Inpatient Guidelines

Developed by

Inpatient guidelines committee consisting of representatives from

MoH, BUP, UB

Purpose

- To provide quick guidance to medical officers, interns and nurses working in Botswana how to treat commonly encountered medical conditions
- Developed after international guidelines and evidence
- Adjusted to local context and limitations
- Fast reference tool not to replace review of literature or clinical judgement

Botswana National Guideline for

1. Abnormal Liver Function Test
2. Acute Coronary Syndrome
3. Acute Confusional State
4. Acute Respiratory Distress Management
5. Acute Kidney Injury (AKI)
6. Acute/Decompensated Heart Failure
7. Stroke Management
8. Hyperglycemic Emergencies
9. Hypertensive Urgency and Emergency
10. Meningitis for HIV negative or unknown patients
11. Meningitis in HIV Positive Patients
12. Sepsis Management
13. Status Epilepticus
14. Acute GI Bleed
15. Overdose Treatment

Botswana National Guideline for Abnormal Liver Function Test

- **Defintion: acute elevation of AST, ALT, Bilirubin or GGT to > 2 ULN**
- **LFT (AST, ALT, Bilirubin, ALP) Glucose, if HIV positive and no CD4 in last 6 month or CD4 <450 get urgent CD4 count**
- Complete and careful drug history (when was what started) including traditional medicines. Physical exam. Obtain prior LFT results if possible

Isolated elevation of ALP and GGT or ALP > 4 times upper limit of normal (ULN) irrespective of AST and ALT?

Yes → Consider infiltrative process such as TB (or TB IRIS), MAC, lymphoma, Kaposi's, fungal - also consider bone as source with isolated AP elevation (particularly if GGT normal), or if on ATT consider Rifampicin and/or INH toxicity d/w TB specialist

No

Elevation of AST and or ALT >5 ULN
Do the following test
- Hep A IgM, Hep BsAg (if Hep BsAg +ve then do Hep B IgM core antibody), RPR
- Renal function tests, INR ,FBC, urine pregnancy test HIV (if previous negative or unknown)
- Malaria smear/RDT if from endemic area
- Abdominal ultrasound

- **Moderate Elevation in AST and ALT up to 3-5 X ULN.**
Symptoms such as:
Nausea/vomiting, malaise , jaundice, dark urine, easy bruising, rash

Yes → (to Elevation of AST and or ALT >5 ULN)

No

Mild elevation AST and ALT up to 3 X ULN

Patient on ART **and** at least 2 of the following?
Diffuse abdominal pain, Kussmaul breathing, nausea, vomiting, weight loss

Yes → call HIV specialist

No → **Continue current medications, send RPR, repeat LFT in 1 week , unless new symptoms then immediately , if LFTs still elevated get abdominal ultrasound, Hep BsAg, ANA, HIV**

STOP all hepatotoxic medications (e.g. all ART, TB treatment , Co-trimoxazole, Carbamazepine, Valproic Acid, Phenytoin, Paracetamol, Statins, Fluconazole, estrogen contraceptives, NSAIDs, antibiotics
If anti-seizure medication or antibiotics stopped d/w specialist about substitution
Check INR, repeat LFT in 24-48 hours and INR if available, give 5mg of Vitamin K po once if INR>2

Patient was on ART and at least 2 of the following?
Diffuse abdominal pain, Kussmaul breathing, nausea, vomiting, weight loss

Yes → call HIV specialist

No

Patient was on TB drugs and severe TB disease?

Yes → Consider changing the regimen to liver sparing regimen: Ethambutol, Levofloxacin and Streptomycin AFTER discussion with TB specialist

No

Repeat LFT in 24-48 hours, LFT increasing?

