rate should be maintained and no further increases should be made
- Most women progress and deliver with an infusion of about 10 mU/min
- Infusion rates beyond 20 mU/min should only be considered after discussion with the Consultant and warrant internal monitoring if available. Exercise caution when rates exceed 20 mU/min as the antidiuretic effects (with water retention) at such a high dose may become significant.
- If uterine hyperactivity (hypertonic or tetanic contractions) or fetal distress, discontinue the infusion

Intravenous Giving Sets and Conversion of Oxytocin Infusion Rates

- Typically, giving sets are labelled as delivering 1 mL via 12 drops or 1 mL via 15 drops. Check the specification on the packaging in drops per minute (dpm).
 - If labelled as 12 dpm, 12 dpm = 1 mL per minute
 - If labelled as 15 dpm, 15 dpm = 1 mL per minute
- For example, if you take 0.5 ml of oxytocin 5 U/ml and dilute it in 1 L of NS, then the oxytocin concentration is 2.5 U/1000

ml, or 2.5 mU/ml. For a giving set labelled as 15 dpm, the conversion is 15 dpm = 1 mL/min = 2.5 mU/min.

Oxytocin amount in 1000 ml of NS	Oxytocin amount in 500 ml of NS	Drops per min	Dose in mU/min*
2.5 U	1.25 U	15	2.5
2.5 U	1.25 U	30	5
2.5 U	1.25 U	45	7.5
2.5 U	1.25 U	60	10
5 U	2.5 U	15	5
5 U	2.5 U	30	10
5 U	2.5 U	45	15
5 U	2.5 U	60	20
10 U	5 U	15	10
10 U	5 U	30	20

*assumes giving set labelled 15 dpm

Quality Indicator % of patients with prolonged labour who are reassessed within 2-3 hrs after the intervention

Breech Presentation and Breech Delivery

Protocol & Guideline Number B3, February 2014

Introduction/Definition

The fetus that presents in (complete or frank) breech presentation may be delivered vaginally if conditions are favourable per ultrasound. Investigated breech includes the following parameters: fetal attitude, EFW, AFI, fetal anomalies, uterine masses, and type of breech.

Diagnosis

History Check for a possible cause of the breech presentation, i.e. placenta praevia, congenital fetal abnormalities, uterine masses and intrauterine abnormalities

Exam Ballotable mass consistent with fetal head in the fundus, broad irregular mass in the lower pole

Investigations Confirm breech presentation and rule out fetal abnormalities with ultrasound (US) at ≥ 36 wks gestation and prior to caesarean delivery

Management

- Attempt external cephalic version at ≥ 36 wks gestation if there are no contraindications to vaginal delivery
- Decide (with patient and senior colleagues) on mode of delivery
 - Counsel patient that her options include caesarean delivery or trial of labour
- Caesarean delivery for term pregnancy, especially if:
 - Large baby with EFW ≥ 3.5 kg
 - BPD > 9.5 cm
 - Footling breech
 - Extended head
 - Clinically small pelvis
 - Nulliparous (primigravida)
 - Concomitant soft indications for caesarean delivery (i.e. preclampsia)
- If assisted breech vaginal delivery to be attempted, then steps include:
 - First stage – preferably spontaneous onset and progress of labour
 - Open partograph
 - IV access

- Hb, group and save
- Consider caesarean delivery for any delay in labour; no labour induction or augmentation
- Second stage
 - Delivery to be conducted by the most experienced person (i.e. registrar)
 - Consider episiotomy
 - Lovset manoeuvre (if necessary) for extended arms
 - Delivery of the after-coming head by any of the following methods:
 - ❖ Mauriceau-Smellie-Veit manoeuvre: the middle finger of one hand is placed in the mouth, and the second and fourth fingers are placed on the malar eminences to promote flexion and descent while counter-pressure is applied to the occiput with the middle finger of the other hand
 - ❖ Pipers forceps: fully dilated cervix, ruptured membranes, +/- episiotomy, empty bladder, adequate analgesia and adequate contractions. There should be no concern for cephalopelvic disproportion. This instrument is currently not available at the UTH.

Quality Indicator % of patients with documented breech presentation at 35-36 wks who are offered external cephalic version

Caesarean Delivery

Protocol & Guideline Number B4, February 2014

Introduction/Definition

Caesarean delivery is delivery of the infant through a uterine incision. Indications include: obstructed labour, cephalopelvic disproportion, abnormal lie, malposition and malpresentation, placenta praevia, preeclampsia or eclampsia with Bishop score < 6, fetal distress, cord prolapse with pulsating cord, abruptio placenta with fetal distress, previous myomectomy, two or more previous caesarean deliveries, high HIV viral load (> 1000 copies) and cervical dystocia.

Diagnosis

History/Exam/Investigations Indication for caesarean delivery should be clearly documented in the file

Management

Pre-operative care

- Elective caesarean deliveries should be done during the weekday whenever possible
- Informed consent must be signed by patient
- IV access
- Send blood for Hb, group and save and X-match if indicated
- Catheterise patient
- Dexamethasone 6 mg IM every 12 hours x 4 doses if:
 - Alive pregnancy at 26-34 wks gestation, even if delivery is expected within 24 hrs (if stable, consider delaying caesarean delivery until 24 hrs after the second dose of steroids)
 - Elective caesarean delivery < 39 wks gestation with Consultant input
- Medications for maternal patient:
 - Ranitidine 150 mg 1 hour before OT
 - Antacid PO before transfer to OT
 - Prophylactic antibiotics (i.e. cefotaxime 1g IV stat)

Procedure

- Transverse skin incision (i.e. Cohen, Pfannenstiel) preferred
- Low transverse incision (i.e. Kerr) preferred for uterine incision
 - Classical incision (vertical uterine incision in the upper segment even up to fundus) indicated for poorly

formed lower segment (i.e. extreme prematurity), transverse lie, inaccessible lower segment (i.e. dense adhesions, large leiomyomata) or cancer of cervix

- Double layer closure of uterine incision, especially for women at risk of becoming pregnant again
- Consider bladder flap if patient at high risk of bladder injury
- Controlled cord traction preferred over manual removal for placental delivery

Post-operative care

- Monitor vitals (BP, TPR) and check for bleeding every 30 min for 2 hrs, every 1 hr for 4 hrs, then every 4-6 hrs until discharge. See *Perioperative Management* and other recovery room protocols.
- First 24 hrs post caesarean delivery
 - Adequate IV fluids: [5% dextrose 1 L + RL 1 L + NS 1 L] or [NS 2 L + RL 1 L] over 24 hrs
 - Adequate analgesia: pethidine 50-100 mg IM every 6 hrs for 4 doses or morphine 15 mg IM every 6 hrs for 4 doses with antiemetic medication
 - Early ambulation (when the effects of anaesthesia are gone)
 - For low risk patients, encourage early ambulation for thromboprophylaxis. For high risk patients, see *Venous Thromboembolism* for thromboprophylaxis.
 - If catheterized, then remove catheter within 24 hrs unless otherwise indicated
- Diet
 - Fluids PO when fully awake
 - Normal diet after 24 hrs or when fully recovered from regional anaesthesia
- Continue oral antibiotics only if maternal patient is at high risk for infection (i.e. chorioamnionitis) or has a wound infection. There is no evidence for routine oral antibiotics post-caesarean delivery.
- Post-op day 3: consider discharge if in stable condition and ambulatory
- Permanent suture removal: transverse skin incision on post-op day 5 or midline skin incision on post-op day 7

Eclampsia

Protocol & Guideline Number B5, February 2014

Introduction/Definition

Eclampsia is a disease characterized by tonic clonic seizures, attributable to no other aetiology, that occur during the antenatal, intrapartum or postnatal period.

Diagnosis

History/Exam Generalized tonic-clonic convulsions (observed or by history) +/- \uparrow BP

Investigations Check urine for proteinuria, send blood for FBC, Cr and LFT

Management

Initial management

- Check airway, breathing, circulation (ABC). Correct hypoxia.
- Protect patient from injury (left lateral position in bed with rails or on floor)
- Admit to SOU or Annex or ICU
- Control BP: hydralazine 5-10 mg IV slowly every 15-60 min until BP < 160/110
- Prevent more seizures: MgSO₄ 4 g (20 ml of 20% MgSO₄) IV over 5-20 min AND 5 g (10 ml of 50% MgSO₄) IM in each buttock with 1 ml of 2% lignocaine loading dose in same syringe.* If no IV, then IM only. If convulsions recur, then give another MgSO₄ 2 g (10 ml of 20% MgSO₄) IV over 5-20 min.
- Assess for mode of delivery (assisted vaginal delivery or caesarean delivery)

Labour & delivery, postnatal management

- Maintain airway, stop seizures, inform senior obstetrician and anaesthetist and exclude other causes
- Monitor BP, PR, RR, urine output (UOP), deep tendon reflexes and level of consciousness
 - If UOP < 30 ml/hr, then withhold MgSO₄
 - If absent knee jerk reflex or RR < 16 per minute, then magnesium toxicity; give calcium gluconate 10% IV 1 g/10 min
- Give IV fluids cautiously: NS \leq 1.5-2 L over 24 hrs

- $MgSO_4$ 5 g (with 1 ml of 2% lignocaine) IM every 4 hours in alternate buttock* for 24 hrs after last seizure or delivery, whichever is later
 - If seizures still recur, then
 - Call for help, senior obstetrician, senior anaesthetist and experienced midwives
 - Repeat $MgSO_4$ load; give diazepam or thiopental x 1 if persistent
 - Intubate to maintain airway and ventilate
- Once seizures are controlled, consider Bishop score and start delivery process. Goal is delivery within 24 hrs of admission.
 - For patient in stable condition with poor Bishop score, consider induction of labour vs. caesarean delivery.
 - For vaginal delivery, assist with second stage (i.e. vacuum or forceps)
- If 26-34 wks gestation, then steroids (dexamethasone 6 mg IM every 12 hrs x 4 doses**) even if entire course will likely not be given before delivery. If stable, consider delaying iatrogenic delivery until 24 hrs after the second dose of steroids.
- Control BP (goal BP < 160/110): hydralazine IV and/or nifedipine PO; postnatal atenolol PO

Quality Indicator % of eclamptic patients who are seen by Consultant or senior registrar

*Alternative regimen is $MgSO_4$ 4-6 g IV over 15-20 min followed by $MgSO_4$ infusion IV at 1-3 g/hr

**Nurse/midwife may give first dose without doctor if patient meets eligibility criteria

Fetal Surveillance

Protocol & Guideline Number B6, February 2014

Introduction/Definition

Fetal surveillance aims to evaluate fetal well-being. During antenatal care, the fetal heart is assessed using a fetoscope (≥ 20 wks gestation) or Doppler (≥ 12 wks gestation). For abnormalities or complicated pregnancies, use cardiotocogram (CTG), non stress test (NST) or biophysical profile (BPP).

Diagnosis History/Exam/Investigations

Method	Procedure	Interpretation and Management
Non Stress Test (NST)	<ul style="list-style-type: none">Place CTG on abdomen for ≥ 20 minObserve up to 40 min if non-reactive (may be due to fetal sleep cycle or normal period of fetal inactivity)	<ul style="list-style-type: none">Reactive test has ≥ 2 accelerations (15 bpm above baseline x 15 sec) in 20 minNon-reactive test requires CST or BPP
Contraction Stress Test (CST)	<ul style="list-style-type: none">Adequate test if ≥ 3 contractions (each lasting 40-60 sec) in 10 minPatient can massage her nipple for 10 min with 5 min breaks or treat with oxytocin until adequate contractions	<ul style="list-style-type: none">Negative test has no decelerations with adequate contractionsPositive test has late decelerations with $> 50\%$ of adequate contractionsSuspicious test has inconsistent late decelerationsUnsatisfactory test does not have adequate contractions

Method	Procedure	Interpretation and Management
Modified BPP	<ul style="list-style-type: none"> • Amniotic fluid index (AFI) with NST 	<ul style="list-style-type: none"> • Normal if AFI > 5 cm and reactive NST
Biophysical Profile (BPP)	<p>Use NST and real-time US for:</p> <ul style="list-style-type: none"> • Fetal breathing (1 breathing cycle ≥ 30 sec during 30 min period) • Gross body movements (3 discrete body or limb movements) • Fetal tone (1 episode of extension or flexion of limbs or trunk, or opening or closing of hand) • Amniotic fluid volume (1 pocket ≥ 2 cm in 2 perpendicular planes) 	<ul style="list-style-type: none"> • Assign 2 points if present and 0 points if absent for US components • Assign 2 points if reactive NST and 0 points if non-reactive NST • Score < 7 (out of 10) is suspicious for fetal hypoxemia
Intrapartum fetal heart monitoring	<ul style="list-style-type: none"> • Evaluate fetal heart rate for ≥ 1 min for all women in admission with fetoscope or Doppler • Evaluate fetal heart rate before, during, and after a contraction every 30 min of active phase of labour • Record fetal heart rate in active phase on partograph 	<ul style="list-style-type: none"> • Normal includes fetal heart rate that increases or decreases with contraction but recovers to baseline after contraction • Abnormal includes bradycardia, tachycardia, and decelerations in the absence of a contraction or persisting after a contraction <ul style="list-style-type: none"> ○ Evaluate for maternal fever, hypotension, and medications ○ Evaluate for placental abruption and chorioamnionitis ○ Requires CTG

Method	Procedure	Interpretation and Management
<p>Cardiotocogram (CTG)</p>	<ul style="list-style-type: none"> • Place fetal heart monitor on abdomen so that heart beat is detected easily • Place monitor for detection of contractions at top of the fundus 	<ul style="list-style-type: none"> • Normal includes <ul style="list-style-type: none"> ○ Baseline rate of 120-160 bpm with variability of 5-25 bpm ○ Accelerations ○ Early decelerations (often due to fetal head compression) • Abnormal includes <ul style="list-style-type: none"> ○ Late decelerations (suspicious for fetal hypoxia and acidosis due to placental insufficiency) ○ Sinusoidal if fetal anaemia ○ Variable decelerations (often due to cord compression and may not require intervention) • Management of abnormal CTG <ul style="list-style-type: none"> ○ Evaluate for possible aetiology ○ Place woman in left lateral position ○ Stop oxytocin if applicable and treat with tocolytic (i.e. nifedipine) if hyperstimulation (> 5 contractions/10 min) ○ Treat with NS 500 ml IV bolus if hypotension ○ Treat with oxygen by mask if available ○ Elevate the presenting part if cord prolapse ○ Consider Caesarean or operative vaginal delivery

Hypertensive Disorders in Pregnancy

Protocol & Guideline Number B7, February 2014

Introduction

Hypertensive disorders in pregnancy are associated with increased perinatal morbidity and mortality (i.e. IUFD, IUGR, preterm delivery (PTD)). Take BP with an appropriately sized cuff size (falsely ↑BP if small cuff) when the woman is at rest. Use a mercury sphygmomanometer when possible. Urinalysis is critical to distinguish the specific disease. Order an early US for dating because management sometimes depends on GA.

Disease	Definition/Diagnosis History/Exam/Investigations
Chronic hypertension (HTN)	<ul style="list-style-type: none"> • HTN before pregnancy; or • BP \geq 140/90 mm Hg at \leq 20 wks gestation; or • Persistence of BP \geq 140/90 after 6 wks[†] postnatal • Baseline proteinuria may or may not exist
Gestational HTN (previously known as PIH)	<ul style="list-style-type: none"> • BP \geq 140/90 mm Hg at $>$ 20 wks gestation on two occasions at least 6 hrs apart; and • HTN resolves by 6 wks[†] postnatal; and • No proteinuria
Mild preeclampsia	<ul style="list-style-type: none"> • BP 140-159/90-109 mm Hg at $>$ 20 wks gestation on two occasions at least 6 hrs apart; and • HTN resolves by 6 wks[†] postnatal; and • Proteinuria (300 mg/L or 1 to 2+ on dipstick)
Severe preeclampsia	<ul style="list-style-type: none"> • BP \geq 160/110 mm Hg at $>$ 20 wks gestation* on two occasions at least 6 hrs apart; and • HTN resolves by 6 wks[†] postnatal; and • With proteinuria: 5 g/L or 3 to 4+ on dipstick; • With or without the following: <ul style="list-style-type: none"> ○ Severe headache ○ Visual disturbance (i.e. scotomata, blurriness) ○ Epigastric and/or right upper quadrant pain ○ Vomiting ○ Liver tenderness ○ Low platelets ○ Abnormal LFT ○ HELLP syndrome

Disease	Definition/Diagnosis History/Exam/Investigations
Eclampsia	Tonic-clonic seizures that cannot be attributed to any other causes; commonly, but not always, associated with preeclampsia
Other hypertensive disorders	Include stroke, malignant HTN, aneurysm, coarctation of the aorta, renal artery stenosis, renal disease, hyperthyroidism and adrenal disorders

*18 wks gestation in multiple gestation or molar pregnancy

†Some use as high a threshold as 12 wks postnatal

	Chronic HTN	Gestational HTN	Mild preeclampsia	Severe preeclampsia	Eclampsia	Other HTN disorders
Management						
Antenatal care (ANC):						
• Stop contraindicated antihypertensive medications (i.e. diuretics, ACE inhibitor)	✓					
• Order US for major fetal anomalies	✓					
• Involve physicians for secondary causes	✓					
• Baseline labs: send blood for LFT, Cr and FBC; 24 hr urine protein collection	✓					
• Consider fundoscopic or eye exam, ECG	✓					
ANC visits: every 2 wks until 28 wks gestation and weekly thereafter	✓	✓				
ANC visits: weekly until delivered			✓			
Send urinalysis and blood for LFT, Cr and FBC at every visit for possible progression of disease		✓	✓			
Check BP and urinalysis daily for possible progression of disease			✓			

Management	Chronic HTN	Gestational HTN	Mild preeclampsia	Severe preeclampsia	Eclampsia	Other HTN disorders
Involve senior doctors in OB, anaesthesiology +/- internal medicine, as well as experienced midwives				✓	✓	✓
Admit to annex or SOU				✓	✓	
Stabilize patient (intubate and ventilate if needed)				✓	✓	✓
Treat with antihypertensive medications <ul style="list-style-type: none"> • Hydralazine 5-10 mg IV every 15-60 min until BP < 160/110; repeat hourly as needed • Nifedipine 10 mg SL if persistent BP ≥ 160/110 mm Hg (despite hydralazine) • Methyldopa and/or nifedipine PO for maintenance (goal DBP 90) • Treat with atenolol PO if postnatal BP ≥ 160/110 	✓	✓	✓	✓	✓	✓
Treat with MgSO ₄ until 24 hrs after delivery or last seizure, whichever is longer <ul style="list-style-type: none"> • Repeat loading dose for persistent or recurrent seizure; give diazepam or thiopental x1 if needed • Monitor RR, DTRs and O₂ sat • Monitor UOP (stop MgSO₄ if < 20 ml/hr) • Calcium gluconate 1 g over 10 min if loss of DTRs or ↓ RR 				✓	✓	