No → **Continue to hold medication until ALT and bilirubin <2X ULN and symptoms resolved, if on TB drugs re-initiation as per TB guidelines, if on ART d/w HIV specialist for re-initiation of ART**

Yes → Possible development of acute liver failure or alternate diagnosis – d/w specialist

Botswana National Guideline for Acute Coronary Syndrome

Defintion: One or more criteria:
Severe or ongoing pain in the chest, back, radiating pain to the left arm, or to the chin, Nausea vomiting associated with the pain, Diaphoresis associated with the pain, Dyspnoea not due to pulmonary etiology, Worsening chest pain in patient with known cardiac failure, angina (agina: pain or discomfort that is 1) substernal, 2) provoked by exercise and/or emotion, and 3) relieved by rest and/or nitroglycerin.), or previous MI, Sudden loss of consciousness

History , examination, i.v. cannula, give oxygen, ECG, FBC, U&E, Troponin, if not available CK-MB, random glucose

ST Elevation MI (STEMI):
ECG: ST segment elevation or new left bundle branch block
Or if no ECG available: prolonged chest pain at rest (>20 minutes), severe dyspnoea, new pain at rest or loss of consciousness, or severe diaphoresis and epigastric pain WITHOUT history of gastric ulcer or melana
Or New signs of CCF(pulmonary edema, shortness of breath), cardiac shock **+ high CK-MB, and/or Troponin**

give Clopidrogel (Plavix) 300mg p.o. **and** ASA 300mg po, Enoxaparin 30mg iv bolus (do **NOT** give if Cr Cl<30 AND >75 yrs), Morphine 5mg i.v., Nitroglycerin 0.5ml sublingual **(Do NOT use Nitroglycerin if sildenafil <24 hours ago, BP<100, severe Aortic Stenosis)**
Admit or transfer to higher level care, d/w cardiology for possible catherization if symptoms <12hours since initial pain or ongoing

Non ST elevation MI (NSTEMI): ECG: ST depression or T-wave inversion + elevated CK-MB, and/or Troponin
Or Unstable Angina: Normal cardiac markers ECG: ST and T wave changes (maybe transient)

ASA 300mg (If allergic give Clopidrogel 300mg), oxygen, pain control
Admit

High Risk (hemodynamic instability, BP<90, Pulse >120 or <50)
Monitor in HDU, consider urgent transfer, catherization
Repeat cardiac markers, ECG every 6 hours for 2 days

Intermediate Risk (neither low nor high risk)
Monitor in general ward or HDU for 24 hours.
Repeat cardiac markers, ECG every 6 hours for 2 days

Low Risk (no hx of angina, CCF or CAD, <65yrs, Chest pain <20 minutes, no ECG changes, <3 of the following: HTN, DM, Fam Hx, smoking
Monitor, if no signs of heart failure: general ward
Repeat cardiac markers, ECG 8h after onset, re-assess risk based on results
Suitable for early discharge if pain free + OPD review within a month

Start enoxaparin (1mg/kg s.c. 12-hrly for 5 days) **OR** if Cr Clearance <30 or no enoxaparin Heparin 333IU/kg X1 s.c. then 250IU/KG q12h for 5 days (do not switch enoxaparin to heparin or vice versa once initiated) + Carvedilol 6.25mg BD (alternative: propranolol 40mg po BD) (do NOT use if pulse <60, allergy or cardiogenic shock, Diabetes or Asthma are NOT contraindications) + Atorvastatin 20mg if HIV; Simvastatin 40mg OD if HIV negative

At Discharge:
Enalapril 2.5mg OD 48h after initial presentation, Carvedilol 12.5 BD after 10days, if tolerated increase to 25mg BD, Atorvastatin 20mg if HIV or Simvastatin 40mg OD if HIV negative, ASA 150mg OD/Clopidrogel (Plavix) 75mg OD (as alternative if allergic to ASA) or add if high risk,

High risk and/or evidence of ischemia?

No → **OPD review in 4 weeks**

Yes → **OPD specialist review in 2 weeks**

Botswana National Guideline for Acute Confusional State

Definition: Acute change in mental status such as confusion, confabulation, non-responsiveness, obtundation, over hours or days. Make sure NO history of ingestion or exposure of toxic substance

Review medication, do physical. Exam, take BP, Pulse, O2 sat (if available), respiratory Rate, place cannula, give 100mg Thiamine i.v. if not available po
Bloods: Glucose (if not available give Dextrose 50% bolus), kidney and liver function tests, full blood count, PT, PTT, blood culture, urine culture + analysis, HIV test if unknown or negative >6 months ago, Chest X-ray, Urine pregnancy test

RR >20 or <12 and or O2 sat <90% on RA? — Yes → Administer oxygen to bring SpO2 to >90% and review acute respiratory distress protocol

No

Blood pressure < 90mmHg/60mmHg or Pulse >120? — Yes → Give 1 liter Normal saline bolus and review sepsis protocol and meningitis protocols

No

Fingerstick glucose <3.3mmol/L or >25 mmol/l ? — Yes → Give Dextrose 50% if RBS <3.3. If >15, review DKA/HHS protocol

No

Suspect toxic ingestion?
(e.g. nystagmus, size of pupils, fasciculations, dystonia, skin changes, arrhythmias) — Yes → Consider acute poisoning and treat accordingly

No

Hemiparesis present? — Yes → Review Stroke protocol, criteria for CT scanning

No

- HIV- in past 12 months and no signs of immunosuppression OR
- HIV+ with known CD4 >250 cells/µL within past 6 months

No

Yes

Two or more criteria?
- Fever or hypothermia
- Headache
- Neck stiffness
- Photophobia
- Focal neurologic signs
- Nausea/vomiting

Yes → Review meningoencephalitis protocol

None of the above? → Do LP (send for cell count, india ink stain, glucose, protein, AFB smear and culture) check RPR, Vitamin B12, TSH

Other etiologies to think of
- Head Trauma, subdural hematoma, space occupying lesion
- Hyper/hypothyroidism
- Hepatic or renal failure
- Hypokalemia
- Hypo/hypernatremia
- Hypo/hyperglycemia
- Hyperthermia (T>40.6)
- Hypothermia (T <32.2)
- Hypo/hypercalcemia
- Alcohol intoxication
- Postictal, seizure complications such as status epilepticus
- Medication effect: antihistamines, anticholinergics, benzodiazepines, steroids, narcotics

Botswana Guideline for Acute Respiratory Distress

Definition: use of accessory muscles, orthopnea , SpO2 <90% with or without: diaphoresis and/or confusion and/or inability to speak

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Take Vital signs (BP, RR, Pulse, Pulse oximetry on RA), place i.v. cannula, examine patient (listen to chest, look at neck veins), take medication history, Give 2-8L O2 if SPO2 <90%, get Chest Xray and ECG (continue in algorithm while waiting), LFT, RFT, FBC, HIV test if not known or >6 months, woman<50 UPT

↓

Upper respiratory obstruction? Look for any of the following :
Inspiratory stridor, hoarseness, sensation of choking, severe sore throat , recent history of intubation, ACE-inhibitor

No ↓

Signs of pneumothorax?
Asymmetric breath sounds, or tracheal deviation: together with distended neck veins without peripheral oedema, hypotension

Yes → Immediately perform needle thoracostomy (14 gauge needle inserted into 2nd intercostal space in mid-clavicular line), insert chest tube, administer O2, get chest xray to confirm pneumothorax improving, admit to ward

No ↓

Wheezing or history of Asthma /COPD?

Yes → Salbutamol 5mg nebulized or 10 puffs with a spacer every 15 minutes
Ipratropium 0.5 mg nebulized , or 10 puffs with a spacer
Hydrocortisone 300mg iv /12mg dexamethasone
No response after 20 minutes give 0.5ml of epinephrine SQ, repeat after 20 minutes

No ↓

Any one of the following?
History of CCF or S3 on exam, pulmonary venous congestion on CXR, paroxysmal dyspnea?

Yes → Furosemide 40mg IV
Refer to CCF protocol

No ↓

No history of above **AND** distended neck veins, hepatojugular reflex, or pulse >100

Yes → Clear lung fields on CXR, enlarged heart, or clear lungs on exam?

Yes → Consider pericardial effusion , get ultrasound. Pericardial effusion?

Yes → give 1 liter NS i.v. fluids, initiate TB treatment and Prednisone 60mg od, if patient unstable refer for cardiac evaluation

No → Consider right sided heart failure, start Clexane (1mg/kg s.c q12h) transfer to referral center to get urgent Echo

No ↓

Signs of pneumonia, fever, cough, crackles on exam, Infiltrate on Chest x ray?

Yes → Treat for pneumonia per protocol

No ↓

Consider acute MI, Pulmonary embolism, neuromuscular weakness, metabolic acidosis (patient on D4T, 3TC, AZT?), malaria, acute blood loss, severe anaemia, intoxication, Methemoglobinemia (recently started on Dapsone, STX/TMP ?), restrictive pericarditis. If questions, contact specialist

Yes ↓

If foreign body visible or history suggests foreign body, perform Heimlich maneuver. If removed, observe. Obstruction not removed?