Management	Chronic HTN	Gestational HTN	Mild preeclampsia	Severe preeclampsia	Eclampsia	Other HTN disorders
<ul style="list-style-type: none"> • Diazepam or thiopental for refractory seizures 				✓	✓	
Send blood for LFT, Cr and FBC				✓	✓	
Restrict fluid intake to 80 ml/hr or 1 ml/kg/hr				✓		
Treat with frusemide for pulmonary oedema				✓		
Deliver at 38 wks gestation if stable BPs and asymptomatic <ul style="list-style-type: none"> • Induce labour if no contraindications to vaginal delivery 	✓	✓	✓			
Delivery is treatment irrespective of GA* <ul style="list-style-type: none"> • Induce/augment labour if ≥ 35 wks gestation • Steroids (dexamethasone 6 mg IM every 12 hrs x 4 doses**) and deliver ≥ 24 hrs after second dose if < 35 wks gestation and stable with BP $< 160/110$ mm Hg in severe preeclampsia. Start steroids and deliver within 24 hrs of admission for eclampsia. • Induce labour with aim of vaginal delivery if Bishop score ≥ 7 • Caesarean delivery if Bishop score < 7 or contraindications to vaginal delivery 				✓ ✓ ✓ ✓	✓ ✓ ✓ ✓	

Management	Chronic HTN	Gestational HTN	Mild preeclampsia	Severe preeclampsia	Eclampsia	Other HTN disorders
Assist second stage with vacuum or forceps (concern for increased BPs)				✓	✓	
AMTSL with oxytocin (not ergometrine)	✓	✓	✓	✓	✓	✓
If < 37 wks gestation, then US for growth, consider early delivery and see every 1-2 wks If ≥ 37 wks gestation and: <ul style="list-style-type: none"> • If stable BP, then await spontaneous labour until 40 wks gestation • If unstable BP, then admit to annex or SOU and induce labour or proceed to caesarean delivery 						✓ ✓
Postnatal management per physicians						✓

*Conservative management with close monitoring of maternal patient and fetus, especially at 28-33 wks, may be done with Consultant review

**Nurse/midwife may give first dose without doctor if patient meets eligibility criteria

Quality Indicator % of eclamptic patients who have vacuum- or forceps-assisted vaginal deliveries

Quality Indicator % of eclamptic patients who have vacuum- or forceps-assisted vaginal deliveries

Induction of Labour

Protocol & Guideline Number B8, February 2014

Introduction/Definition

Induction of labour is accomplished with a variety of interventions that ripen the cervix and initiate labour. Indications include unfavourable Bishop score < 6 with any of the following: postterm, eclampsia, severe preeclampsia, mild preeclampsia at term) placental abruption, PROM > 24 hrs at term, unexplained APH and IUFD. Contraindications include:

- Poor condition of the mother (must stabilize first)
- Abnormal lie and presentation of singleton or first twin
- Obstructed labour
- Features suggestive of a compromised baby
- Placenta praevia
- Limb deformities with contracted pelvis
- Previous VVF repair
- Previous transfundal uterine surgery
- Multiple gestation of an order of 3 or higher

Diagnosis

History/Exam/Investigations Clearly document the indication for the induction

Management

Calculate the Bishop score to determine if cervix needs ripening

Cervix	Score			
	0	1	2	3
Position	Posterior	Midposition	Anterior	-
Consistency	Firm	Medium	Soft	-
Effacement	0-30%	40-50%	60-70%	≥ 80%
Dilation	Closed	1-2 cm	3-4 cm	≥ 5 cm
Station of fetal head	-3	-2	-1	+1, +2

Methods to ripen the cervix

Misoprostol*

- If second trimester gestation (considered termination of pregnancy), then misoprostol

- 400 mcg PV or SL every 3 hrs, max of 5 doses, for induced abortion
- 200 mcg PV every 6 hrs, max of 4 doses, for IUFD at 13-17 wks gestation
- 100 mcg PV every 6 hrs, max of 4 doses, for IUFD at 18-26 wks gestation
- If previous caesarean delivery, use half the dose and review plan with Consultant
- If third trimester gestation, then misoprostol 25 mcg PV every 6 hrs (or PO every 2 hrs)
 - Same regimen for induction of labour or IUFD
 - If previous caesarean delivery, do not use misoprostol

Other methods

- Foley bulb / catheter inflated with ~60 ml of water (mechanical dilation)
- PGE2 vaginal suppository 10 mg every 4 hrs; review plan with Consultant

Once cervix is ripened, continue with augmentation of labour or with methods of induction for favourable cervix (see below).

Methods of induction for favourable cervix (Bishop score ≥ 8)

- Amniotomy alone (for previous transfundal uterine surgery and grandmultiparous mothers)
- Oxytocin alone
- Amniotomy and oxytocin if no contraindications

Try to avoid prolonged duration of ruptured membranes in HIV-infected patients.

Methods of induction of labour in IUFD

Amniotomy even if unfavourable cervix, start oxytocin at 5 mU/min and vaginal delivery. If grandmultiparous, then amniotomy. If no contractions after 1-2 hrs, then start oxytocin at 2.5 mU/min. Stop oxytocin when contractions are regular.

Quality Indicator % of patient undergoing induction of labour with clear indications in file

*Patients with previous caesarean delivery are not candidates for misoprostol and should be induced using foley catheter, amniotomy +/- oxytocin.

Intrauterine Fetal Demise (IUFD)

Protocol & Guideline Number B9, February 2014

Introduction/Definition

Intrauterine fetal demise (IUFD) is death of the fetus > 24 wks gestation while in utero. 80-90% of women experience labour within 2-3 wks. There is a 25% risk of DIC with IUFD retained for \geq 4-5 wks.

Diagnosis

History Decreased or absent fetal movement

Exam No fetal heart heard on fetoscope or doppler, fundal height may be less than expected

Investigations US with no fetal cardiac activity

Management

- Draw FBC to exclude infection and thrombocytopenia
- If no chorioamnionitis or preeclampsia, then may allow up to 3 wks for spontaneous labour (draw platelets every wk)
- If induction of labour needed for IUFD, then misoprostol
 - 200 mcg PV every 6 hrs, max of 4 doses, at 13-17 wks gestation
 - 100 mcg PV every 6 hrs, max of 4 doses, at 18-26 wks gestation
 - 25 mcg PV every 6 hrs (or PO every 2 hrs) in third trimester
 - If one prior low transverse caesarean delivery and
 - In second trimester, then use half the dose of misoprostol as above
 - In third trimester, then no misoprostol. Consider foley bulb followed by low-dose oxytocin with close monitoring of woman.
 - If prior classical caesarean delivery, then discuss and document > 1% risk of uterine rupture and advise repeat caesarean delivery
- If augmentation of labour, then manage similar to live birth
- Ensure privacy to the extent possible
- Provide adequate analgesia
- Provide bereavement counselling
- Placental evaluation and perinatal autopsy recommended
- Counsel regarding risk of recurrence (depends on aetiology)

Quality Indicator % of suspected IUFD confirmed with ultrasound

Intrauterine Growth Restriction (IUGR)

Protocol & Guideline Number B10, February 2014

Introduction/ Definition

Intrauterine growth restriction (IUGR) presents a complex management problem with increased risk of perinatal morbidity and mortality. IUGR describes a fetus whose estimated fetal weight (EFW) is < 10%ile for gestational age. Determination of growth by gestational age (GA) requires standardized ultrasound (US) reporting that includes locally relevant nomograms. IUGR represents 30% of all small for gestational age infants. When possible, constitutionally small fetuses should be excluded.

Diagnosis

History Ascertain reliability of pregnancy dating; hypertension, vascular disorders, tobacco use, recreational drug use, medications (i.e. anticonvulsants), previous IUGR, previous abruption, placenta praevia in current pregnancy, multiple gestation in current pregnancy

Exam Complete examination, including BP, signs of extreme malnutrition, and stigmata of alcohol, tobacco, and drug use; fundal height (FH) \geq 3 cm smaller than what is expected for GA

Investigations

- US for anatomy: EFW, liquor volume, anomalies
- US for growth every 2-4 wks (frequency depends on precision of measurements)
- Doppler velocimetry of the umbilical artery if available
- Screen for TORCH infections
- Screen for thrombophilias if early onset IUGR, early onset severe preeclampsia, thrombosis, or IUFD
- Consider fetal karyotype if structural anomalies, IUGR < 32 wks gestation, IUGR < 3%ile or polyhydramnios (suggestive of trisomy 18)

Management

Because treatment is individualized, review management with the Consultant. The plan depends on the GA, severity of IUGR, maternal condition and fetal condition.

- Mild or moderate IUGR: daily fetal kick counts, weekly antenatal care visits, weekly non-stress test (NST) or biophysical profile (BPP) if indicated, and serial US for growth and liquor volume

- Severe IUGR: admit to UTH, twice weekly NST or BPP
- IUGR 26-34 wks gestation: steroids (dexamethasone 6 mg IM every 12 hrs x 4 doses), regular fetal surveillance and deliver at 35 wks gestation
- IUGR \geq 35 wks gestation: immediate delivery

Mode of delivery

- Vaginal delivery with continuous CTG if fetal surveillance is normal and immediate caesarean delivery is possible if needed
- Caesarean delivery if antenatal and/or intrapartum fetal surveillance is abnormal

Malpresentation, Malposition and Abnormal Lie

Protocol & Guideline Number B11, February 2014

Introduction/Definition

Malpresentation refers to any abnormalities of the fetal presenting part, normal being cephalic presentation. Abnormal fetal position occurs when the fetal head is not occiput anterior during labour. With transverse lie, there is no presenting part.

Presentation, Position, or Lie	Characteristics	Diagnosis History/ Exam/Investigations	Management
Breech	<ul style="list-style-type: none">• Incidence: 2-3% of term pregnancies• Types: frank (65%), complete (10%), footling (25%)• Predisposing factors: uterine anomaly, abnormal amniotic fluid volume, anencephaly, reduced fetal tone, hydrocephaly, and multiple gestation	<ul style="list-style-type: none">• Ultrasound (US) for major fetal anomalies• US for BPD, fetal weight, placental location, type of breech	<p><i>Antenatal management</i></p> <ul style="list-style-type: none">• Perform fetal surveillance to check well being• Look for possible causes of breech presentation• Perform external cephalic version at 36 wks with Consultant (see <i>Breech Presentation and Breech Delivery</i>) <p><i>Mode of delivery</i></p> <ul style="list-style-type: none">• No induction of labour• Caesarean delivery at 39 wks gestation for primigravida• Caesarean delivery for footling breech in labour• Low threshold for Caesarean delivery (i.e. prolonged labour, complications, abnormal fetal assessment)

Presentation, Position, or Lie	Characteristics	Diagnosis History/ Exam/Investigations	Management
Breech (continued)			<ul style="list-style-type: none"> ● Vaginal delivery for term pregnancy, EFW 2.5-3.5 kg and normal pelvic dimensions <ul style="list-style-type: none"> ○ Skilled clinician at delivery ○ Adequate analgesia ○ No labour augmentation ○ Assist delivery of the legs, arms (Lovset manoeuvre), and head (Burn-Marshall manoeuvre, Mauriceau-Smellie-Veit manoeuvre or forceps)
Compound	<ul style="list-style-type: none"> ● Simultaneous presentation of extremity next to the presenting part ● Increased risk of perinatal loss due to preterm delivery, prolapsed cord and traumatic obstetrical procedures 	<ul style="list-style-type: none"> ● Intrapartum diagnosis by VE: feel prolapsed extremity with presenting part 	<ul style="list-style-type: none"> ● Monitor closely ● In general, leave the prolapsed extremity alone because it usually does not interfere with labour ● For prolapsed arm, monitor closely to see if arm retracts out of the way. If it does not, then gently push it upwards while pushing the head downwards by fundal pressure. If this fails, then Caesarean delivery.

Presentation, Position, or Lie	Characteristics	Diagnosis History/ Exam/Investigations	Management
Transverse	<ul style="list-style-type: none"> Risk factors include: high parity, preterm labour, multiple gestation, uterine anomalies, placenta praevia, severe pelvic contracture 	<ul style="list-style-type: none"> US to confirm fetal lie and absence of presenting part Inspection reveals wide abdomen with top of fundus only slightly above umbilicus Head and buttocks are palpable in the iliac fossae Intrapartum diagnosis by VE: feel ribs, scapula and clavicle or shoulder and arm 	<ul style="list-style-type: none"> Perform external cephalic version at 36 wks with Consultant Caesarean delivery at 39 wks gestation for persistent transverse lie Caesarean delivery for transverse lie in labour

Presentation, Position, or Lie	Characteristics	Diagnosis History/ Exam/Investigations	Management
Occiput posterior	<ul style="list-style-type: none"> • Membranes rupture easily although head is not well opposed to cervix • Premature maternal desire to push due to back pain • Increased risk of prolonged second stage • Predisposing factors include: slightly smaller pelvic inlet and large fetus 	<ul style="list-style-type: none"> • Antenatal diagnosis is inaccurate; 75% of cases with occiput posterior position rotate into occiput anterior position • Intrapartum diagnosis by VE: feel both fontanelles • If moulding or caput present, then feel the ear to determine position 	<ul style="list-style-type: none"> • Monitor progress of labour closely • Adequate analgesia • IV access with NS at maintenance rate to prevent dehydration and decrease risk of distress • Fetal surveillance <p><i>Mode of delivery</i></p> <ul style="list-style-type: none"> • Spontaneous delivery may occur as face to pubis • Consider Kielland forceps for assisted delivery only by experienced obstetrician or midwife • Low threshold for Caesarean delivery (i.e. relative CPD)

Presentation, Position, or Lie	Characteristics	Diagnosis History/ Exam/Investigations	Management
Occiput transverse (persistent)	<ul style="list-style-type: none"> Usually a transitory position with spontaneous anterior rotation 	<ul style="list-style-type: none"> Intrapartum diagnosis by VE 	<ul style="list-style-type: none"> Consider oxytocin augmentation if weak contractions without CPD Rotate head manually into occiput anterior position Consider outlet forceps delivery with instrumental rotation or vacuum assisted vaginal delivery Low threshold for Caesarean delivery
Brow	<ul style="list-style-type: none"> May be due to fetal neck oedema (i.e. goitre, cystic hygroma) Suspect if prolonged first stage of labour despite strong contractions and history of vaginal delivery 	<ul style="list-style-type: none"> Intrapartum diagnosis by VE: feel supraorbital ridges and anterior fontanelle Confirm by US if available 	<ul style="list-style-type: none"> May convert to vertex or face presentation in early labour with subsequent vaginal delivery Caesarean delivery for persistent brow presentation
Face		<ul style="list-style-type: none"> Intrapartum diagnosis by VE : feel supraorbital ridges and alveolar margins 	<ul style="list-style-type: none"> Vaginal delivery for anterior mentum Caesarean delivery for posterior mentum

Multiple Gestation

Protocol & Guideline Number B12, February 2014

Introduction/Definition

Multiple gestation refers to any pregnancy with more than one fetus and is a high risk pregnancy. Maternal complications include: APH, anaemia, hyperemesis gravidarum, thromboembolism, hypertensive disorders of pregnancy, preterm labour (PTL), prolonged labour, PPH and caesarean delivery. Fetal/neonatal complications include: twin-twin transfusion syndrome, twin reverse arterial perfusion sequence, polyhydramnios/oligohydramnios, miscarriage, prematurity, IUGR, IUFD, hydrops fetalis, conjoined twins, cord entanglement, malpresentation and death.

Diagnosis

History Increased symptoms of early pregnancy (i.e. nausea, vomiting), history of ovulation stimulation drug use, family history of multiple gestation

Exam FH ≥ 3 cm than expected by dates, multiple fetal parts and/or > 2 fetal poles palpable, multiple fetal heart tones ($\Delta \geq 10$ bpm)

Investigations US with multiple fetal hearts or heads

Management

Antenatal management

- Order US for dating and chorionicity as early as possible
- Order US for anatomy at 18-20 wks gestation
- Order monthly US after 28 wks gestation for growth
- For growth discordance $> 25\%$, weekly NST (see *IUGR*)
- Antenatal care visits: monthly up to 28 wks gestation, every 2 wks up to 36 wks gestation and then weekly until delivery
- Nutrition: extra daily caloric needs of 600 kcal (for twin gestation) more than a non-pregnant woman; eat normal balanced diet
- No specific intervention to prevent preterm labour
- For monoamniotic pregnancy, treat with steroids (dexamethasone 6 mg IM every 12 hrs x 4 doses*) as early as 26 wks gestation, admit to inpatient ward at 34 wks gestation and caesarean delivery at 36 wks gestation. Consider salvage course of steroids prior to delivery if ≥ 7 days has passed since initial course of steroids and 26-34 wks gestation.

Intrapartum management

- Partograph to monitor labour progress
- Prepare two delivery sets and prophylactic oxytocin IV
- Obstetrics and paediatrics registrars at delivery
- Low threshold for caesarean delivery; proceed cautiously if need for labour augmentation
- For unknown chorionic/amniotic status in twin gestation, treat as dichorionic/diamniotic pregnancy
- For cephalic presentation of first twin and no complications, vaginal delivery no later than at 40 wks gestation; induction of labour if needed (earlier delivery if oligohydramnios, IUGR, maternal hypertension or other indications)
- For delay > 30 min between delivery of twins, assess lie and presentation and proceed accordingly
 - For transverse lie of second twin, perform internal podalic version then breech extraction in OT
 - For cephalic presentation of second twin, start oxytocin augmentation
- After delivery of second twin, perform AMTSL followed by oxytocin 20 IU/1L of NS IV at 30 dpm

Triplet gestation and beyond

- Treat with steroids (dexamethasone 6 mg IM every 12 hrs x 4 doses*) as early as 26 wks gestation
- Consider admission +/- caesarean delivery at 34 wks gestation
- Consider salvage course of steroids prior to delivery if ≥ 7 days has passed since initial course of steroids and 26-34 wks gestation
- Caesarean delivery is preferred mode of delivery
- Paediatricians at delivery because extra support needed for infants
- Counsel regarding postnatal family planning

One antenatal fetal death in multiple gestation

- Admit to inpatient ward for expectant management
- Monitor for maternal complications of IUFD (see *Intrauterine Fetal Demise*)
- Monitor fetal well being of surviving twin

*Nurse/midwife may give first dose without doctor if patient meets eligibility criteria

Non-pneumatic Anti-Shock Garment

Protocol & Guideline Number B13, February 2014

Introduction/Definition

The non-pneumatic anti-shock garment (NASG) is used in the management of haemorrhagic shock. It works by shunting circulation from the periphery to the core (heart, lungs and brain) through a compression garment. It can be applied at UTH and in primary health centres until the patient reaches UTH for further management of shock. NASG has been associated with reduced blood transfusions, fewer emergency hysterectomies and fewer units of blood for transfusions, as well as decreased mortalities.