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O2, airway suction, jaw thrust, Epinephrine SC, (0.1 to 0.5 mg (0.1 to 0.5 mL of 1:1000 solution), hydrocortisone 300mg i.v. or 12mg dexamethasone, consult doctor with surgical expertise or transfer to higher level care. If patient unstable attempt tracheostomy

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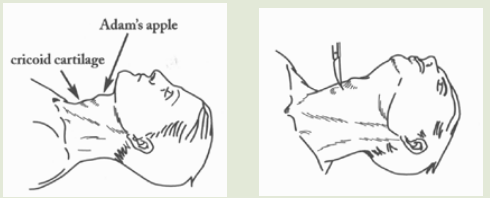
Tracheostomy (find Adam's apple, slide finger below into the groove and make a 1cm horizontal shallow cut and insert tube after making a hole through ligaments using a blunt instrument or your finger)



Botswana National Guideline for Acute Kidney Injury (AKI)

Definition: (1) Serum Creatinine rises by > 26µmol/L within 48 hrs or (2) Serum creatinine rises by > 1.5 fold from reference value (known or presumed to have occurred within 1 week) or (3) Urine output is <0.5ml/kg/hr for >6 consecutive hours, **in acute kidney injury assume Crea Clearance <10ml/hr**

Diagnostic work up:
Full history and exam (including medication history up to 2 weeks prior), BP, Pulse, Temp, RR, daily weights
Serum creatinine , urea, Na, K, Renal Ultrasound if available, if not get as soon as possible, Urine: UA, Urine microscopy, urine culture, if available urine Na and creatinine and protein, measure fluid intake and urine output q4h, place urinary catheter unless patient able to collect urine
send blood for: Glucose, HIV (if not know), LFT, ESR, hepatitis B, C, ANA, CK, lipid profile

If K.> 5.5 give kayexylate 15 g QD-QID until three loose stools/24hours, **if** K>5.5 or ECG with peaked T waves), give Calcium gluconate 10% (iv) 10ml over 2 mins and 50ml of 50% glucose with 10u actrapid Check K every 6 hours, or at least daily
If volume overload (pulmonary or leg oedema): High flow oxygen, furosemide 120-250mg (iv)bolus, If no response, call specialist

Renal USS: signs of urinary obstruction, hydronephrosis, if no US available look for: palpable urinary bladder

Yes

Post Renal

Insert catheter. Do gynae and rectal exam. Refer to urology, surgery , neurology, or gynae as indicated

No

Pre Renal

Causes: hypovolemia, decreased cardiac output, CCF, Liver failure, diarrhea, sepsis, renal artery stenosis, hypotension, major surgery ischemia, NSAIDs, ACE-Inhibitors, ARBs, diuretics, if on ACE-I, NSAIDs, diuretics stop the drugs

If clinically dehydrated (low BP and/or Pulse>100/min):
Fluid challenge with 4 liters of NS **unless:**
◆fluid overloaded (peripheral edema, pulmonary edema), ◆ known CCF (call cardiology), ◆ random blood sugar >15 go to hyperglycemic emergency guidelines, ◆ if T>37.5 C go to sepsis algorithm
if no urine output after that refer

urine output >0.5ml/kg/hr, BP<100, Pulse >100, O2 sat>90% on room air: continue iv fluids at 20ml/kg/hr + previous hours urine output, until creatinine is improving and patient taking oral medications, if not after 4 liters call specialist

Indications for out-patient nephrology referral:
Progressive renal failure, Worsening diabetic or hypertensive nephropathy
Possible intrinsic renal disease (3+ protein or evidence of vasculitis or low plts and hemolytic anaemia)

Consider urgent referral & dialysis:
Refractory hyperkalemia, Fluid overload refractory to diuretics, Uremia with encephalopathy or pericarditis
Poisoning with Methanol, Lithium, ethylene glycol , salicylate; intractable acidosis, nausea, vomiting

Urine microscopy: Bland or hyaline casts?, if not available, creatinine<250mcmol/l

Yes

No

Renal:

Causes:
ATN: Muddy brown casts (75%)
AIN: WBC casts +/- proteinuria
GMN: dysmorphic RBCs & RBC casts