Diagnosis

History/Exam/Investigations Shock ((BP < 90/50 and PR >100) with history of or current PVB

Management

- Anyone who has been oriented to NASG can place it on a woman once shock is confirmed (BP < 90/50 and PR >100)
- Sequentially wrap the articulated segments around the legs, pelvis and abdomen using the Velcro
- Position foam ball on the uterus to provide additional compression
- Do not forget to initiate other management to treat shock
- Remove NASG per NASG protocol and only by doctor's order
 - NASG can be left in place when performing procedures, i.e. surgery, laceration repairs
- Clean and decontaminate NASG for reuse (up to 40 or more times)
- If patient arrives from referring health facility with NASG, then give clean NASG in exchange so that the health facility always has one

Quality Indicator % of pregnant patients in haemorrhagic shock who are managed using the NASG

Oligohydramnios and Polyhydramnios

Protocol & Guideline Number B14, February 2014

	Oligohydramnios	Polyhydramnios
Introduction/ Definition	Oligohydramnios is defined as single deepest pocket ≤ 2 cm or Amniotic fluid index (AFI)* ≤ 5 cm (severe) AFI = 5.1-8 cm (mild)	Polyhydramnios is defined as single deepest pocket ≥ 8 cm or AFI ≥ 35 cm (severe) AFI = 30.1-34.9 cm (moderate) AFI = 24-30 cm (mild)
Diagnosis		
<i>History</i>	May be associated with draining (ROM), maternal hypertension, and fetal renal anomalies	May be associated with maternal diabetes, substance abuse, TORCH infections, multiple gestation, and fetal anomalies. Ask about dyspnoea and abdominal pain.
<i>Exam</i>	<ul style="list-style-type: none"> • Fundal height (FH) is smaller than expected by dates by ≥ 3 cm • Easily palpable fetal parts • Subjectively reduced liquor volume • Sterile speculum exam if draining suspected 	<ul style="list-style-type: none"> • FH is larger than expected by dates by ≥ 3 cm • Stigmata for TORCH infections
<i>Investigations</i>	<ul style="list-style-type: none"> • US (AFI, anomaly, growth) • Amniocentesis if GI anomalies (send for chromosomal defects) • Screen for hypertension (HTN), systemic lupus erythematosus, antiphospholipid 	<ul style="list-style-type: none"> • Screen for DM, Rh alloimmunisation, TORCH infections, and substance abuse

*Consider performing AFI three times and taking the average

	Oligohydramnios	Polyhydramnios
<i>Investigations</i> (continued)	syndrome, and placental insufficiency (i.e. HC:AC ratio and umbilical artery Doppler)	
Management	<p><i>At term</i></p> <ul style="list-style-type: none"> • Continuous CTG if vaginal delivery • Involve paediatricians <p><i>For mild and < 37 wks gestation</i></p> <ul style="list-style-type: none"> • Outpatient: oral hydration 2L daily and twice weekly biophysical profile (BPP) • Steroids (dexamethasone 6 mg IM every 12 hrs x 4 doses**) if 26-34 wks gestation • Induce labour at 37 wks gestation <ul style="list-style-type: none"> ○ Transcervical amnioinfusion if available ○ Continuous CTG <p><i>For severe and < 37 wks gestation</i></p> <ul style="list-style-type: none"> • Inpatient: oral hydration 2 L daily • Steroids if < 34 wks gestation • Deliver if fetal lung maturity or fetal distress <ul style="list-style-type: none"> ○ Induction of labour (IOL) if no IUGR with transcervical amnioinfusion if available ○ Caesarean delivery if IUGR 	<p><i>For treatable aetiologies</i></p> <ul style="list-style-type: none"> • Management is specific to aetiology <p><i>For congenital anomalies or idiopathic</i></p> <ul style="list-style-type: none"> • Outpatient: US for growth and AFI every 2 wks • Monitor for preterm labour (PTL) or maternal symptoms of dyspnoea and abdominal pain • Steroids (dexamethasone 6 mg IM every 12 hrs x 4 doses) if 26-34 wks gestation • Indomethacin 25mg OD for 1 week if < 32 wks gestation and moderate/ severe polyhydramnios or maternal symptoms <ul style="list-style-type: none"> ○ US-guided amnioreduction if maternal symptoms despite indomethacin • Deliver at term unless significant fetal or maternal compromise • High risk for cord prolapse with AROM • High risk for PPH (see <i>Postpartum Haemorrhage</i>)

**Nurse/midwife may give first dose without doctor if patient meets eligibility criteria

Operative Vaginal Delivery: Forceps and Vacuum

Protocol & Guideline Number B15, February 2014

Introduction/Definition

Operative vaginal delivery (or assisted vaginal delivery) may be performed via forceps or vacuum.

Indications	Forceps	Vacuum
Maternal	<ul style="list-style-type: none"> • Maternal exhaustion • Conditions in which expulsive efforts should be avoided (i.e. cardiac disease, h/o stroke) 	
Fetal	<ul style="list-style-type: none"> • Delivery of head in breech delivery • Fetal distress • Prematurity 	<ul style="list-style-type: none"> • Fetal distress • Delay in descent of the fetal head, especially second twin • Other indications

Diagnosis

History/Exam/Investigations Document indication(s) and consent for operative vaginal delivery clearly in the file

Management

Check that following conditions are fulfilled prior to operative vaginal delivery:

Criteria	Forceps	Vacuum
Maternal	<ul style="list-style-type: none"> • Fully dilated cervix • Ruptured membranes • No signs or symptoms of cephalopelvic disproportion • Empty bladder • Adequate analgesia • Adequate contractions • +/- Episiotomy for forceps 	

Criteria	Forceps	Vacuum
Fetal	<ul style="list-style-type: none"> • Scalp visible at introitus; descent at 0/5 or head at $\geq +2$ station • Sagittal suture in direct AP position with occiput anterior • If face presentation, then anterior chin 	<ul style="list-style-type: none"> • Term or late preterm (GA > 34 wks) fetus • Vertex presentation • Head at ≥ 0 station or $\leq 2/5$ above symphysis pubis

Procedure

- Use aseptic technique
- Performed by obstetrician or experienced/trained midwife
- Explain procedure and provide emotional support and encouragement to mother (who should continue to push if not contraindicated)
- For forceps application
 - Place pudendal block for local anaesthesia
 - Test the locking mechanism
 - Lubricate the blades with sterile lubricant
 - Insert left blade first +/- episiotomy
 - If difficulty with locking, then recheck position of fetal head and re-apply blades as indicated
- For vacuum application
 - Identify the posterior fontanelle
 - Place cup ~ 1 cm anterior to posterior fontanelle
 - Check that there is no maternal tissue trapped within cup
 - Create vacuum seal slowly from 0.2 kg/cm^2 to 0.8 kg/cm^2
- Pull in direction of birth canal axis (initially, downward and forward) with each contraction; expect descent with each combination of pulling and maternal pushing
- Proceed to Caesarean delivery if there is no descent after 3 pulls or after 30 min or 3 pop-offs occur

Quality Indicator % of patients who undergo operative vaginal delivery with consent documented in the file

Perineal Lacerations

Protocol & Guideline Number B16, February 2014

Introduction/Definition

Perineal lacerations may be sustained during vaginal delivery and should be repaired immediately, usually following delivery of the placenta. If repair is delayed > 24hrs, then wait 3 months to repair as an outpatient procedure.

The degree of the laceration is defined by its depth and involvement of the anal sphincter. A first degree (1°) perineal laceration is limited to the superficial perineal skin or vaginal mucosa. A second degree (2°) laceration extends to the perineal muscles and fascia but does not involve the anal sphincter. A third degree (3°) laceration involves the anal sphincter but does not compromise the rectal mucosa, while a fourth degree (4°) laceration interrupts the rectal mucosa.

Diagnosis

History/Exam/Investigations If exam at bedside is difficult, then do EUA in OT

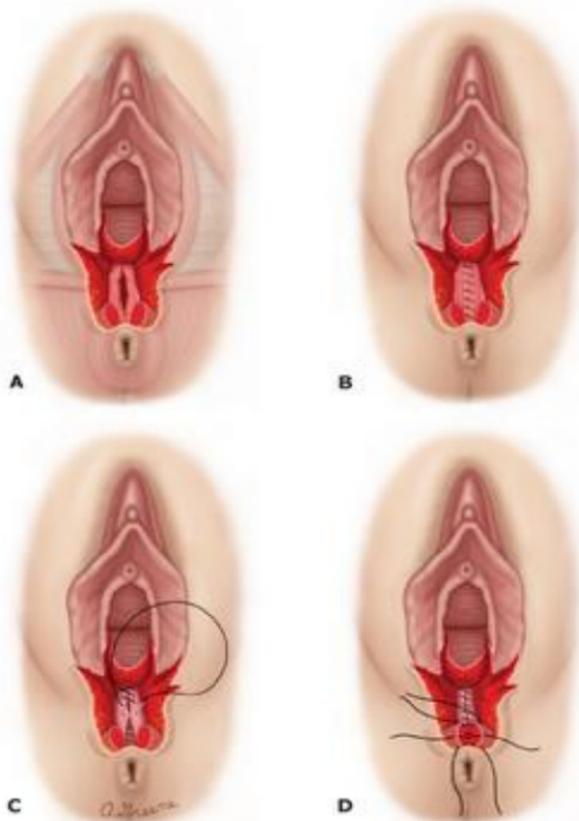
Management (of 3° or 4° laceration)

- Prophylactic metronidazole 500 mg IV 30 min before the procedure if 3° or 4° laceration
- Lithotomy position
- Clean perineum with antiseptic solution
- Pain control: local lignocaine or pudendal block or GA
- Procedure for 3° or 4° laceration repair
 - Close rectal and anal mucosa with interrupted sutures of vicryl if available on round body needle, starting from apex, with knots inside the lumen
 - Repair rectal muscles and pararectal fascia in similar fashion
 - Reconstruct torn ends of external anal sphincter with figure of eight stitch of same suture
 - Reinforce with interrupted sutures
 - Repair perineal muscles with interrupted sutures of vicryl
 - Repair vaginal walls and perineal skin with interrupted sutures

Post-procedure care

- Sitz baths up to TDS
- Metronidazole 400 mg PO TDS for 5-7 days
- Soft diet and stool softeners for 3-4 weeks

Repair of a fourth-degree obstetric laceration



A. 4th degree laceration B. The torn anal mucosa is repaired using a running stitch, but interrupted sutures are also acceptable. C. The internal anal sphincter should be properly identified and repaired as a separate layer. D. The external sphincter is then identified and repaired. The repair consists of either end-to-end or overlapping plication of the disrupted external anal sphincter and capsule using interrupted or figure-of-eight sutures.

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Postdates and Postterm Pregnancy

Protocol & Guideline Number B17, February 2014

Introduction/Definition

Postdates pregnancy is defined as pregnancy between 40 and 42 wks gestation and postterm as ≥ 42 wks gestation. Postterm pregnancy is associated with increased risk of meconium aspiration, IUFD, oligohydramnios and fetal distress. Accurate pregnancy dating is critical so that interventions can be done - or avoided - as indicated.

Diagnosis

History/Exam/Investigations see Pregnancy Dating Criteria

Management

- If GA 40-41wks, then conservative management until delivery is indicated for other reasons (i.e. preeclampsia) or pregnancy reaches 42 wks gestation*
 - Refer patient to B02
 - Strip membranes if no contraindications
 - Assess amniotic fluid volume with US
 - If oligohydramnios, then admit for induction of labour (IOL); may consider caesarean delivery depending on severity (look at AFI or deepest pool)
 - If patient reports reduced or lack of fetal movement, then admit for IOL regardless of fetal cardiac activity
 - If normal amniotic fluid volume, then return at 42 wks gestation* for IOL
- If GA ≥ 42 wks*, then deliver with the following in place or readily available
 - Close fetal monitoring with CTG (once, intermittent, or continuous)
 - AROM early in labour
 - Paediatricians at delivery
 - Neonatal endotracheal tube to be available
 - Suction machine to be available
 - Do not perform routine suction for meconium or meconium-stained liquor

Quality Indicator % of patients at 40-41 wks gestation who have US

* Some firms use a cut-off of 41 wks gestation instead of 42 wks gestation

Postpartum Haemorrhage (PPH)

Protocol & Guideline Number B18, February 2014

Introduction/Definition

Primary PPH is defined as blood loss ≥ 500 ml within 24 hrs of vaginal delivery, or blood loss ≥ 1000 ml within 24 hrs of Caesarean delivery, or any amount of blood loss that disturbs maternal hemodynamic status. Secondary PPH is defined as abnormal bleeding at 24 hrs - 6 wks postnatal. Causes of PPH include: atony (most common), retained placenta/products, vaginal/cervical lacerations, uterine rupture, uterine inversion, and coagulation disorders (i.e. DIC).

Prevention of PPH is done via routine AMTSL and routine prophylactic oxytocin 20 IU in 1L NS at 30 drops/min for multiple gestation, polyhydramnios, macrosomia, and prolonged labour.

AMTSL includes the following:

- Oxytocin 10 IU IM immediately after all deliveries, including caesarean deliveries
- Delayed cord clamping at 1-3 min after delivery
- Controlled cord traction for delivery of placenta, including caesarean delivery (optional)
- Fundal massage (optional)
- Regular and frequent assessment of uterine tone by palpation of fundus after delivery of placenta

Diagnosis

History/Exam/Investigations PVB, +/- shock

Management

Initial management

- Call for help
- Check airway, breathing, circulation (ABC)
- Oxygen 10-15 L/min if available
- Obtain IV access with 2 large-bore cannulae (i.e. 16G) and start IV fluids
- Draw blood:
 - X-match ≥ 6 units WB and 4 units FFP (transfuse as needed)
 - Bedside clotting time
 - FBC (if unavailable, then Hb)
- Uterine massage to induce contractions
- Place woman in supine position and keep warm
- If in shock and/or awaiting further management, then NASG

For uterine atony

- Vigorous uterine massage
- Repeat oxytocin 10 IU IV (slow infusion)
- If bleeding persists, then oxytocin 40 IU IV in 500 ml of NS at 125 ml/hr
- If bleeding persists, then carboprost IV or misoprostol 600 mcg PO or 800 mcg SL one dose
- If bleeding persists, then intrauterine balloon tamponade using inflated Foley catheter or condom
- If above steps fail, then OT for uterine artery ligation or hysterectomy. While awaiting OT, consider bimanual uterine compression.

For retained products/placenta

- If tolerated, then manual removal of retained products/placenta at bedside
- If not tolerated, then manual removal in OT with oxytocin 40 IU in 500 ml NS
- If morbidly adherent or retained, then consult senior doctor immediately

For vaginal/cervical lacerations

- Identify apex before initiation of repair
- Consider repair in OT if difficult to visualize apex at bedside

For coagulopathy

- Evaluate for coagulation abnormality via bedside clotting time
- Draw blood for fibrinogen, platelet count, PT and PTT
 - If deranged, then transfuse PRBC, FFP, +/- platelets, +/- WB

For uterine inversion

- Suspect when ill-defined fundus, dimpling and severity of CV decompensation does not correlate with EBL
- Correct uterine inversion in OT under GA

Quality Indicator % of patients with PPH who are seen by Consultant or senior registrar

Pregnancy Dating Criteria

Protocol & Guideline Number B19, February 2014

Introduction/Definition

Dating the pregnancy accurately is of critical importance since management often depends on the gestational age (GA) (i.e. steroids, conservative management versus early delivery, postterm induction of labour).

Diagnosis

History Ask the date of the first day of the woman's last menstrual period (LMP). Clarify whether the LMP was normal or not, such as a post-hormonal contraception period.

Exam Measure FH from pubic symphysis to upper edge of uterus; a discrepancy ≥ 3 cm merits further investigation, usually done with US

Investigations Urine pregnancy test may be useful in the first trimester, ultrasound (US) for dating

Management

FH discrepancy will alert the doctor that GA by dates, that is LMP, may be incorrect.

Order US for dating and adjust GA accordingly:

- GA by LMP and GA by US should agree by
 - +/- 1 week (7 days) in 1st trimester
 - +/- 2 weeks (14 days) in 2nd trimester
 - +/- 3 weeks (21 days) in 3rd trimester
- If there is agreement, then use LMP for EDD
- If there is discrepancy, then use US estimates for EDD
- If only one measurement can be taken:
 - Head circumference best predicts GA if GA 14-22 wks
 - Femur length best predicts GA in third trimester

Quality Indicator % of pregnancies re-dated by US estimates (instead of dates) when US done for dating

Premature Rupture of Membranes (PROM)

Protocol & Guideline Number B20, February 2014

Introduction/ Definition

Premature rupture of membranes (PROM) refers to draining of amniotic fluid before the onset of labour. Preterm PROM (PPROM) is associated with significant maternal and neonatal morbidity and mortality. Spontaneous rupture of membranes > 24 wks gestation complicates 2-3% of pregnancies.

Diagnosis

History Continuous draining of fluid

Exam Sterile speculum reveals fluid in the vaginal vault and/or fluid passing per os

- Avoid a digital examination, especially if PPRM
- Use nitrazine paper to check pH (pH > 6 indicates amniotic fluid)

Investigations US may show low liquor volume

Management

Topic or GA	Plan
General care	<ul style="list-style-type: none">• Admit patient to antenatal ward or labour ward• Monitor uterine activity and fetal heart• Check maternal PR and temperature every 4 hrs• Assess for labour, chorioamnionitis and placental abruption at least daily• US for presentation, anatomy and liquor volume
PROM > 24 hrs	<ul style="list-style-type: none">• Amoxicillin 500 mg TDS; or erythromycin 250 mg QID; or amoxicillin 500 mg TDS and metronidazole 400 mg TDS; or amoxicillin 500 mg TDS and erythromycin 250 mg QID• Induce labour if indicated• Caesarean delivery if previous CD
PPROM	<ul style="list-style-type: none">• Send investigations: HVS, endocervical culture, urine culture, FBC*• Oral antibiotics for latency: erythromycin 250 mg QID[†] and amoxicillin 500 mg TDS for 7 days[°]

Topic or GA	Plan
PPROM (continued) 35 - 36 wks	<ul style="list-style-type: none"> • Induce/augment if no spontaneous labour within 24 hrs • Misoprostol if not contraindicated
PPROM (continued) 32 - 34 wks	<ul style="list-style-type: none"> • Steroids: dexamethasone 6 mg every 12 hrs BD x 4 doses. Nurse/midwife may give first dose if patient meets eligibility criteria Send amniotic fluid to evaluate fetal lung maturity (FLM) if available • If L:S \geq 2 or result indicates FLM, then deliver immediately • If results indicate immaturity or FLM is unknown, then treat with steroids and oral antibiotics and deliver at 35 wks gestation
PPROM (continued) 28 - 31 wks	<ul style="list-style-type: none"> • Expectant management • Steroids: dexamethasone 6 mg every 12 hrs BD x 4 doses • Minimise mobility; encourage leg exercises and/or anti-embolic measures • Treat with steroids and oral antibiotics and deliver at 35 wks gestation • Send FBC upon admission and repeat if indicated
PPROM (continued) < 28 wks	<ul style="list-style-type: none"> • Consultant input strongly recommended • Determine GA to provide a realistic appraisal of outcomes • If GA 26-27 wks, then dexamethasone 6 mg every 12 hrs BD x 4 doses • Options include: <ul style="list-style-type: none"> ○ Labour induction with high dose IV oxytocin and/or oral or vaginal misoprostol ○ D&E after cervical ripening with misoprostol 400 mcg PV 3 hrs or SL 2-3 hrs before procedure ○ Conservative management with: close monitoring for infection, labour or placental abruption, strict pelvic rest, modified bed rest with bathroom privileges, serial US, and oral antibiotics

Topic or GA	Plan
	for latency.
Outpatient care ONLY for very compliant patient with PPROM who understands risks	<ul style="list-style-type: none"> • Consultant input required • Discharge can be considered if there are no signs of labour and in-patient observations are satisfactory after 1 week • Strict pelvic rest (no coitus) • Check maternal temperature twice daily; return for T \geq 38 • Attend the Antenatal Day Unit or Labour Ward for FBC and CTG twice weekly • Attend antenatal care clinic B02 weekly • HVS for any alteration in vaginal loss • Review signs & symptoms of chorioamnionitis with patient and advise her to return for any concerns
Chorioamnionitis**	<ul style="list-style-type: none"> • Ampicillin 2 g IV every 6 hrs until 48 hrs afebrile • Gentamicin 80 mg IV every 8 hrs until 48 hrs afebrile • Metronidazole 500 mg IV every 8 hrs until 48 hrs afebrile, start after delivery

*WBC is elevated in pregnancy and up to 7 days after antenatal corticosteroids (i.e. dexamethasone)

† May substitute erythromycin for 7 days with azithromycin 1 g PO once

‡ if possible, start preferably with ampicillin 2 g IV every 6 hours for 48 hours plus amoxicillin for 5 days

**Signs of chorioamnionitis include: maternal tachycardia, maternal fever, abdominal tenderness, foul vaginal discharge, and WBC > 16,000

Quality Indicator % of patients with PPROM for whom oral antibiotics are prescribed for 7 days per drug chart

Preterm Labour and Delivery

Protocol & Guideline Number B21, February 2014

Introduction/Definition

Preterm labour is defined as contractions that cause cervical dilation at < 37 wks gestation. It complicates 10-12% of all pregnancies and is associated with significant neonatal morbidity and mortality, especially at 24-34 wks gestation.

Diagnosis

History Risk factors include multiple gestation, polyhydramnios; acute local or systemic inflammation (i.e. appendicitis), UTI and/or pyelonephritis, STIs; vaginal bleeding, placental abruption; uterine anomalies, incompetent cervix; previous preterm delivery; tobacco and illegal drug use, lower socioeconomic status, extremes of age, poor nutrition and poor antenatal care

Exam Cervical dilation with effacement on VE

Investigations TVUS for cervical length (short cervix \leq 2.5 cm)

Management

Prevention of preterm labour and delivery

- Screen and treat asymptomatic bacteriuria
- If previous preterm delivery and current singleton gestation, then treat with 17 α -hydroxyprogesterone caproate 250 mg IM every week at 16-36 wks gestation if available
- Interventions with inconsistent evidence: treatment of asymptomatic bacterial vaginosis, cervical cerclage

Established preterm labour

- Open partograph and monitor fetal heart rate and contractions
- IV line with NS at maintenance rate
- Send investigations if available: FBC, urinalysis, urine culture, rectovaginal cultures for GBS, cervical culture for GC and chlamydia, wet prep for trichomonas and bacterial vaginosis
- US for presentation, amniotic fluid index (AFI), placental location, EFW, EGA and anatomy
- Group B streptococcus prophylaxis
 - Obtain rectovaginal cultures (results are valid for 5 wks) if available

- Treat with penicillin IV (erythromycin if allergy to penicillin)
- If cultures are negative, then stop penicillin
- Steroids for decreased risk of respiratory distress syndrome (RDS), necrotizing enterocolitis (NEC) and intraventricular haemorrhage (IVH)
 - Treat at 26-34 wks gestation unless fetal lung maturity is confirmed
 - Betamethasone 12 mg IM every 24 hrs x 2 doses; or
 - Dexamethasone 6 mg IM every 12 hrs x 4 doses
- Give steroids even if delivery is expected within 24 hrs. Nurse/midwife may give first dose without doctor if patient meets eligibility criteria.
- Tocolytic medications to delay delivery for steroids: look at following table

Tocolytic medication	Contraindication	Maternal side effects	Fetal/neonatal side effects
Terbutaline 0.25 mg SC every 20-180 min (hold for maternal PR > 120 bpm)	Arrhythmias	Arrhythmias, pulmonary oedema, myocardial ischemia, hypotension, tachycardia	Tachycardia, hyperinsulin- emia, hyper- glycemia, myocardial and septal hypertrophy, myocardial ischemia
Magnesium sulphate 6 g /20 min load then 3 g/hr IV	Myasthenia gravis	Flushing, lethargy, headache, muscle weakness, diplopia, dry mouth, pulmonary oedema, cardiac arrest	Lethargy, hypotonia, respiratory depression, demineraliza- tion with prolonged use

Tocolytic medication	Contraindication	Maternal side effects	Fetal/neonatal side effects
Nifedipine 30 mg load then 10-20 mg PO s (hold for every 4-6 hr maternal BP < 90/50 mm Hg)	Cardiac disease, use caution with renal disease, do not use with magnesium	Flushing, headache, dizziness, nausea, transient hypotension, transient tachycardia, palpitations	Sudden fetal death, fetal distress
Indomethacin 50-100 mg load then 25-50mg PO every 6 hrs x 48 hrs	Significant renal or hepatic impairment	Nausea, heartburn	Constriction of ductus arteriosus, pulmonary HTN, reversible renal dysfunction with oligohydramnios, IVH, NEC, hyperbilirubemia

Adapted from: Hearne AE and Nagey DA, *Clin Obstet Gynecol* 2000.

- Delivery and neonatal care
 - Inform NICU so that neonatologist or paediatrician may attend delivery
 - Deliver with intact membranes if possible
 - Minimize trauma by easing out the head in second stage of labour
 - Forceps may be used to assist delivery; avoid vacuum extraction
 - Suction neonatal airway immediately, avoid hypothermia and transfer neonate to NICU as soon as possible
- Consider Caesarean delivery if breech presentation

Quality Indicator % of patients with preterm labour for whom tocolytics are prescribed for 48 hours per drug chart

Previous Caesarean Delivery

Protocol & Guideline Number B22, February 2014

Introduction/Definition

Pregnancies with previous caesarean delivery are at increased risk of uterine rupture, haemorrhage, and perinatal morbidity and mortality. Adverse outcomes coupled with anticipated litigation have led to routine preference of elective repeat caesarean deliveries. However, planned VBACs in women with one previous caesarean delivery can be successful and should be attempted at the UTH.

Diagnosis

History/Exam/Investigations Documentation of the previous caesarean delivery, especially indication and complications, and any subsequent vaginal delivery should be reviewed prior to deciding on vaginal birth after caesarean (VBAC) or elective repeat caesarean delivery

Management

Mode of delivery

- Counsel on mode of delivery during antenatal care visits. This decision is made jointly by the patient and the obstetrician before 36 wks gestation.

VBAC candidates	Repeat caesarean delivery candidates
Uncomplicated previous caesarean delivery	Transfundal caesarean delivery Contraindications to vaginal delivery
Complicated previous caesarean delivery (Consultant review) Previous diagnosis of CPD led to caesarean or instrumental delivery (Consultant review)	Obstetric fistula (current or repaired)

- Document the decision clearly in the medical file.
- If repeat caesarean delivery is chosen, then discuss and document the plan for the situation when labour starts prior to the scheduled date of surgery
- Review (with details of previous surgery) with Consultant if:

- VBAC is desired with complicated previous caesarean delivery with low transverse uterine incision
- Previous diagnosis of CPD led to caesarean or instrumental delivery

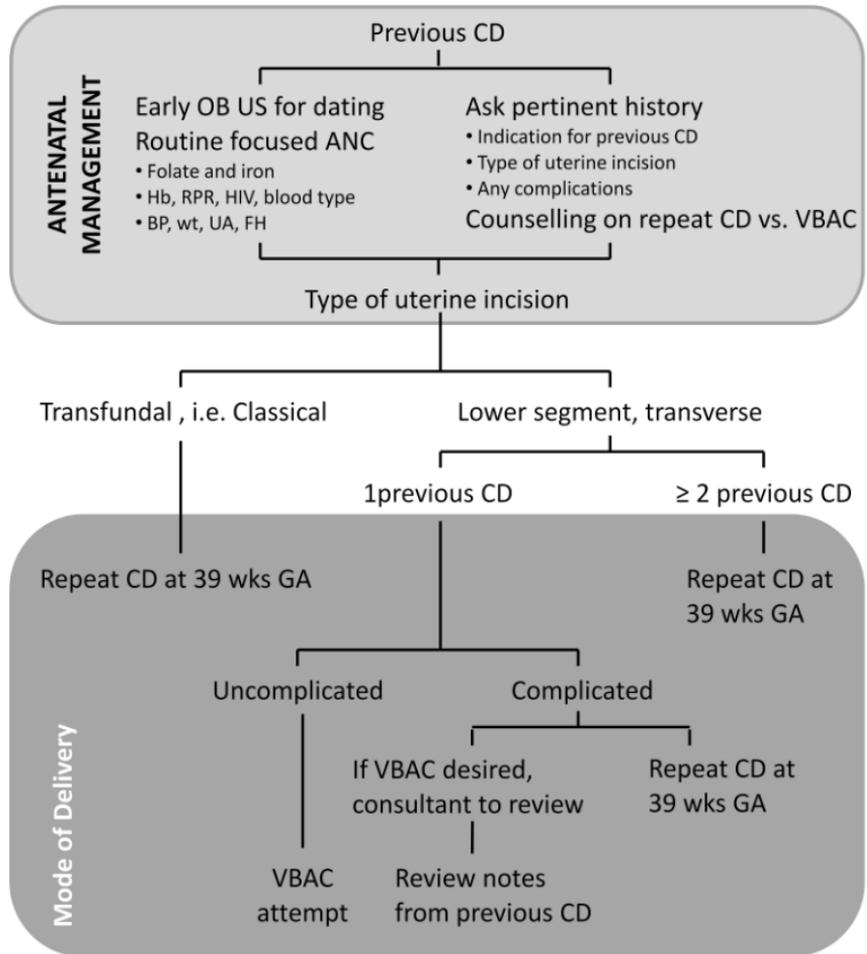
VBAC

- Send blood for group and save. Send blood for X-match if patient may be at higher risk for BT (i.e. ≥ 2 previous caesarean deliveries, baseline anaemia).
- Serial cervical assessments by the same person is preferred
- Delivery by obstetrician or experienced midwife
- Inform anaesthetist and neonatologist of possible emergencies
- If induction or augmentation of labour is needed, need input from Consultant or senior registrar
 - Inform woman of 2-3x increased risk of uterine rupture and 1.5x increased risk of caesarean delivery in cases of induced or augmented labour compared with spontaneous labour; document the discussion.
 - No misoprostol; ripen the cervix with Foley's catheter
 - AROM and oxytocin at 2 mU/min (maximum of 10 mU/min)

Elective repeat caesarean delivery

- Delivery by senior house officer if scheduled; if emergency, then delivery by registrar or above
- Send blood for X-match so that BT is readily available if needed

Management of the Patient with Previous Caesarean Delivery



Quality Indicator % of patients with previous caesarean delivery with documented discussion and clear decision regarding mode of delivery prior to 36 weeks gestation

Shoulder Dystocia

Protocol & Guideline Number B23, February 2014

Introduction/Definition

Shoulder dystocia is an obstetric emergency in which the anterior shoulder is impacted against the pubic symphysis and thus the shoulders and body of the infant fail to deliver after the head has delivered. Although previous history of shoulder dystocia, macrosomia, large fetus in a diabetic mother, postdates pregnancy and failure to progress in late first stage or in second stage are risk factors, shoulder dystocia cannot be predicted. Thus, the clinician should be prepared for shoulder dystocia at all deliveries.

Diagnosis

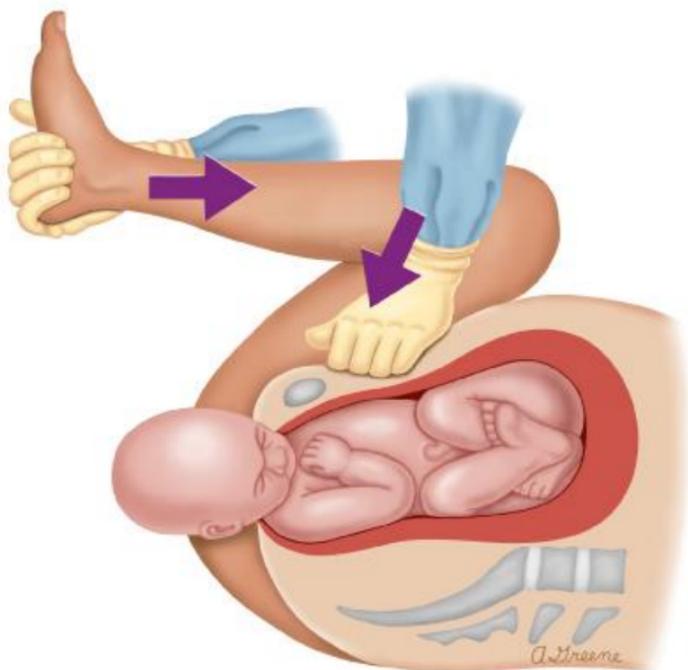
History/Exam/Investigations Retraction of the fetal head against the maternal perineum (turtle sign)

Management

- Call for help; at minimum registrar should be present
- Do not exert excess traction on the head or place fundal pressure
- Generous episiotomy
- Catheterization
- McRoberts manoeuvre = exaggerated flexion and abduction of maternal hips so that thighs are against the abdomen (patient can hold her legs)
- Suprapubic pressure = application of pressure using the palm or fist superior to the pubic symphysis in order to push the anterior shoulder downwards towards fetal chest
- Other methods if McRoberts manoeuvre and suprapubic pressure fail to relieve the shoulder dystocia:
 - Delivery of the posterior arm = flex elbow of posterior arm if needed, pull arm out of the vagina and deliver anterior shoulder; if not possible, then rotate fetus and deliver other arm
 - Woodscrew manoeuvre (reach for posterior shoulder) = 180 degree shoulder rotation of posterior shoulder (pressure on anterior clavicular surface) with delivery of posterior shoulder
 - Rubins manoeuvre = under adequate anaesthesia, rotate posterior shoulder anteriorly
 - Fracture clavicle by pulling clavicle outward

- Zavanelli manoeuvre = rotate head to OA position, flex head and push head cephalad into vagina; proceed with emergency caesarean delivery
- Symphysiotomy if caesarean delivery not possible
- Be cautious for risk of PPH
- If shoulder dystocia is anticipated, be proactive and prepare for assisted vaginal delivery and/or caesarean delivery

McRoberts maneuver and suprapubic pressure



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Quality Indicator % of patients with shoulder dystocia in which McRoberts manoeuvre and suprapubic pressure are recorded as the first steps taken

MEDICAL CONDITIONS IN PREGNANCY

Section C

Adnexal Mass in Pregnancy

Protocol & Guideline Number C1, February 2014

Introduction/Definition

Adnexal masses are not uncommon in pregnancy. During the first trimester, the corpus luteum of pregnancy may be palpated or detected on US; it is too frequently removed because of pain. The differential diagnosis also includes ectopic pregnancy, acute salpingitis or PID, ovarian tumour, uterine leiomyomata and acute appendicitis. Complications usually occur during the first trimester and range from rupture, torsion, and infarction to malignancy.

Diagnosis

History Abdominal pain, nausea/vomiting, abdominal swelling, +/- light PVB

Exam May be difficult to palpate on pelvic and/or abdominal exam
Investigations US

Management

- If mass < 5 cm, then most resolve without intervention. Treat symptoms.
- If mass 5-10 cm, then manage based on patient's age, US findings, etc. Consider close observation with US every 2 wks.
 - If mass increases in size, persists into the second trimester, and/or has malignant characteristics on US, then consider exploratory laparotomy
- If mass > 10 cm without symptoms
 - If first trimester, then observe closely with US every 2 wks for growth or complications
 - If second trimester, then perform exploratory laparotomy with removal
 - Discuss risks and benefits with patient
- If severe pain at any size, then perform emergency laparotomy for suspected torsion or rupture
- The optimal timing for exploratory laparotomy is 16-18 wks gestation. At > 20 wks gestation closely observe mass to avoid precipitating preterm labour (PTL).
- Send all surgical specimens for histopathology
 - If corpus luteum on histopathology and ≤ 7-12 wks gestation, then replace progesterone with appropriate dose

Anaemia in Pregnancy

Protocol & Guideline Number C2, February 2014

Introduction/Definition

Anaemia in pregnancy is defined as Hb < 11 g/dL (severe anaemia as Hb < 7 g/dL) at any gestational age. Iron deficiency is the most common aetiology, but consider other causes with severe anaemia.

Diagnosis

History Easy fatigability, headache, palpitations

Exam Pallor, tachycardia, +/- jaundice, +/- splenomegaly, +/- petechiae

Investigations Point-of-care Hb to determine severity immediately; malaria RDT (or peripheral smear), stool for ova and parasites, FBC if Hb < 8 g/dL

Management

- If Hb < 7 g/dL, especially if symptomatic, then BT
 - Transfuse rapidly if anaemia due to acute blood loss
 - Transfuse slowly and with diuretics if chronic anaemia (to reduce risk of congestive cardiac failure due to sudden circulatory overload)
- If Hb < 8 g/dL, then send blood for FBC and treat per FBC results (see table below)
 - If MCV < 80, then send blood for ferritin, TIBC and % saturation (% sat)
 - If MCV 80-93, then send blood for peripheral smear and reticulocyte count. Calculate reticulocyte index (RI)
$$RI = \text{retic count} \times (\text{patient's PCV} / \text{normal PCV}) / 2$$
 - If RI > 2-3%, then send blood for peripheral smear. Schistocytes indicate haemolysis.
 - If RI < 2-3%, then consider impaired production due to drugs (i.e. antiviral, immunosuppressive), chronic disease (i.e. renal), bone marrow problem or mild iron deficiency
 - If MCV \geq 94, then treat for folate or vitamin B12 deficiency
- If Hb > 8 g/dL, then treat with folate and FeSO₄ 200 mg PO BD and recheck Hb in 2-4 wks
- Treat with mebendazole
- Treat for malaria if indicated

- Mixed anaemia may occur and complicate laboratory findings
- If iron deficiency, then treat with elemental iron 200 mg PO BD-TDS. Titrate up to reduce side effects and encourage compliance. Take iron on empty stomach with vitamin C and without antacids.
- If folate deficiency, then treat with folate 0.5 mg PO OD
- If vitamin B12 deficiency, then treat with vitamin B12 1000 mg IM monthly
- If haemolytic anaemia, then send blood for direct and indirect Coombs tests. Treat with corticosteroids. Of note, drug-induced (i.e. methyldopa, penicillin, cephalosporin) haemolytic anaemia is typically milder and is treated by stopping the offending medication.