If possible, stop any RF causing drugs (e.g. Tenofovir, Ampho B, NSAID, PCN, ACE-inhibitor, ARBs. aminoglycosides, contrast), if patient has urine output and seems dehydrated, give supportive fluids in case partially pre-renal etiology

Other causes: hypertension (HTN), diabetes, HIV, Lupus, trauma, prolonged seizures, hemolysis

- Systolic BP>135 → Optimize HTN control
- Glucose >10 → Optimize Glucose control
- HIV positive? → Start ART as per guidelines
- Trauma, seizure? → Give large i.v. NS bolus

Renal etiologies: **Acute Tubular Necrosis** (ATN): drugs, rhabdomyolysis, toxins; **Acute Interstitial Nephritis** (AIN): drugs (NSAIDS, penicillin), auto-immune, Infection; **Glomerular disease:** Glomerulonephritis (GMN), nephrotic syndrome; **Small vessel disease:** HTN, HUS, pre-eclampsia

Botswana National Guideline for Acute/Decompensated Heart Failure

Defintion: ***New or worsening*** **symptoms or signs of heart failure in a patient with/ without prior history of heart failure**: breathlessness, orthopnoea, paroxysmal nocturnal dyspnoea, reduced exercise tolerance, fatigue, ankle swelling, elevated jugular venous pressure, hepatojugular reflux, S3, laterally displaced apical beat

General management
- Admit medical ward, transfer or keep in High dependency
- Sit Patient Up
- Check O2 saturation (if possible)
- Give O2 via facemask if OsSat<90%
- Insert an IV line
- Daily weights, urine collection or catheterization
- Check Vital signs 2-hourly for at least 24 hours

Investigations:
FBC, UPT if woman <50, HIV if unknown or >6mo
RFTs, TFTs, Chest X-ray , ECG
if available, get:
Echocardiogram, if never done or acute change, if no Echo available get US to assess for pericardial effusion, if effusion treat for TB

Look for and Treat Precipitants
Hypertension (see hypertensive urgency guidelines)
Myocardial infarction (see ACS guidelines)
- Anaemia (Hgb<7g/dl)
- Drugs (see acute intoxication guidelines)
- Thyrotoxicosis,
- TB pericarditis
- Renal failure (see ARF guidelines)
- Arrhythmias (call specialist)
- Infection (see sepsis guidelines)
- Endocarditis (call specialist)
- PE (see acute respiratory distress guideline)
- Asthma, COPD
- Diet/drug non-compliance

Diurese, while also treating underlying causes if found:
On oral furosemide at home:
-Give double the oral dose as IV
-Not on oral furosemide at home:
-Start with 40 mg IV push

Start oral isosorbide dinitrite/mononitrite 10 mg every 8 hours if BP>110mmHg
Start Heparin 5000IU SQ OD or Clexane 40mg SQ OD (do not use if Crea Cl <30), unless on Warfarin

Continue outpatient therapy with:
ACE inhibitor : contraindications: BP<90mmHg, K>5.5, Crea Cl <30;
spironolactone: contraindications: K>5.0, Crea Cl <30);
Carvedilolol: contraindications: Pulse<60, BP<90mmHG, heart block)

Re-evaluation of patient's clinical status 2hrly BP, Pulse, RR, pulmonary congestion, peripheral perfusion

Adequate response
Reduction in dyspnea, good diuresis (over 100ml of urine over last 2 hours), decreased heart and respiratory rate, decreased lung crackles, good warm extremities

no

Symptomatic hypotension (BP < 85mmHg)
(Cold skin, low pulse volume, poor urine output, confusion, myocardial ischaemia)?

no

Double Lasix dose at 2 h interval until adequate response or maximum dose 500mg i.v./24h
If no adequate response: Add hydrochlorothiazide 25- 50 mg twice a day unless Crea Cl <25, then call Cardiology

yes

Stop isosorbide dinitrite, Ace –inhibitor and beta blocker, **if symptomatic hypotension persists call specialist cardiologist or anaethesist at PMH, if not continue in algorithm**

yes

Initiation therapy (prior to discharge once stable): for new CCF patients
Monitor creatinine, potassium daily if on HCTZ and furosemide, if only on furosemide monitor K and Creatinine weekly initially, if unsure call cardiology
Start captoptril 6.25 mg tds or enalapril 2.5mg bd;
spironolactone 25mg OD if renal impairment 12.5mg OD (ONLY if K monitoring available at your site within 24h, if not avoid); carvedilolol 6.25mg bd; if no contraindications, if previously stopped re-introduce Isosorbide dinitrite if BP>110