Disease	Laboratory results								
	MCV	MCH	MCHC	RDW	RI	Hb Electro	Ferritin	TIBC	% Sat
<i>Iron deficiency</i>	↓	↓	↓	↑	↓	AA; A2 < 3.5%	↓	↑	↓
<i>α-thal trait</i>	↓	↓	↔	↔	↓	AA; A2 < 3.5%	↔ or ↑	↓	↑
<i>β-thal trait</i>	↓	↓	↔	↔	↓	AA; A2 > 3.5%; F > 1%	↔ or ↑	↓	↑
<i>Hb S or Hb C trait</i>	↔	↔ or ↑	↔ or ↑	↔ or ↑	↑	AS or AC; A2 < 3.5%; F > 1%	↔ or ↑	↓	↑
<i>Haemolysis</i>	↔ or ↑	↔ or ↑	↔ or ↑	↑	↑	AA; A2 < 3.5%	↔ or ↑	↑	↔ or ↑
<i>B12 deficiency</i>	↑	↑	↔	↑	↓	AA; A2 < 3.5%	↔ or ↑	N/A	N/A
<i>Folate deficiency</i>	↑	↑	↔	↑	↓	AA; A2 < 3.5%	↔ or ↑	N/A	N/A

Aspirin Therapy in Pregnancy

Protocol & Guideline Number C3, February 2014

Introduction/Definition

Aspirin therapy is used for thromboprophylaxis in the reproductive-aged woman and for preeclampsia prophylaxis in the obstetric patient. With regard to obstetrics, 2 meta-analyses found 13-15% reduction in preeclampsia especially for high risk women, 8% reduction in preterm delivery (PTD), and 14% reduction in fetal or neonatal death.

Diagnosis History/Exam/Investigations

Evaluate for indications

- As thromboprophylaxis in the reproductive-aged woman
 - Prior myocardial infarction
 - Well documented prior cerebral thrombosis
 - DVT
- As preeclampsia prophylaxis in the pregnant woman
 - History of preeclampsia
 - Prior delivery of severe IUGR infant
 - Chronic hypertension
 - Renal disease
 - Connective tissue disease
 - Insulin-requiring diabetes
 - History of IUFD
 - Multiple gestation

Management

For patients at higher risk of preeclampsia, give aspirin 75 mg PO OD - BD at 12 wks gestation through 1 wk before expected delivery (to reduce risk of bleeding at delivery). Up to 150 mg/day of aspirin is safe for mother and fetus.

Asthma in Pregnancy

Protocol & Guideline Number C4, February 2014

Introduction/Definition

Asthma occurs when there is reversible bronchoconstriction. It is associated with increased risk of mortality, preeclampsia, preterm delivery (PTD) and LBW. Asthma is unpredictable in pregnancy: 1/3 of women report improvement, 1/3 remain the same, and 1/3 worsen.

Classification	Intermittent	Persistent		
		Mild	Moderate	Severe
Symptoms	≤ 2 days/wk	> 2 days/wk but not daily	Daily	Throughout the day
Night time awakenings	≤ 2 times/month	3-4 times/month	>1 time/week but not nightly	Often 7 times/week
Short-acting β_2 -agonist use for symptom control	≤ 2 days/wk	> 2 days/wk but not daily and not > 1 time on any day	Daily	Several times/day
Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
Lung function	<ul style="list-style-type: none"> • Normal FEV₁ between exacerbations • FEV₁ > 80% predicted • FEV₁/FVC normal 	<ul style="list-style-type: none"> • FEV₁ > 80% predicted • FEV₁/FVC normal 	<ul style="list-style-type: none"> • FEV₁ 60-79% predicted • FEV₁/FVC reduced by ≤ 5% 	<ul style="list-style-type: none"> • FEV₁ < 60% predicted • FEV₁/FVC reduced by > 5%

Diagnosis

History/ Exam Trigger (often viral), chest tightness, shortness of breath; cough, wheezing, decreased pulse ox

Investigations Peak flow meter or spirometry, pulse ox

Management

- Antenatal clinic visit monthly if on regular meds
- Peak flow meter BD (first thing in the morning and 12 hrs later)
- Avoid allergens and tobacco
- For intermittent asthma: manage as low-risk (unless patient presents with acute and/or severe exacerbation - see below)
- For mild - moderate persistent asthma: salbutamol inhaler 1-2 puffs TDS or corticosteroid inhaler (i.e. beclomethasone, budesonide)
- For acute and/or severe exacerbations:
 - Admit to SOU
 - O₂ therapy
 - IV fluids
 - Sit up
 - Continuous fetal monitoring
 - Salbutamol inhaler 1-2 puffs every 4 hrs as needed
 - Aminophylline 750 mg in 1 litre NS IV over 8 hours, usually for maximum of 24 hrs
 - Systemic steroids (i.e. hydrocortisone or prednisone IV) for up to 5-7 days
- Misoprostol if induction of labour indicated
- Oxytocin if PPH

Cardiac Disease in Pregnancy

Protocol & Guideline Number C5, February 2014

Introduction

Women with cardiac disease are at increased risk of maternal morbidity and mortality. Valvular heart disease in Zambia is often due to rheumatic fever.

Cardiac disease	Definition and/or description
Aortic stenosis	<ul style="list-style-type: none">• Associated with left ventricular failure and syncope• Associated with arrhythmias, CCF, and sudden death• Avoid hypotension and fluid overload• Consider pre-conception valvular surgery
Atrial septal defect (ASD)	<ul style="list-style-type: none">• Rare complications unless pulmonary hypertension develops• May lead to atrial fibrillation and CCF
Coarctation of the aorta	<ul style="list-style-type: none">• Increased risk of CCF, bacterial endocarditis, and aortic rupture• Associated with cerebral aneurysm• Treat with bacterial endocarditis prophylaxis
Eisenmenger's syndrome	<ul style="list-style-type: none">• Develops when pulmonary arterial pressure > systemic BP leading to reversal of flow from right to left• Terminate pregnancy (50% risk of maternal mortality)
Marfan's syndrome	<ul style="list-style-type: none">• Autosomal dominant connective tissue disorder• Associated with aortic valve insufficiency, dissecting aneurysm, bacterial endocarditis, and MVP
Mitral regurgitation	<ul style="list-style-type: none">• Rare complications (i.e. CCF)• Treat with bacterial endocarditis prophylaxis
Mitral stenosis	<ul style="list-style-type: none">• Leads to pulmonary HTN and pulmonary oedema• Treat with diuretics and avoid fluid overload• Treat with beta-blocker to prevent tachycardia and subsequent pulmonary oedema

Cardiac disease	Definition and/or description
Mitral stenosis (continued)	<ul style="list-style-type: none"> • Associated with atrial fibrillation, VTE, and stroke • Epidural analgesia if available
Mitral valve prolapse	<ul style="list-style-type: none"> • Billowing of any portion of the mitral leaflets ≥ 2 mm above the annular plane in a long axis view on echocardiogram • Associated with non-ejection click (single or multiple) and murmur of mitral regurgitation
Patent ductus arteriosus (PDA)	<ul style="list-style-type: none"> • Pulmonary HTN +/- CCF if unrepaired • Avoid hypotension (i.e. narcotic epidural, prevent PPH) • Treat with bacterial endocarditis prophylaxis
Tetralogy of Fallot (TOF) (VSD, RVH, over-riding aorta)	<ul style="list-style-type: none"> • Avoid hypotension • Consider pre-conception surgery to improve prognosis (10% risk of maternal mortality)
Ventral septal defect (VSD)	<ul style="list-style-type: none"> • Pulmonary HTN develops if unrepaired • Associated with arrhythmias • High incidence of bacterial endocarditis

History Severe progressive dyspnoea, orthopnoea, paroxysmal nocturnal dyspnoea, haemoptysis, syncope with exertion, chest pain, palpitations, nocturnal cough, sudden reduction in ability to perform ordinary physical activity, increasing dyspnoea on exertion, and haemoptysis are associated with CCF

Exam Cyanosis, finger clubbing, systolic murmur > grade 3 of 6, diastolic murmur, cardiomegaly, sustained arrhythmias, loud P2; CCF: persistent basilar rales, oedema, tachycardia, increase in RR to > 24 breaths per minute

Investigations CXR (shielded) with minimal cardiomegaly, ECG, echocardiogram for accurate diagnosis, ABG for cyanosis if available

Management

- Preconception counselling for known cardiac disease in order to assess risk and optimize treatment (i.e. preconception surgery, family planning)

- Explain the cardiac anomaly to the patient and its impact on pregnancy, including up to 4% risk of infant with congenital heart disease
- Use the New York Heart Association Classification to determine the patient's functional capacity
 - Class I: no limit to physical activity
 - Class II: comfortable at rest, ordinary physical activity leads to discomfort
 - Class III: comfortable at rest, less than ordinary activity causes discomfort
 - Class IV: unable to perform any physical activity without discomfort
- Treat with anticoagulation if valve replacement
 - Switch to heparin in the first trimester due to teratogenicity of warfarin
 - Treat with warfarin at 16-36 wks gestation
 - Switch to heparin at > 36 wks gestation
 - Treat with warfarin during puerperium period

Antenatal management

- Antenatal care visits: regular visits with obstetrician and with cardiologist
 - Assess functional capacity
 - Screen for and prevent anaemia
 - Exclude complications (i.e. CCF, thrombosis)
 - Admit to antenatal ward for any complications
- Behavioural modifications: adequate rest, no smoking
- US for fetal anatomy (congenital heart disease) at 18-20 wks gestation
- Document clear labour plan in medical records
- Treat respiratory infections promptly
- Treat with antibiotics for any dental procedures
- Treat with warfarin and/or heparin if already on anticoagulation

Intrapartum management

- Admit to SOU for vaginal delivery (Caesarean delivery for obstetric indications only)
- Consult anaesthesiologist immediately so that he/she is aware of high risk patient
- Induce labour with misoprostol for obstetric indications only

- First stage of labour
 - Evaluation by doctor every ≤ 2 hours
 - Open partograph, monitor vitals every 30 min, and record fetal surveillance
 - Semi-recumbent position with lateral tilt
 - Minimize IV fluids
 - Treat with oxygen at 4-6 L/min as needed
 - Adequate analgesia with pethidine 100 mg IM or epidural if available
 - Treat with ampicillin 2 g IV every 6 hrs and gentamicin 80 mg every 8 hrs
- Second stage of labour: assist delivery with vacuum or forceps
- Third stage of labour
 - AMTSL with oxytocin 10 IU IM (no ergometrine)
 - Treat with frusemide 80 mg IV STAT after delivery

Postnatal management

- Avoid PPH, anaemia, sepsis, VTE, development of CCF
- Keep in SOU for minimum 24 hrs after delivery if no complications
- Keep in postnatal ward at least 48 hrs to monitor for complications
- For patients on anticoagulation, start heparin 6-12 hrs after vaginal delivery or 12-24hrs after Caesarean delivery
- Inform paediatrician of maternal history of cardiac disease so that newborn is evaluated for congenital heart disease (i.e. examination, echocardiogram)
- Contraception: consider surgical sterilization for life-threatening cardiac disease, may need to avoid oestrogen +/- progesterone
- Review mother and infant at UTH B02 clinic at 6 days and 6 wks postnatal

Chronic Renal Disease in Pregnancy

Protocol & Guideline Number C6, February 2014

Introduction/Definition

Pregnancy may negatively impact chronic renal disease so that proteinuria and hypertension worsen, leading to maternal morbidity +/- IUFD or premature delivery (usually due to preeclampsia and IUGR) with neonatal morbidity. Creatinine > 132 $\mu\text{mol/L}$ and hypertension are the major risk factors for permanent exacerbation of chronic renal disease.

Diagnosis

History/Exam/Investigations Known history of renal disease with $\uparrow\text{Cr}$ and possibly anaemia of chronic disease

Management

Antenatal care

- First visit
 - Early US to confirm viable fetus and dating
 - Establish for baseline BP, proteinuria, FBC, ALT, Cr
 - Stop ACE inhibitor, angiotensin II receptor blockers, cyclophosphamide
 - Check urine culture and sensitivities to treat asymptomatic bacteriuria
- Revisits
 - Schedule every 2 wks until the third trimester (then every wk)
 - Check Cr at least every month
 - Check BP, proteinuria at every visit
 - Check FBC, ALT every trimester
 - Antenatal fetal surveillance with US and fetal heart rate monitoring starting at 28 wks gestation
 - Aggressive treatment of maternal hypertension
 - Induce delivery as indicated, no later than EDD

For patients on dialysis

- Keep BUN < 17 mmol/L by increasing dialysis frequency
- Correct metabolic acidosis and hypocalcaemia
- Monitor fetus during dialysis

For critical care management

- Consult physicians
- Includes strict input-output chart

Diabetes Mellitus and DKA in Pregnancy

Protocol & Guideline Number C7, February 2014

Introduction/Definition

Pregnant women with diabetes mellitus, whether gestational or pre-gestational, are at high risk for perinatal morbidity and mortality. A1 refers to gestational diabetes that is controlled with diet and exercise, while A2 requires either oral medication or insulin. If a pregnant woman is diagnosed with overt diabetes requiring treatment at < 20 wks gestation, she has pre-gestational diabetes (class B). White's classification of pre-gestational diabetes is shown in the following table:

Class	Age of onset	Duration	Vascular Disease
B	>20 yo	<10 yrs	None
C	10 - 19 yo	10-19 yrs	None
D	< 10 yo	> 20 yrs	Benign retinopathy
F	Any	Any	Diabetic nephropathy
R	Any	Any	Proliferative retinopathy
H	Any	Any	Ischemic heart disease
T	Any	Any	Renal transplant

Diagnosis

History Risk factors include family history of diabetes, diabetes in previous pregnancy, previous IUDF, previous macrosomic (> 4000g) infant, BMI > 30 kg/m²

Exam/ Investigations

- Send blood for fasting blood sugar (FBS) or random blood sugar (RBS)
 - FBS > 7.0 mmol/L is suspicious for diabetes
 - FBS > 7.0 x 2 or FBS > 11.0 mmol/L confirms diabetes; no oral glucose tolerance test (OGTT) needed
 - RBS > 11.1 mmol/L is suspicious for diabetes
- Send blood for OGTT at 24-28 wks gestation
 - Procedure: FBS is drawn, woman drinks 75 g glucose load and serum glucose is drawn 1 hr and 2 hrs later
 - Abnormal values: FBS > 5.1 mmol/L, 1 hour blood sugar (BS) > 10.0, 2 hour BS > 8.5

Management

Gestational diabetes

- Initial management: trial of diet and exercise for 2-4 wks

- Nutrition counselling
- Send blood for FBS or check FBS with glucometer twice weekly
- Treat with oral hypoglycaemic for FBS > 8 mmol/L x 2 or more
- Medication-based management
 - Glyburide 2.5 mg PO BD, increase weekly to maximum 20mg daily; consider glibenclamide per RCOG
 - Send blood for FBS or check FBS with glucometer twice weekly
 - Switch to insulin for persistent FBS > 8 mmol/L
- Refer to medicine clinic at 12 wks postnatal due to increased risk of long-term diabetes

Insulin-requiring diabetes (gestational and pre-gestational)

- For pre-gestational diabetics, continue pre-pregnancy regimen if blood sugar is controlled

Insulin	Onset of action	Peak of action	Duration of action
Soluble (short-acting)	15 - 30 min	2.5 - 5 hrs	8 hrs
Long-acting	2 - 5 hrs	8 - 10 hrs	10 - 16 hrs

- For women who never used a glucometer before, consider inpatient admission for diabetic education and glucose control
- Antenatal care visits: every two wks until 30 wks gestation then weekly until delivered
- American Diabetic Association diet at 30-35 kcal/kg/day; increase calories for normoglycemic ketonuria
- Patient logbook to self-record daily insulin dosages and daily blood glucose levels at 07hrs, 11hrs, 16hrs and 21hrs
- Initial insulin is calculated based on maternal weight
 - In first trimester, total daily dose = weight x 0.7 unit
 - In second trimester, total daily dose = weight x 0.8 unit
 - In third trimester, total daily dose = weight x 0.9-1.0 unit
 - Given as 2/3 of total daily dose in the morning at breakfast: 1/3 as soluble insulin and 2/3 as long-acting insulin

- Given as 1/3 of total daily dose in the evening at dinner (17hrs): 1/2 as soluble insulin and 1/2 as long-acting insulin
- For example, for weight of 72 kg in third trimester, give 16 units soluble insulin and 32 units long-acting insulin at breakfast and 12 units soluble insulin and 12 units long-acting insulin at dinner
- Goal blood glucose levels: FBS < 6 mmol/L, other BS 6-8 mmol/L
- How to adjust insulin to achieve goal blood glucose levels
 - 1 unit of insulin changes the corresponding blood glucose by 1 mmol/L
 - See tables below for guidance

FBS	Adjust dose	Other BS	Adjust dose
< 4	Decrease by 4 units	< 4	Decrease by 4 units
4-5.9	No change	4-5.9	Decrease by 2 units
6-7.9	Increase by 2 units	6-7.9	No change
8-10.9	Increase by 4 units, recheck FBS in 2 days, consider inpatient admission	8-9.4	Increase by 2 units
		9.5-11	Increase by 4 units, recheck BS in 2 days, consider inpatient admission
≥ 11	Inpatient admission	>11	Inpatient admission

Time of BS	Insulin to adjust
07hrs	PM long-acting
11hrs	AM soluble
16hrs	AM long-acting
21hrs	PM soluble

Pre-gestational diabetes

- Comprehensive US at 18-20 wks gestation for fetal structural defects
- Baseline maternal ophthalmology exam for diabetic retinopathy

- Baseline serum creatinine for diabetic nephropathy renal disease
- Send urine mcs every trimester
- Fetal surveillance (kick counts and/or biophysical profile (BPP) weekly) at 34 wks gestation until delivery
 - Start at 28 wks gestation for Class D and higher, IUGR or coexistent hypertension (HTN)
- Intrapartum management
 - No specific treatment if labour progresses normally and quickly
 - For induction or prolonged labour: add 1/3 of her daily insulin as soluble insulin to 1 L of DNS and treat at 40 dpm
 - For Caesarean: skip AM insulin, start DNS
 - Place oxytocin in separate bag of NS fluid using separate IV access
- Delivery
 - At 39 wks gestation for women with well-controlled blood sugars and no vascular disease
 - At earlier gestation for Class D and higher, polyhydramnios, macrosomia, poor blood glucose control, chronic HTN on medication or IUGR
 - Caesarean delivery for EFW > 4500g on US

Postnatal period (insulin needs drop rapidly)

- Breastfeed infant early and notify paediatricians of maternal diabetes
- Use insulin sliding scale for 5 days post vaginal delivery and then resume pre-pregnancy regimen
- Treat with DNS at 3L daily post Caesarean delivery until tolerating PO and then use insulin sliding scale
- Insulin sliding scale based on blood glucose drawn 1 hr after meals

Blood glucose	Insulin
0-5 mmol/L	None
5-8 mmol/L	4 units soluble
8-12 mmol/L	8 units soluble
12-16 mmol/L	12 units soluble
16-20 mmol/L	16 units soluble

Diabetic ketoacidosis

Introduction/Definition

Diabetic ketoacidosis is a very severe condition that requires prompt diagnosis and treatment to avoid morbidity and mortality.

Diagnosis

History Presents with nausea and vomiting, thirst, polyuria, polydipsia, altered mental status, either known history of diabetes or not

Exam Tachycardia, tachypnoea, fruity breath (due to ketones)

Investigations

- Point-of-care urinalysis for ketones and/or leukocytes
- Check RBS every 1-2 hours if possible
- Send blood for FBC with differential
- Send urine mcs

Management

Based on reducing blood glucose in controlled manner: see table below.

Timing	Treatment	Insulin	Electrolytes
On admission	NS 1L over 30 min	Soluble insulin 20 units IV* STAT followed by soluble insulin 12-20 units IM every 2 hours	• Add 20 mmol KCl to first litre of NS • Monitor K and anion gap every 1-2 hours until stable if available
Next 2 hours	NS 1L over 1 hour x 2 L		
Next 4 hours	NS ½ L over hour x 2 L		
RBS < 12 mmol/L	DNS	Insulin sliding scale	

*If no IV line, insulin IM is acceptable but not optimal

Headache in Pregnancy

Protocol & Guideline Number C8, February 2014

Introduction/Definition

Headaches are common in reproductive-age women and thus are common in pregnancy. More than 90% of headaches are migraine headaches or tension-type headaches, but more serious aetiologies should be considered, such as preeclampsia, eclampsia, cerebrovascular haemorrhage or thrombosis, intracranial mass and meningitis.

Diagnosis

History Gestational age (consider preeclampsia/eclampsia if gestational age > 20 wks), triggers, alleviating factors, location, chronic headaches (prior to pregnancy) vs. new onset vs. increased severity, any underlying depression

Exam Fever (infectious aetiologies), focal vs. generalized neurologic signs

Investigations CT or MRI of head if focal neurologic signs, LP and EEG if indicated (safe in pregnancy)

Management (depends on aetiology)

First line therapy

- Paracetamol 1000 mg PO x 1 for pain
- Oxygen and subcutaneous sumatriptan if cluster headache
- Hydralazine IV, MgSO₄ IM and delivery if preeclampsia/eclampsia

Alternative therapy

- NSAIDs for < 48 hrs in second/third trimester
- Short course of combination therapy, such as paracetamol with metoclopramide 10 mg
- Sumatriptan if migraine headache

Hepatitis B Virus in Pregnancy

Protocol & Guideline Number C9, February 2014

Introduction/ Definition

Pregnant women who are actively infected with hepatitis B virus (HBV) may transmit HBV to their offspring (10-20% of HBsAg-positive women and 90% of HBsAg/HBeAg- positive women). Vertically acquired HBV can result in a chronic carrier state in up to 90% of infected infants with progression to cirrhosis and/or hepatic carcinoma.

Diagnosis

History/Exam/Investigations Send blood for hepatitis B surface antigen (HBsAg) in all pregnant women

Management

For susceptible pregnant patient

Give vaccine before or during pregnancy

For known HBV exposure in susceptible patient

If known HBV exposure, then Immunoprophylaxis with hepatitis B immunoglobulin (HBIG) if available and vaccine

For HBsAg-positive women

- Send blood for expanded hepatitis B serology and ALT to evaluate for active HBV infection
 - No specific antiviral treatment available for acute HBV infection; 90-95% of adults will recover spontaneously and develop immunity
 - Consult physician regarding lamivudine for chronic HBV infection
- Prevent neonatal infection (85-95% effective): give HBIG and vaccine (1st in series of 3 injections) to newborn within 12 hrs of birth; alert paediatricians

Quality Indicator % of pregnant patients with HBsAg test results

HIV in Pregnancy and PMTCT/EMTCT

Protocol & Guideline Number C10, February 2014

Introduction/Definition

HIV affects up to 20% of pregnancies in Lusaka District. Without any intervention, MTCT is as high as 45%. With efficacious combination antiretroviral therapy (ART), this risk decreases to 1-5%.

Diagnosis

History/Exam Regardless of risk factors, all pregnant and breastfeeding women should be offered HIV testing in an opt-out approach.

Investigations Point-of-care HIV testing should be offered to all HIV-negative women at 3-month intervals during the antenatal and breastfeeding periods. In addition, HIV testing should be repeated in HIV-negative women: (1) in labour ward if their last test was over 6 weeks ago and (2) at the 6 week postnatal visit.

Management

- All HIV-infected pregnant and breastfeeding women should be on ART
- Start ART (for lifetime) when ready, ideally on same day as diagnosis
- TDF/XTC/EFV is first line therapy (XTC = FTC or 3TC)
- Start cotrimoxazole in all HIV-infected pregnant women, regardless of CD4 count, WHO stage or gestational age. Do not give sulfadoxine-pyrimethamine (e.g. Fansidar). For breastfeeding women, initiate or continue cotrimoxazole if CD4 count <350 cells/mm³ or WHO stage 2, 3 or 4.
- Laboratory tests at the following time points
 - At baseline: Cr, FBC, ALT, HBsAg, syphilis test, CD4 count, urinalysis
 - At 2 and 4 wks after initiation and every focused ANC visit: Cr, urinalysis
 - Every 6 mos during antenatal and breastfeeding period: HIV RNA PCR (viral load)
 - Follow Adult ART guidelines for other laboratory monitoring during postnatal period
- Vaginal delivery unless
 - Viral load $> 1,000$ copies/ml at ≥ 34 wks gestation
 - ART for $< 4-12$ wks and CD4 < 350
 - Obstetric indications for caesarean delivery

- Breastfeeding is encouraged unless formula is affordable, feasible, acceptable, sustainable, safe (AFASS)
- Continue ART during labour and delivery and for life
- NVP syrup for infant for 6 wks (dose based on infant weight)
- Cotrimoxazole syrup for infant starting at 6 wks until final HIV testing results return as negative

Quality Indicator % of newly diagnosed HIV-infected pregnant patients starting ART within 2 weeks of diagnosis

Herpes Simplex Virus in Pregnancy

Protocol & Guideline Number C11, February 2014

Introduction/Definition

Although its incidence is 1 in 2500 to 1 in 20,000 live births, neonatal herpes simplex virus (HSV) infection is associated with a case fatality rate as high as 50-60%, with 50% of survivors suffering severe neurologic sequelae. Neonatal HSV infection results from in utero transmission (5% of cases); contact with infected maternal genital secretions at delivery (85%); and postnatal transmission (10%).

Diagnosis

History/Exam Classic presentation of small, very painful vesicular lesions, but suspect for any vesicular or ulcerative genital lesions with or without pain; prior history of HSV is not always elicited

Investigations Tzanck prep (of secretions)

Management

Indication	Acyclovir (oral tablets)
First clinical episode	200 mg 5x daily for 7-14 days or 400 mg TDS for 7-14 days
Recurrent episode(s)	200 mg 5x daily for 5 days or 400 mg TDS for 5 days
History of HSV (daily suppressive therapy)	400 mg BD at \geq 36 wks gestation until delivery

- Active lesions: treat with oral acyclovir, topical lidocaine and sitz baths
- Active lesions and PPROM: expectant management because the risks of prematurity often outweigh the risks of neonatal HSV infection; treat with oral acyclovir
- Disseminated HSV or HSV-related pneumonitis, hepatitis, and/or encephalitis: treat with acyclovir IV
- Mode of delivery
 - Vaginal delivery if there are no active genital lesions or prodromal symptoms
 - Caesarean delivery if there are active genital lesions or prodromal symptoms even if membranes are ruptured
 - Vaginal delivery with lesions covered if there are non-genital lesions (i.e. on the thighs)
- Infant and infected mother can be together

- Counsel on hand washing and hygiene techniques to prevent postnatal transmission
- Breastfeeding is contraindicated only for breast lesion(s)

Kaposi Sarcoma in Pregnancy

Protocol & Guideline Number C12, February 2014

Introduction/Definition

Kaposi's sarcoma is a low-grade vascular tumour associated with human herpesvirus 8 (HHV-8). KS is a WHO Stage IV illness.

Diagnosis

History/Exam Papular lesions found on lower extremities, face, oral mucosa or soles of feet; assorted colours due to vascularity; lymphoedema (clinical diagnosis)

Investigations HIV test with CD4⁺ cell count and FBC, Cr, AST for antiretroviral therapy (ART) initiation; skin biopsy can be done if needed

Management

- All patients with KS are eligible for ART regardless of CD4⁺ cell count
 - ART prevents new KS lesions
 - ART may induce immune reconstitution inflammatory syndrome (IRIS)
- Chemotherapy is indicated in patients with
 - KS lesions > 25 in number
 - Extensive oedema
 - Symptomatic visceral involvement
 - IRIS
 - Need to weigh risks and benefits to decide whether to deliver and start chemotherapy vs. start chemotherapy while still pregnant

Pruritic Disease and Skin Disorders in Pregnancy

Protocol & Guideline Number C13, February 2014

Introduction/Definition

The following skin disorders are limited to pregnancy and the puerperal period: pruritic urticarial papules and plaques of pregnancy (PUPPP), pemphigoid gestationis, atopic eruption of pregnancy (includes eczema in pregnancy, pruritic folliculitis of pregnancy, prurigo of pregnancy), pustular psoriasis of pregnancy and intrahepatic cholestasis of pregnancy. Differential diagnosis includes: infections, dermatitis herpetiformis, erythema multiforme, contact dermatitis and drug reactions.

Diagnosis

History/Exam/Investigations

- Pemphigoid gestationis: periumbilical blisters, onset usually second/third trimester or postnatal, rarely on face and mucosal membranes; consider skin biopsy for histopathology
- PUPPP: erythematous papules within striae spread to extremities, very pruritic, onset usually third trimester or postnatal; no investigations needed
- Atopic eruption of pregnancy: no investigations needed
 - Eczema of pregnancy: ranges from eczematous patches to inflammatory papules, flexural distribution, onset usually first/second trimester
 - Prurigo of pregnancy: erythematous excoriated nodules or papules on extensor surfaces of trunk and extremities, onset second/third trimester
 - Pruritic folliculitis of pregnancy: follicular-based papules and pustules on trunk +/- extremities, onset second/third trimester; bacterial and fungal cultures to rule out infection
- Pustular psoriasis of pregnancy: erythematous plaques with rings of pustules, on trunk and extremities, usually not pruritic, vague systemic symptoms (malaise, anorexia, nausea, fever); consider skin biopsy for histopathology; bacterial and fungal cultures to rule out infection; check serum calcium because of risk for hypocalcaemia

- Intrahepatic cholestasis of pregnancy: severe generalized pruritis (especially palms and soles) without skin lesions; check bile acids

Management

For symptoms

- PUPPP, atopic eruption of pregnancy: low-medium potency topical corticosteroid ointment
- Pemphigoid gestationis: medium-high potency topical corticosteroid ointment, antihistamine PO, glucocorticoids PO (i.e. prednisone 0.5 mg/kg/day)
- Pustular psoriasis of pregnancy: prednisolone 80 mg PO OD and then taper
- Intrahepatic cholestasis of pregnancy: ursodeoxycholic acid 500 mg PO BD until delivery

For fetus

- Increased morbidity and mortality
 - IUGR and preterm delivery (PTD) in pemphigoid gestationis
 - IUGR and IUFD in pustular psoriasis of pregnancy
 - IUFD, PTD, meconium and neonatal respiratory distress in intrahepatic cholestasis of pregnancy
- Antenatal fetal assessment with biophysical profile (BPP) and/or non-stress test (NST)

Risk of recurrence

- Increased risk of recurrence in pemphigoid gestationis in subsequent pregnancies
- Increased risk of recurrence in pustular psoriasis of pregnancy in subsequent pregnancies, during menses and with use of OCPs

Sickle Cell Disease in Pregnancy

Protocol & Guideline Number C14, April 2014

Introduction/Definition

Sickle cell disease (HbSS) is associated with an increased risk of maternal and fetal complications, including transfusion, maternal infections, maternal death, eclampsia, IUGR, and PTD. Sickle cell disease is common in Zambia because of improved survival in those with asymptomatic sickle cell trait (HbAS).

Diagnosis

History/Exam Usually a childhood diagnosis because decreasing levels of fetal haemoglobin lead to symptoms

Investigations Screen with sickling test; confirm with haemoglobin electrophoresis

Management

Preconception management

- Multidisciplinary management of patient with physicians and haematologist to achieve optimal state of health before pregnancy is attempted
- Check that patient is not taking teratogenic medications
- Give folic acid 5 mg PO OD
- Vaccinations, i.e. hepatitis B and pneumococcal, should be up-to-date
- Counsel on the risks of sickle cell disease in pregnancy
- Genetic counselling and screening of the husband or partner
- Advise family planning for all women who do not want to be pregnant

Antenatal management

- Counsel to start antenatal care as early as possible, i.e. first trimester
- Advise to take 1-2 litres of fluids daily and to avoid precipitants of painful crisis, such as a cold environment, excessive exercise, and dehydration
- Manage mild pain with rest, oral fluids, and paracetamol or weak opioids. Use NSAIDs only at 12-28 wks GA and for a short duration.
- Collect blood for baseline FBC and U&Es
- Check urinalysis at every visit and urine culture monthly to screen for urinary tract infections

- Give medications
 - Folic acid
 - Anti-malarial medication
 - Penicillin prophylaxis (against infection with encapsulated bacteria)
 - Influenza vaccine, if available
 - Aspirin 75 mg PO OD from 12 wks GA (preeclampsia prophylaxis)
 - LMWH in case of antenatal admission
- Order monthly ultrasound scans to monitor fetal growth
- Offer anaesthetic assessment in the third trimester, if available

Management during labour and delivery

- Admit to a high dependency ward (i.e. Annex or SOU)
- Keep the patient warm
- Keep the patient well hydrated
- Give adequate analgesia with morphine; avoid pethidine because of the increased risk of seizures in those with sickle cell disease
- Continuous fetal monitoring, if possible
- Consider transfusion for Hb < 7 g/dl
- Practice active management of third stage of labour
- Caesarean delivery with regional analgesia for obstetric indications only

Postnatal management

- Keep in the hospital for minimum of 24 to 48 hrs after delivery
- Give medications
 - LMWH for 1 wk postnatal
 - Antibiotic prophylaxis for up to 1 wk postnatal
- Counsel on family planning, preferably progesterone only options, including injection and IUD
- Advocate for early diagnosis of sickle cell status for the newborn

Syphilis in Pregnancy

Protocol & Guideline Number C15, February 2014

Introduction/Definition

Syphilis is a STI that can be transmitted from mother to fetus. When a woman tests reactive for syphilis, all of her partners and the newborn should also be treated.

Stage of infection	Diagnosis	
	History/Exam	Investigations
Primary syphilis	Macule Painless hard ulcer	VDRL or TPHA or SYPHILIS TEST or FTA or WR or TPI
Secondary syphilis	Present 4-8 wks after chancre: lymphadenopathy, alopecia, fever, rash, malaise, uveitis, condylomata lata, hepatitis	As above Plus AST, ALT and serum albumin
Tertiary syphilis	Gummas in the skin, mucosa, bone and joints occur 2-20 years after latency	As above plus histopathology of gummas
Quaternary syphilis	Aneurysms, dementia, psychoses, tabes dorsalis	As above Plus MRI of brain

Stage of infection	Management
Primary syphilis	Benzathine penicillin G 2.4 MU IM once only <ul style="list-style-type: none"> If allergic to penicillin, then erythromycin 500 mg QID for 15 days
Secondary syphilis	<ul style="list-style-type: none"> If partner allergic to penicillin, then tetracycline 500 mg QID for 15 days or doxycycline 100mg BID for 15 days
Tertiary syphilis	Benzathine penicillin G 2.4 MU IM once weekly for 3 wks <ul style="list-style-type: none"> If allergic to penicillin, then erythromycin 500 mg QID for 30 days If partner allergic to penicillin, then tetracycline 500 mg QID for 30 days
Quaternary syphilis	<ul style="list-style-type: none"> Admit to inpatient ward Penicillin G 2-4 MU IV every 4 hrs for 10-14 days

Thromboprophylaxis in Pregnancy

Protocol & Guideline Number C16, February 2014

Introduction/Definition

Pregnancy is associated with an increased risk of thromboembolism. Prophylaxis is not recommended for all pregnant women, but those at higher risk should take preventive measures during the antenatal, intrapartum and/or postnatal period.

Diagnosis

History/Exam/Investigations Ask all pregnant patients about previous history of and current risk factors for thromboembolism. Risk factors include: age > 35 yrs, obesity (BMI ≥ 30 kg/m²), operative delivery, immobility, preeclampsia, parity > 4, surgical procedure in pregnancy or puerperium, previous history of DVT, excessive blood loss, positive thrombophilia screen, sickle cell disease, dehydration and/or paraplegia.

Management

Risk Category/ Indication	Antenatal and Intrapartum	Postnatal
Low risk Single episode of thromboembolism with no additional risk factors	Heparin 5000 IU SC BD or LMWH (Clexane) 20mg SC OD at delivery	Heparin or LMWH for 1 week then switch to warfarin for 5 wks
High risk Multiple episodes of thromboembolism or single episode with risk factor	Heparin 10000 IU SC BD or LMWH (Clexane) 40mg SC OD <ul style="list-style-type: none">• Start at 4-6 wks before gestational age at which previous thromboembolism occurred and continue through delivery	Heparin or LMWH for 1 week then switch to warfarin for 5 wks
Patients with prosthetic heart valves	Warfarin (goal INR of 3 to 4.5) up until 36 wks gestation then switch to heparin until delivery	Warfarin at pre-pregnancy dose for 1 week

Thyroid Disease in Pregnancy

Protocol & Guideline Number C17, February 2014

Introduction/Definition

Although thyroid disease in pregnancy is not common, it is associated with perinatal morbidity and mortality. Hyperthyroidism, when untreated or uncontrolled, is associated with spontaneous abortion, stillbirth, IUGR, preterm labour, preeclampsia and cardiomyopathy. Hyperthyroidism is usually due to Graves disease (thyroid-stimulating antibodies). Thyroid storm is a life-threatening emergency that is typically triggered by infection, surgery or labour. The most common aetiologies of hypothyroidism are Hashimoto thyroiditis, post ablation or thyroidectomy, primary atrophic hypothyroidism and iodine deficiency. Because maternal subclinical hypothyroidism has been associated with neuropsychological decrements in children, consider screening pregnant women with the following for thyroid disease: personal or family history of thyroid disease, signs/symptoms suggestive of goitre or hypothyroidism, type 1 diabetes and personal history of other autoimmune disorders.