Readiness for discharge
when congestion has resolved and weight is stable on oral diuretic regimen is established for at least 24 h
Review dietary salt and fluid intake

Discharge on oral regimen from hospital and plan review after ≤ 2 wks, to optimize medications d/w cardiology, document discharge weight

Botswana National Guideline for Stroke Management

Defintion: Sudden onset of *new, focal* neurologic deficit: assess for history of stroke risk factors (Hypertension. diabetes, HIV, atrial fibrillation); brief neurological exam (<2 minutes)m check reflexes, strength on both sides, check blood glucose level, if unable give dextrose 50% once, if no response continue in algorithm for glucose >2.7 and <22.7

Glucose >2.7 and <22.2 mmol/L

Glucose <2.7 mmol/L → **Give Dextrose 50% iv**

Glucose >22.2 mmol/L → **See diabetes guideline**

Identical symptoms ever before in the past? **Yes** → Consider recrudescence of known old stroke in setting of new infection, or post-ictal paralysis after seizure

No

Head CT, if available within 24 hours of symptom onset and patient <65

Did patient have severe headache right before symptoms, history of uncontrolled hypertension or is patient comatose?

No → Give 325mg aspirin orally; *If unable to swallow place NG tube*

Check: EKG for Afib (if Sinus rhythm, re-check daily) and/or ACS; if woman of childbearing age urine pregnancy test; FBC, RFTs, HIV, ESR, total Cholesterol, LFTs, RPR,

Yes

Asymmetric, bright lesion/blood on CT? Or brightness/blood filling ventricles?

Yes

Yes

Acute hemorrhagic stroke management:

1. Maintain ABCs; head of bed to 30*, keep head midline
2. Check BP at least QID; keep SBP <160; refer to HTN emergency guidelines for management if needed
3. NO aspirin, NO heparin
4. On day 3 start Clexane 40mg (do not use if Crea Cl <30) or Heparin 5000IU subcutaneaously OD
5. Frequent turns in bed, keep normoglycemic, normothermic
6. If fever, do infection work up, give paracetamol 500mg po every 6 hours
7. Monitor for brain swelling (worst days 3-7) If worsening, d/w specialist on best management
8. Start physiotherapy when neuro exam stable

Acute ischemic stroke management:

1) Maintain ABCs; head of bed FLAT x 24 hours, then gradually elevate and monitor for worsening of neuro exam, get history (e.g. weight loss, fevers, night sweats, cough)
2) Allow BP to auto-regulate x 14 days; only treat if SBP >220; stop old antihypertensives *unless on beta-blocker for atrial fib; then give ½ dose. If patient hypertensive then, after 14 days, start HCTZ 12.5mg once a day, gradually increase, goal <130/80*
3) Give Ranitidine 150mg once a day
4) Frequent turns in bed, keep normoglycemic, normothermic, physiotherapy, swallow evaluation
5) If fever, do infection work up, give paracetamol 500mg po every 6 hours
6) Start atorvastatin 40mg daily on DAY 1; if HIV+, start 10mg if on ART, do NOT use if patient pregnant
7) Start aspirin 81mg daily on DAY 2
8) Start Clexane 40mg (do not use if Crea Cl <30) or Heparin 5000IU subcutaneously daily from DAY 1
9) Address cause of stroke: review results of studies sent above
    1) If atrial fibrillation OR CCF with EF <30% , check PT/PTT and consider Warfarin 5mg OD on day 10
    2) If diabetic, start hypoglycemics or insulin, arrange outpatient follow-up
    3) If HIV+, check CD4, refer to IDCC
    4) If RPR+: do LP (VDRL, if available, protein, cell count); if abnormal , treat for neurosyphilis with Penicillin G 4 million units iv every 4hours or Ceftriaxone 2g iv or im q24h for 14 days
    5) If ESR > ½ of patient's age: check ANA, ANCAs, evaluate for rheumatologic disease
    6) If hx of fever, night sweats or weight loss: consider TBM as cause, get LP, CXR, Sputum for AFB
    7) Get Echo if patient has murmur to rule out endocarditis as etiology, if vegetation send BCX