Disease	Hypothyroidism	Hyperthyroidism	Thyroid Storm
Diagnosis			
<i>History/ Exam</i>	Fatigue, muscle cramps, hair loss, inability to concentrate, constipation and dyspnoea	Tachycardia, thyromegaly, failure to gain weight, heat intolerance, fatigue, palpitations and warm moist skin	Tachycardia >150 bpm, fever, altered mental status, diarrhoea, hypertension, nausea, vomiting, severe dehydration, and fetal tachycardia +/- high output cardiac failure and arrhythmia

Disease	Hypothyroidism	Hyperthyroidism	Thyroid Storm
<i>Investigations</i>	Increased TSH Decreased free T4 (fT4) Decreased FTI	Decreased TSH Increased fT4	Leukocytosis, electrolyte abnormalities (i.e. hypercalcaemia), elevated LFT, increased fT4 and fT3
Management	Goals of therapy <ul style="list-style-type: none"> • TSH at or slightly below normal • fT4 at the upper limit of normal <i>Pre-established hypothyroidism</i> <ul style="list-style-type: none"> • Levothyroxine daily dose usually increases in pregnancy • Send blood for fT4 and TSH every trimester so that dose can be changed to maintain goals of therapy; send blood more frequently (but ≥ 4 wks apart) if indicated 	<ul style="list-style-type: none"> • Start with PTU 100-150mg PO TDS until fT₄ is at upper limit of normal • Maintain with PTU 50-150mg PO OD • Stop PTU for jaundice, fever, chills, sore throat, petechiae or bleeding gums; switch to methimazole 5-10mg PO TDS • Send blood for fT4 or FTI every 4 wks throughout pregnancy • Follow every 1-2 wks; keep pulse < 100 and monitor weight gain • If indicated, then propranolol 10-40mg PO every 6-12 hours 	Manage in SOU or ICU

Disease	Hypothyroidism	Hyperthyroidism	Thyroid Storm
Management (continued)	<p><i>New diagnosis of hypothyroidism</i></p> <ul style="list-style-type: none"> • Start with levothyroxine 50-100 mcg PO OD and increase every 4 wks to achieve goals of therapy (most require 150-300 mcg PO OD) • Send blood for fT4 and TSH every 4 wks until goals of therapy are attained and then every 8-12 wks 	<ul style="list-style-type: none"> • For preterm labour, do not treat with beta-mimetics and use magnesium sulphate with caution due to possible volume overload and cardiomyopathy 	

Trauma in Pregnancy

Protocol & Guideline Number C18, February 2014

Introduction/Definition

Trauma is a leading cause of morbidity and mortality in reproductive-age women; pregnant women are not excluded.

Diagnosis

History/Exam/Investigations If trauma is reported, regardless of visible signs of injury, the patient and her fetus should be thoroughly evaluated.

Management

- Ensure safety of the woman first
- Check airway, breathing, circulation (ABC)
 - If airway is blocked, then foreign body removal
 - If upper airway is inflamed and cannot be relieved, then tracheotomy
 - If airway is patent, then check breathing
 - If breathing is compromised, then look for cause and treat accordingly
 - Involve general surgeons if operative management may be needed (i.e. ICD)
 - If breathing is compromised due to weakness of respiratory muscles, then intubation
 - Once breathing addressed, check circulation via BP and pulse rate (quality and rate)
 - Insert 2 large bore cannulae (i.e. 16G) for possible resuscitation
 - If shock, then give IV fluids to keep BP $\geq 100/60$ while waiting for blood products
 - Take blood for Hb and X-match for whole blood
- Catheterise a patient in haemorrhagic shock to monitor urine output
- Start fluid chart (strict ins and outs)
- Raised foot of bed to ensure adequate circulation to vital organs
- Look for other deformities and treat accordingly
- Confirm viability of fetus with US

Tuberculosis in Pregnancy

Protocol & Guideline Number C19, February 2014

Introduction/Definition

Caused by *Mycobacterium tuberculosis*, tuberculosis (TB) is an infection that typically attacks lungs (pulmonary TB, or PTB) but can affect any organ system.

Type of TB	Diagnosis		Management*
	History/Exam	Investigations	
PTB - new case, confirmed AFB positive	Productive cough, pleuritic chest pains, haemoptysis, bronchial breath sounds	Sputum AFB CXR	2 mos of HRZE followed by 4 mos of HR (2HRZE/4HR)
PTB - relapse or treatment failure	Same as above with a history of treatment	Sputum AFB Sputum c+s CXR	Consult physicians 2HRZES/ 1HRZE/5HR
MDR PTB	Same as above with patient currently on treatment	Sputum AFB Sputum c+s CXR	Consult physicians
Spine	Back pain, psoas abscess, spinal cord compression, gibbus	Plain x-ray Tissue biopsy of spinal tissue	Consult physicians 2HRZE/4HR
Bone	Chronic osteomyelitis	Bone biopsy	
Peripheral joints	Monoarthritis	Plain x-ray Synovial biopsy	
GI	Abdominal mass, diarrhoea	Barium x-ray	
Liver	RUQ pain and mass	US Biopsy	

*Isoniazid = H, Rifampin = R, Pyrazinamide = Z, Ethambutol = E, Streptomycin = S

Type of TB	Diagnosis		Management*
	History/Exam	Investigations	
Renal and urinary tract	Urinary frequency, dysuria, haematuria, loin pain/swelling	Urine culture IVP US	Consult physicians 2HRZE/4HR
Adrenal gland	Hypotension	Plain x-ray US Serum sodium, urea, glucose	
Female genital tract	Infertility, PID, ectopic pregnancy	US Tissue biopsy Pelvic x-ray	
Meningitis	Focal neurological symptoms, seizures	CSF mcs Biochemistry CT or MRI	2HRZE/4HR Dexamethasone

*Isoniazid = H, Rifampin = R, Pyrazinamide = Z, Ethambutol = E, Streptomycin = S

Urinary Tract Infection and Pyelonephritis in Pregnancy

Protocol & Guideline Number C20, February 2014

Introduction/Definition

Urinary tract infection (UTI) and progression to pyelonephritis is a common complication in pregnancy due to untreated asymptomatic bacteriuria. UTI is defined as $\geq 100,000$ organisms/ml if asymptomatic or >100 orgs/ml with pyuria (>7 WBCs/ml) if symptomatic.

Diagnosis

History/Exam Dysuria, increased frequency and urgency, retropubic/suprapubic pain, abdominal pain

For acute pyelonephritis, spiking fevers or chills, loin pain or tenderness, rib cage tenderness, anorexia, nausea and vomiting

Investigations Urinalysis, urine mcs (clean-catch, midstream sample)

Management

Acute cystitis (infection limited to the bladder)

- Nitrofurantoin 100 mg PO BD x 7 days* (2nd choice is cefuroxime or cefalexin)
- Check urine culture and sensitivities if available. Adjust antibiotics as indicated, especially if first-line treatment fails.
- If UTI recurs, then check urine culture and sensitivities. Adjust antibiotics.

Acute pyelonephritis (infection of upper tract, mainly of renal pelvis +/- parenchyma)

- Ceftriaxone 2 g IV every 24 hrs; if none, benzyl penicillin 5 MU IV and then 2.5 MU every 6 hrs and gentamicin 5 mg/kg x body weight IV every 24 hrs*
- Check urine culture and sensitivities if available prior to starting antibiotics.
 - Adjust treatment according to results. If no clinical response within 72 hrs, then re-evaluate results and antibiotic coverage.
 - If unavailable, then antibiotics until afebrile for 48 hrs. Change to cephalosporin if no clinical response within 72 hrs.

- Once afebrile, switch to oral antibiotics for total of 14 days
- PO or IV hydration
- Paracetamol 500 mg PO for pain and fever

Prophylaxis to prevent future UTIs

- Prophylactic nitrofurantoin 100 mg PO OD* until 2 wks postnatal
- Indications: acute cystitis, pyelonephritis, recurrent or persistent asymptomatic bacteriuria

*Due to > 80% resistance to amoxicillin and ampicillin, per Dept of Microbiology (2013). Switch according to patient-specific sensitivity results.

Varicella Zoster Virus in Pregnancy

Protocol & Guideline Number C21, February 2014

Introduction/Definition

Highly contagious, varicella zoster virus (VZV) is transmitted through the air, by direct contact and by indirect contact. The most infectious period spans from 48 hours before rash appears until vesicles have crusted over, which is 5-7 days after onset of rash. Primary VZV infection in pregnancy is associated with pneumonia, hepatitis, encephalitis and maternal mortality. It results in increased risk of spontaneous abortion and in fetal varicella syndrome at ≤ 28 wks gestation in 1-2% of cases.

Diagnosis

History/Exam Fever, malaise, pruritic maculopapular rash (clinical diagnosis)

Investigations Send VZV IgG only if needed. US findings suggestive of fetal varicella syndrome include: hydrops, hyperechogenic foci in the liver and bowel, cardiac malformations, limb deformities, microcephaly, and/or IUGR.

Management

For pregnant women with VZV infection

- Any suspicious rash should be seen immediately
- Avoid contact with susceptible individuals for 5-7 days after onset of rash
- Treat symptoms and practice clean hygiene
- Treat with acyclovir 800 mg oral 5x daily for 7 days if ≥ 20 wks gestation and rash < 24 hrs
- Postpone delivery until 5-7 days after onset of rash, even at term
- For the infant born to a woman with VZV
 - Neonatal ophthalmic exam soon after birth
 - Send VZV IgM soon after birth and VZV IgG at 7 months old
 - Treat with varicella zoster immunoglobulin (VZIG) if birth and onset of maternal rash occur within 7 days of each other
 - Monitor for infection until 28 days after the onset of maternal rash; treat neonatal infection with acyclovir

For susceptible pregnant women with known exposure

Send blood for VZV IgG. If significant exposure and seronegative for VZV IgG, treat with VZIG within 10 days of contact and manage as infectious for 8-28 days after.

For women susceptible to VZV infection

- Vaccinate women preconception or postnatal if no history of chickenpox
- If pregnant and seronegative for VZV IgG, then woman should avoid contact with anyone with an active VZV infection; if exposure occurs, then she should report immediately to the health facility

Quality Indicator % of pregnant women with rash who see doctor within 30 minutes of presenting

GYNAECOLOGY & GENERAL MEDICAL CONDITIONS

Section D

Abortion

Protocol & Guideline Number D1, February 2014

Introduction

An abortion is any pregnancy loss before 24 wks gestation, the age of viability in Zambia.

Definition	Diagnosis <i>History/Exam</i>	Investigations	Management
Inevitable	<ul style="list-style-type: none">• Profuse PVB or draining• Crampy pelvic pain• Open cervix• Uterine size = GA	<ul style="list-style-type: none">• Hb• Group & save*	<ul style="list-style-type: none">• For < 14 wks gestation<ul style="list-style-type: none">○ MVA with analgesia○ Doxycycline 100 mg PO OD and metronidazole 400 mg PO BD for 48 hrs total• For ≥ 14 wks gestation<ul style="list-style-type: none">○ Expedite expulsion with oxytocin if absent membranes○ Analgesia○ Doxycycline 100 mg PO OD and metronidazole 400 mg PO BD until 48 hrs after MVA○ Evacuation of retained POCs after expulsion○ Sieve and inspect specimen after evacuation of retained POCs• Bereavement counselling and family planning• Link to other sexual and reproductive health (SRH) services• Send specimen for histopathology and karyotype

Definition	Diagnosis <i>History/Exam</i>	<i>Investigations</i>	Management
Missed (non viable pregnancy that has not yet been expelled) or IUFD	<ul style="list-style-type: none"> • Dirty vaginal discharge • Closed cervix • Loss of pregnancy symptoms 	<ul style="list-style-type: none"> • Hb • Group & save* • Bedside clotting test • Ultrasound: non-viable pregnancy; may be repeated if GA < 8 wks 	<ul style="list-style-type: none"> • Medical management <ul style="list-style-type: none"> ○ For first trimester gestation: misoprostol 800 mcg PV every 3 hours, max 2 doses, or 600 mcg SL every 3 hours, max 2 doses ○ For 13-17 wks gestation: misoprostol 200 mcg PV every 6 hours, max 4 doses ○ For 18-26 wks gestation: misoprostol 100 mcg PV every 6 hours, max 4 doses • Surgical management <ul style="list-style-type: none"> ○ For first trimester gestation <ul style="list-style-type: none"> ▪ Misoprostol 400 mcg PV 3 hrs or SL 2-3 hrs before procedure ▪ MVA with analgesia (i.e. cervical block) ○ For second trimester gestation <ul style="list-style-type: none"> ▪ Misoprostol 400 mcg PV 3 hrs or SL 2-3 hrs before procedure ▪ Evacuation of retained POCs in OT under GA • Bereavement counselling and family planning • Send specimen for histopathology and karyotype if available

Definition	Diagnosis <i>History/Exam</i>	<i>Investigations</i>	Management
Threatened	<ul style="list-style-type: none"> • Minimal PVB • Minimal or no abdominal pain • Closed cervix • Uterine size = GA • Viable fetus 	<ul style="list-style-type: none"> • Hb • Group & save* • US for viability • Serum progesterone level if available 	<ul style="list-style-type: none"> • No specific treatment (self-limiting condition) • Excessive work is discouraged • Avoid coitus
Incomplete	<ul style="list-style-type: none"> • Profuse PVB • Pelvic pain • Open cervix • Uterine size < GA • POCs present 	<ul style="list-style-type: none"> • Hb • Group & save* • X-match if shock present 	<ul style="list-style-type: none"> • If shock, then resuscitate with IV fluids and/or BT • Medical management with misoprostol 600 mcg PO or 400 mcg SL one dose to start • Surgical management <ul style="list-style-type: none"> ○ MVA with analgesia ○ Doxycycline 100 mg PO OD and metronidazole 400 mg PO BD for 48 hrs • Bereavement counselling and family planning • Link to other SRH services • Send specimen for histopathology and karyotype if available

Definition	Diagnosis <i>History/Exam</i>	Investigations	Management
Complete	<ul style="list-style-type: none"> Minimal PVB Closed cervix Small, bulky uterus h/o having passed POCs 	<ul style="list-style-type: none"> Hb Group & save* 	<ul style="list-style-type: none"> Bereavement counselling and family planning Link to other SRH services Consider ultrasound to confirm empty uterus If first trimester loss and at risk for alloimmunisation, then lower dose of anti-D is acceptable If febrile or infection suspected, then doxycycline 100 mg PO OD and metronidazole 400 mg PO BD for 48 hrs
Septic (any of above with clinical infection of the uterus and its contents)	<ul style="list-style-type: none"> T $\geq 38^{\circ}\text{C}$ Maternal PR > 100 bpm Purulent vaginal discharge/POCs Pelvic pain, tenderness Possible pregnancy interference 	<ul style="list-style-type: none"> FBC with differential Group & save* X-match if needed Bedside clotting time Endocervical swab or HVS 	<ul style="list-style-type: none"> Ergometrine 0.5 mg IM (or syntometrine) on admission Adequate resuscitation: IV fluids and/or BT Monitor VS and urine output Ampicillin 500 mg IV QID, gentamicin 80 mg IV TDS, metronidazole 500 mg IV TDS starting ideally 8 hrs pre-MVA and for total of 14 days MVA by experienced DOCTOR under GA (high risk for perforation) Send specimen for histopathology, microbiology, and karyotype if available Watch out for coagulopathy

* Group & save determines ABO blood group plus Rhesus. Give anti-D 250 IU IM x 1 if Rhesus negative and unsensitised.

Quality Indicator % of patients with abortion who receive ABO blood group and Rhesus screening

Amenorrhea

Protocol & Guideline Number D2, February 2014

Introduction/Definition

Primary amenorrhea is no menarche by 16 years old with normal growth and secondary sexual characteristics. Secondary amenorrhea is the cessation of menses for 6 months after menarche.

Diagnosis

History/ Exam Ask about pubertal development, family history, neonatal or child health (for congenital adrenal hyperplasia), virilisation, galactorrhea, headaches, visual field defects, polyuria/polydipsia stress/weight change/exercise, current medications; height and weight, Tanner staging of breasts, pelvic exam

Investigations Determine if uterus is present (check UPT, FSH, PRL, TSH; if virilisation, then check serum testosterone and DHEA-S) or absent (check serum testosterone +/- karyotype)

Management

Treatment is dependent on the aetiology of amenorrhea

Antibiotic Prophylaxis

Protocol & Guideline Number D3, February 2014

Introduction/Definition

Antibiotic prophylaxis is antibiotic use for the purpose of preventing, not treating, infection.

Diagnosis

History/Exam/Investigations Document clearly in operative notes whether antibiotic prophylaxis was given or not

Management

Scenario	Pre-operative (give ≥ 1 hour before surgery)*	Post-operative (total 5 days)
Elective operation (obstetrics or gynaecologic)	Cefotaxime 1 g IV or Ceftriaxone 2 g IV	- Cefotaxime 500 mg IV TDS or ceftriaxone 1 g IV OD for 48 hrs - Then cephalosporin PO for 3 days
ROM > 6 hrs, chorioamnionitis, obstructed labour	Benzylpenicillin 2 MU IV + metronidazole 500 mg IV + gentamicin 240 mg OD	- Benzylpenicillin 2 MU IV QID + metronidazole 500 mg IV TDS + gentamicin 240 mg IV OD for 48 hrs - Then amoxicillin 500 mg PO TDS + metronidazole 400 mg PO TDS for 3 days

* If surgery > 3 hrs or EBL warrants blood transfusion of ≥ 2 units, then repeat dose of antibiotics

Cervical Cancer Screening

Protocol & Guideline Number D4, February 2014

Introduction/ Definition

Cervical cancer is caused by human papillomavirus (HPV). Precancerous lesions (cervical intraepithelial neoplasia = CIN) begin in the transformation zone and may take 6 months to several years to develop into cancer. Alternatively, CIN may persist for life. The objective of cervical cancer screening, most commonly performed here as visual inspection with acetic acid (VIA), is to detect precancerous lesions and treat them before they progress to cancer. CIN1 reflects mild dysplasia, CIN2 moderate dysplasia, and CIN3 severe dysplasia.

Diagnosis

History/Exam/Investigations All sexually active women (21-70 years old) should be screened for cervical cancer at least once every 3 years

Management

Screening methods

- Papanicolaou (Pap) smear: cytology based but not widely available in Zambia because it requires a clinical examination with speculum and light, supplies, and a skilled pathologist
- HPV DNA testing: PCR based and detects active HPV infection
- VIA: based on clinical examination with speculum and light and visual determination of disease by trained health care worker

Diagnosis by	Pap smear	VIA
CIN1 or low-grade disease	Repeat Pap smear after 6 months or after treating infections. If CIN1 persists, then perform local destructive therapy of cervix.	Cryotherapy
CIN2 /CIN3 or high-grade disease	Perform local destructive therapy of cervix.	LEEP

Management of \geq CIN II/III

- Loop electrosurgical excision procedure (LEEP): preferred method if equipment and expertise in place
- Cryotherapy: can be done as outpatient
- Cone biopsy: done in OT
- Cauterization/vaporisation

Follow up

Pap negative or VIA negative women can be seen in 3 years provided they are HIV negative. HIV positive women should be screened yearly.

Chronic Pelvic Pain

Protocol & Guideline Number D5, February 2014

Introduction/Definition

Chronic pelvic pain is defined as intermittent or constant pain that occurs in the lower abdomen or pelvis for at least six months. It may be associated with menses or intercourse; it is not associated with pregnancy. Organ systems of aetiology include: gynaecologic (20% of cases; endometriosis, PID), gastrointestinal (irritable bowel syndrome, diverticulitis), urologic (painful bladder syndrome, interstitial cystitis), psychological, musculoskeletal (pelvic floor pain, fibromyalgia) or neurological.