Botswana National Guideline for Hyperglycemic Emergencies

Defintion: Patient with history of increased thirst and/or polyuria or known diabetic with SOB, abdominal pain, neurological deficit, or altered MS

place cannula, urinalysis (ketones in urine), blood glucose, UPT, HIV testing, renal function tests (especially K^+)blood gas, if available,

symptoms are rapid in onset , SOB, increased RR, diffuse abdominal pain
Labs: glucose>10mmol/L + Positive urine ketones test **+/-**Acidosis (pH<7.3 or HCO3 < 15mmol/L), (if no blood glucometer available, use urine dip stick, if positive for glucose this indicates a glucose level>10)

DKA

Symptoms developed over days to weeks
Patient has neurological deficits or consciousness
Labs: Blood glucose>30mmol/L, urine ketones negative

HHS in HHS fluids more important than insulin

- Give 1 liter NS/RL i.v. bolus, insulin (10 units of actrapid or 0.1/kg iv stat), DVT prophylaxis with 40mg of clexane or Heparin 5000IU subcutaneously daily Check BP q4h, O2 saturation (give O2 if <95%), weigh patient (or estimate weight, document in chart), monitor urine output every 6 hours
- get UA for ketones, if positive check ketones twice a day, CXR, ECG, Amylase, blood & urine MCS (if infection suspected, start antibiotics as needed)
- check K and Na and blood glucose level daily, until pt stablized (gluc<20mmol, no ketones, alert and awake)

Administer minimum 5 liters fluids NS or RL, 1st liter over 1 hour, 2nd liter over 2hr, 3rd over 4hr, 4th over 6hr, 5th over 8hr, add 40mEq of KCL to every liter if K is <5, if no i.v. KCL add 600mg slow K po TDS, if no oral KCL give NG tube and give orange juice, feed patient bananas, as soon as alert, start 0.2 Units of Actrapid sq every two hours, if cannot measure K, supplement K from 3rd liter onwards, as hyperkalemia more likely than hypokalemia

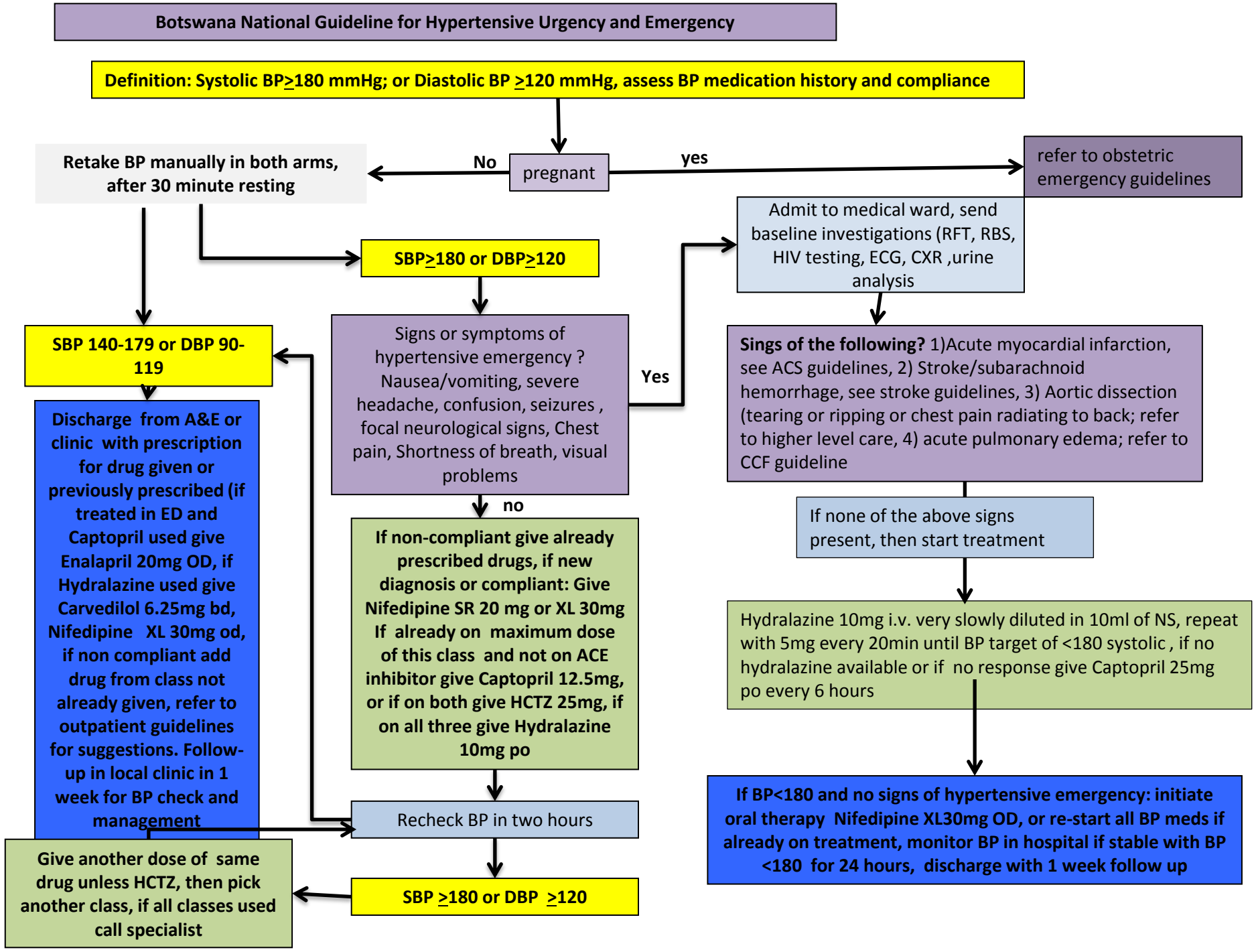
Check RBS q2h, >10% drop in RBS?
- no → Add 2 units to current Actrapid dose
- yes → Continue Actrapid dose i.m. q2h,