Diagnosis

History Ascertain possible causes, covering every possible organ system of aetiology

Exam Thorough pelvic exam with speculum and bimanual exams

Investigations Send blood and/or urine for FBC (for WBC), STI testing, urinalysis, and UPT; send endocervical swab for mcs; pelvic US for pelvic masses

Management

- Perform laparoscopy (diagnostic and/or therapeutic) if available
- Treatment depends on the cause; for example,
 - Injection with a local anaesthetic (i.e. lignocaine, marcaine) for trigger points
 - Surgical removal or laser treatment of endometriosis
- Three approaches to medication:
 - Sequential drug treatments for the most likely causes
 - Hormonal treatment (for endometriosis overlaps for pelvic congestion syndrome)
 - General analgesics (i.e. paracetamol, ibuprofen, diclofenac)
- Coping strategies if available
 - Physical therapy
 - Psychotherapy and/or counselling
 - Acupuncture, biofeedback and relaxation therapies
 - Pain management clinics for pain and for dependency on narcotics that may develop
 - Nerve stimulation devices

Comatose Patient

Protocol & Guideline Number D6, February 2014

Introduction/Definition

The comatose patient requires prompt attention. Coma is a state of deep unconsciousness for a prolonged or indefinite period of time.

Diagnosis

History Elicited from relatives or the ambulance workers: onset of coma, condition in which patient was found, fever, convulsions, any pertinent chronic medical illnesses (i.e. diabetes or asthma), alcohol and/or substance abuse, poisoning, suicide note, etc.

Minimal OB history includes parity, GA, and history of PVB.

Exam/Investigations Temperature, signs of shock, pallor, jaundice, cyanosis, neck stiffness, pupils, fundoscopy, abdominal exam for peritonitis and/or haemoperitoneum (to assess for uterine rupture or abruptio placentae), check breath for alcohol and/or ketones

Management

- Call for help
- Airway: ventilate if patient is cyanotic
- Breathing: intubate if no spontaneous breathing
- Circulation (check pulse and BP): resuscitate if signs of shock
- Send blood for glucose, FBC, U&Es, Cr and MPS
- Start IV line and treat with 50 ml of 50% dextrose unless glucose is confirmed as normal
- If organophosphate poisoning suspected, then treat with atropine 0.6-2.4 mg IV every 15 min until normal PR, dilatation of pupils, etc. Obtain physician consultation.
- Admit patient to SOU (high dependency ward)
 - Monitor VS, GCS, and pupillary reaction
 - If poisoning, then monitor every 30 min until normal
 - Send blood for culture and alcohol and/or substance abuse
 - Order CXR
 - Perform LP if no contraindication
 - Take full history when possible
- Nursing care
 - Feeding via nasogastric tube
 - 2 hourly turnings

Disseminated Intravascular Coagulopathy (DIC)

Protocol & Guideline Number D7, February 2014

Introduction/Definition

Disseminated intravascular coagulopathy (DIC) is a bleeding and clotting disorder, secondary to underlying systemic process resulting in thrombin or plasmin dominance.

Diagnosis

History/Exam Purpura, oliguria, pulmonary oedema, GI bleeding, epistaxis, oozing from puncture and surgical wounds, and reduced consciousness.

Investigations Send blood for PT and aPTT (high), platelets (low), D-dimers and FDP (high)

Management

Initial management

- Admit to SOU or ICU
- Contact blood bank immediately for blood products
 - Packed red blood cells (PRBCs) first (improve oxygenation)
 - FFP at 15-20 ml/kg of actual body weight (4-6 units total)
 - Platelets at 1-2 units/10 kg of actual body weight (use platelet concentrates if plt < 20,000 or if plt ≤50,000 and continued bleeding)
 - Cryoprecipitate at 10-20 ml/kg (4-6 units total) if PTT >54, PT >18, INR > 1.6, fibrinogen <100, if available
- Initiate volume resuscitation immediately with NS or RL until blood products arrive
- Collect hourly blood gases, ionised calcium, aPTT, and PT until features of DIC are resolving, if available
- Consider heparin if thrombosis is dominant

Treat underlying cause (i.e. sepsis, MSB, toxins, etc)

Infertility

Protocol & Guideline Number D8, February 2014

Introduction/Definition

Infertility is the inability for a couple to conceive after regular, unprotected sexual intercourse for one year. Aetiologies of infertility may be found in the female partner, male partner, and/or both partners, or may be unexplained.

Diagnosis

History

- Both partners: STIs, drug history (alcohol, tobacco), occupational history
- Female: age (≥ 35 years old), previous pelvic and/or abdominal surgery, contraceptive use, menstrual history and any menstrual abnormalities
- Male: previous urogenital surgery, varicocele and/or genital pathology, mumps

Exam/Investigations - as indicated

- Female: basal body temperature graph; TSH, PRL, FSH, LH, oestrogen; pelvic US, HSG, +/- diagnostic laparoscopy
- Male: semen analysis (2 samples should be submitted), urine mcs

Management

- Pre-conception management includes weight loss if female BMI > 30 and female rubella status
- Couples should be advised to have regular intercourse 2 - 3 times per wk, especially circa the time of ovulation if the woman has predictable menstrual cycles
- Counsel on treatment options, including
 - Adoption of relative's or other's child who is an orphan (more acceptable in Zambia)
 - Surrogacy (may not be acceptable in Zambia)

Treatment*	Indication/comments
Bromocriptine	Hyperprolactinemia
Clomiphene citrate	Anovulation
GnRH or purified FSH	Anovulation
Intrauterine insemination	Unexplained, oligospermia, etc

Treatment*	Indication/comments
In vitro fertilization	Unexplained, tubal blockage, oligospermia, etc
Salpingolysis	Adhesions that affect tubal patency
Tuboplasty	Tubal blockage
Urology consult	Male factor, i.e. oligospermia

*Refer outside Zambia if not available

Quality Indicator % of patients with infertility whose partner undergoes semen analysis

Pelvic Organ Prolapse

Protocol & Guideline Number D9, February 2014

Introduction/Definition

Pelvic organ prolapse is herniation of pelvic organs to or beyond the vagina. Other terms for pelvic organ prolapse include procidentia, anterior or posterior compartment or apical prolapse, cystocele, rectocele and enterocele.

Diagnosis

History Vaginal or pelvic pressure, sensation of vaginal bulge or something falling out of the vagina, +/- vaginal discharge, +/- PVB from ulceration, +/- urinary symptoms (ranging from stress urinary incontinence to urinary retention), +/- defecatory symptoms (ranging from constipation to rectal incontinence), +/- sexual dysfunction

Exam/Investigations Pelvic exam using POPQ or Baden Walker system to classify

Management

Expectant management

If symptoms are tolerable and the patient prefers to avoid treatment, then the prolapse can be observed and evaluated regularly for the development of worsening urinary and/or defecatory symptoms.

Conservative management (usually temporary measure)

- Vaginal pessary (multiple types, multiple sizes)
- Pelvic floor muscle exercises (Kegel's)
- Oestrogen therapy (vaginal cream or pessary) as an adjunct

Surgical treatment

Procedure of choice depends on many factors, including risk factors for recurrence, patient age and technical expertise. Consider surgery only after child-bearing is complete. For apical prolapse, determine if anatomic correction will result in occult stress incontinence.

- Abdominal vs. vaginal approach
- Reconstructive vs. obliterative procedure (colpocleisis if no longer sexually active)
- +/- Concomitant hysterectomy, anti-incontinence procedure (i.e. slings, tapes), and/or use of surgical mesh

Perioperative Management

Protocol & Guideline Number D10, February 2014

Introduction/Definition

While perioperative management is individualized to the specific patient and condition requiring surgical intervention, certain steps should be performed.

Diagnosis

History/Exam/Investigations Document clearly the indication for surgery in the file.

Management

Pre-operative management

- Ensure patient is identified and well clerked (thorough history and physical, including clear indication for surgery)
- Explain operation in detail, including risks of additional procedures (i.e. myomectomy may lead to hysterectomy), and then obtain written consent from patient
- If major surgery, then anaesthetist to see the patient on the day before
- Starve patient ≥ 6 hrs for elective cases (emergency surgeries are excluded from this rule)
- Consider baseline investigations
 - FBC or at least Hb
 - Renal function tests
 - Liver function tests
 - Chest X-ray
- Give prophylactic broad spectrum antibiotics if indicated
- Give antiemetic medications (i.e. metoclopramide)
- Give antacid medications (i.e. ranitidine)

Post operative management

- Keep nil per os (no oral intake) for procedures done under GA until patient is fully awake; consider slowly advancing diet as tolerated vs. allowing regular diet, dependent on surgery
- Maintenance IV fluids: RL or NS or DNS ≥ 3 L /24 hrs. May need much more if large blood loss before or during surgery. Caution in hypertensive patients.
- Pain control

- Paracetamol or NSAIDS (i.e. ibuprofen) for minor operations
- Pethidine 100 mg IM every 6 hrs for at least 24 hrs for major operations
- Place patient in recumbent position

Patients with cardiac disease

- Consult cardiologist for pre-operative assessment and post-operative follow up

Sepsis

Protocol & Guideline Number D11, February 2014

Introduction/Definition

Sepsis is a systemic response to infection associated with high morbidity and mortality. There is a spectrum of disease, ranging from sepsis to septic shock. Sepsis is the clinical syndrome that results from a dysregulated inflammatory response to an infection.

Diagnosis

History Identify aetiology, i.e. dysuria, cough or recent abortion or delivery.

Exam Sepsis exists if two or more of the following abnormalities are present, along with either a culture-proven or visually identified infection:

- T >38.5 °C or <35 °C
- PR > 90 beats/min
- RR > 20 breaths/min or PaCO₂ <32 mmHg
- WBC > 12,000 cells/mm³, <4000 cells/mm³ or > 10% immature (band) form

Investigations FBC, blood mcs, urine mcs, arterial lactate, Cr, bilirubin, LFTs

Management

- Airway, breathing, circulation (ABC)
 - O₂
 - Correct hypotension with IV crystalloid fluids (up to 5 litres in first 6 hours given as 500ml rapid boluses)
 - If persistent hypotension, then give norepinephrine or phenylephrine
 - If myocardial dysfunction suspected, then give dobutamine
- Broad spectrum antibiotics (vancomycin + cephalosporin for 7 days) and/or incision and drainage (directed by infectious source)
- If severe shock or septic shock, then transfer to ICU for intensive monitoring

Sexual Assault

Protocol & Guideline Number D12, February 2014

Introduction/Definition

Sexual assault is defined as non-consensual sexual act. The clinician should complete the history, examination and management in a non-judgmental manner. Record the chain of evidence, what was collected and where it went. Verbal consent for the exam should be given by the patient or next of kin.

Diagnosis

History Record details of the events before and after the assault, drugs taken voluntarily or involuntarily, force and/or weapons used, condom use, timing and sequence of events, specific events of the assault and post assault hygiene. Ask about LMP, current hormonal contraception and previous intercourse.

Exam Visualize entire body to draw a detailed body map. Mark abnormalities (i.e. contusions, bites, ligature marks, old and new trauma), distinguishing features (i.e. tattoos, piercings, scars) and areas where swabs were obtained. Include pertinent negatives. For the pelvic exam, visualize before using a speculum. Mounting injuries occur at 3-6-9 o'clock on the posterior fourchette. Other common areas of injury include head/neck and anus/rectum. Note tenderness, tears, ecchymosis, abrasions, erythema and oedema. No findings do not mean that the exam is inconsistent with history of sexual assault.

Investigations Time dependent specimens include sperm/semen, foreign material, swabs of body secretions and fingernail scrapings. Blood and hair from the head or pubic area are NOT time dependent. Also do the following:

- Collect forensic evidence with swabs i.e. saliva, vagina, cervix, anus/rectum
- If available, colposcopy for better visualization and photography; and apply toluidine blue, remove excess and visualize to support findings
- STI screening
- HIV test
- Urine pregnancy test (UPT)

Management

- STD prophylaxis

- Azithromycin 1 g PO for presumed chlamydia exposure
- Ceftriaxone 125 mg IM for presumed gonorrhoea exposure
- Metronidazole 400 mg PO TDS for presumed trichomonas exposure
- Hepatitis B vaccine if applicable
- Emergency contraception: levonorgestrel 1.5 g PO (take within 120 hrs)
- HIV post exposure prophylaxis
 - HIV test immediately and at 6 wks, 3 mos, and 6 mos post assault
 - TDF/FTC + LPV/r PO for 28 days (start within ≤ 72 hrs)
 - Warn patient of side effects: nausea, vomiting, headaches
- Tetanus booster if applicable

Surgical Wound Dehiscence

Protocol & Guideline Number D13, February 2014

Introduction/Definition

Dehiscence occurs when fascia, SC tissue and skin separate prior to healing. Risk factors include: haematoma, excessive intra-abdominal pressure (i.e. coughing or vomiting), DM, malignancies, anaemia, infection, immunosuppression, poor technique and inappropriate suture.

Diagnosis	History/Exam/Investigations	Management
Superficial wound dehiscence	<ul style="list-style-type: none">• Separation of skin and SC tissue• Intact fascia• Serosanguineous fluid from closed wound	<ul style="list-style-type: none">• Evacuate all hematomas and/or seromas• Treat underlying infection• Wound care<ul style="list-style-type: none">○ Heal via secondary intention○ Irrigate wound dressings to remove surface bacteria○ Do wet-to-dry wound dressings BD• If sufficient healthy granulation, then consider superficial vertical mattress closure
Fascial dehiscence	<ul style="list-style-type: none">• Separation of skin, SC tissue and fascia• Early recognition is critical	<ul style="list-style-type: none">• Surgical emergency; act quickly to prevent bowel necrosis, perforation and/or peritonitis• If evisceration of abdominal contents, then place abdominal binder with sterile, saline-soaked towels (temporary measure) over fascial dehiscence

Fascial dehiscence (continued)		<ul style="list-style-type: none">• If critically ill, then place abdominal binder until patient can tolerate definitive treatment• Procedure: fascial closure under general anaesthesia after debridement of necrotic or infected tissue and abdominal wash out with warm normal saline
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Steps to prevent surgical wound complications

- Maintain haemostasis
- Handle tissues gently
- Remove devitalized tissue
- Use monofilament suture
- If subcutaneous tissue ≥ 2 cm depth, then close dead space with subcutaneous suture in Camper fascia

Urogenital Fistula

Protocol & Guideline Number D14, February 2014

Introduction/Definition

Obstructed labour is the most common cause of urogenital fistulas in Zambia. Other aetiologies include surgery, radiation therapy and traumatic or instrumental vaginal delivery.

Diagnosis

History Continuous leakage of urine from vagina, +/- vulvar irritation, +/- infections, +/- chronic pyelonephritis leading to renal insufficiency

Exam Speculum exam to identify fistula

Investigations

- Dye test
 - Use catheter to retrograde fill bladder with sterile milk or methylene blue (2-3 drops) mixed with NS in 60 ml aliquots
 - Place tampon or large cotton swabs in vagina and check for sterile milk or dye
 - If no leakage, ask patient to cough or bear down (Valsalva manoeuvre)
 - Staining likely indicates vesicovaginal fistula
 - Wetness with clear fluid may indicate ureterovaginal fistula. Consider oral phenazopyridine to turn urine orange (vs. blue for vesicovaginal fistula)
- Intravenous pyelogram
- US to assess upper renal tract dilation (dilated ureter or renal pelvis)
- Cystoscopy in OT

Management

Timing

- If urogenital injury is noted at time of surgery, then repair immediately
- Excise and repair within 6-8 wks of delivery when the surrounding tissues are healthy. Small fistula will heal spontaneously with catheterization.

Types of repair depending on fistula location

- Suburethral or juxtaurethral VVF: simple vaginal tissue mobilization with layered closure +/- anterior bladder wall mobilization +/- Martius graft
- Midvaginal or massive VVF: wide tissue mobilization into the paravaginal spaces bilaterally to facilitate closure of the bladder with full-thickness Martius skin graft (to reduce risk of vaginal stenosis)
- Juxtacervical VVF: combined vaginal and abdominal approach with omental graft between bladder and cervix
- Vesico-endometrial vaginal fistulas: cystogram confirms diagnosis; repair via laparotomy with resection of the fistulous tract from both bladder and uterus, closure of the openings, and then interposition of the omentum or peritoneum; alternative is hysterectomy with excision of fistula from bladder
- Vesico-colonic fistulas: excision of fistula from bladder and colon and interposition of omentum or peritoneum
- Fistulas with total urethral loss: create a neourethra from vulvar/labial tissue

Venous Thromboembolism

Protocol & Guideline Number D15, February 2014

Introduction/Definition

Deep vein thrombosis (DVT) refers to a blood clot in the vein. Common sites are the calf and/or thigh. An embolism occurs when part of the thrombus breaks off and blocks the proximal circulatory system. Pulmonary (thrombo)embolism (PTE) refers to an embolus in the lungs and is associated with significant morbidity and mortality.

Diagnosis	History	Exam	Investigations
Deep vein thrombosis (DVT)	Acutely painful swollen leg in the absence of trauma	Turgid and tender calf and/or thigh	<ul style="list-style-type: none">• FBC, Doppler US of site• Coagulation profile (PT/PTT/INR) if available• MRI for suspected pelvic vein thrombosis if available
Pulmonary (thrombo-) embolism (PTE)	Dyspnoea, collapse, chest pain, haemoptysis	Tachypnoea, cyanosis, loud P2, focal chest signs with or without signs of heart failure	<ul style="list-style-type: none">• D-dimer, CXR, ECG, Doppler US of bilateral lower extremities• Spiral CT scan with contrast if available• Arterial blood gases and ventilation/perfusion scan if available

Management

- Manage DVT with elevation of affected leg, elastic stockings and mobilization
- Manage PTE in SOU (or MICU) with oxygen
- Treat with unfractionated heparin or LMWH for suspected DVT or PTE until the diagnosis is excluded by objective testing
- Antidote of heparin: protamine sulphate 1 mg for every 100 IU of heparin given

Type of heparin	Initial/loading dose	Maintenance dose	Investigations
Unfractionated heparin (UFH)	5,000 IU followed by continuous IV infusion at 1,000 IU per hour; or 15,000 – 20,000 IU SC 12 hourly	10,000 IU SC BD	aPTT daily (goal 1.5 - 2.5x average lab control value)
Low molecular weight heparin (LMWH)	1 mg/kg* twice daily	40 mg SC OD	None

*If pregnant, use early pregnancy weight

- Anticoagulation treatment in pregnancy:
 - Warfarin is safe in the second and third trimesters until 36 wks gestation
 - Intrapartum dosing (start the day prior for induction of labour): heparin 5,000 IU SC BD
 - For vaginal delivery: treatment dose at 6 hours postnatal
 - For elective caesarean delivery: no morning dose of heparin, then thromboprophylactic dose at 3 hours after procedure and treatment dose at 12 hours after procedure
 - For caesarean delivery: thromboprophylactic dose at 3 hours after procedure and treatment dose at 12 hours after procedure
 - Warfarin for 6 wks postnatal after 5 days of heparin-warfarin overlap

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