Check RBS q2h, RBS<15?
- no → Continue NS over 8 h, if Na>160mmol/l use RL, call specialist
- yes → Use D5NS, if Na>160mmol/l use DNS alternating with D5, **DO NOT STOP INSULIN**

When Pt eating and alert, stop insulin injections

On insulin at home?
- no → Start isophane 0.2iu/kg per day 2/3 at 6 am 1/3 at 10pm, plus sliding scale, every morning add insulin from sliding scale used the previous day to daily dose or isophane
- yes → Re-start previous insulin regimen, with sliding scale

If type 2 diabetic and RBS controlled on insulin with <20units/day start on oral hypoglycemics with sliding scale while in hospital, if RBs<10 with oral hypoglycemics discharge with oral medication only, if not, contact specialist for management advice.


Botswana National Guideline for Hypertensive Urgency and Emergency
Definition: Systolic BP≥180 mmHg; or Diastolic BP ≥120 mmHg, assess BP medication history and compliance
pregnant
No
yes
refer to obstetric emergency guidelines
Retake BP manually in both arms, after 30 minute resting
SBP≥180 or DBP≥120
SBP 140-179 or DBP 90-119
Signs or symptoms of hypertensive emergency ? Nausea/vomiting, severe headache, confusion, seizures , focal neurological signs, Chest pain, Shortness of breath, visual problems
Yes
no
Admit to medical ward, send baseline investigations (RFT, RBS, HIV testing, ECG, CXR ,urine analysis
Sings of the following? 1)Acute myocardial infarction, see ACS guidelines, 2) Stroke/subarachnoid hemorrhage, see stroke guidelines, 3) Aortic dissection (tearing or ripping or chest pain radiating to back; refer to higher level care, 4) acute pulmonary edema; refer to CCF guideline
If none of the above signs present, then start treatment
Hydralazine 10mg i.v. very slowly diluted in 10ml of NS, repeat with 5mg every 20min until BP target of <180 systolic , if no hydralazine available or if no response give Captopril 25mg po every 6 hours
If BP<180 and no signs of hypertensive emergency: initiate oral therapy Nifedipine XL30mg OD, or re-start all BP meds if already on treatment, monitor BP in hospital if stable with BP <180 for 24 hours, discharge with 1 week follow up
Discharge from A&E or clinic with prescription for drug given or previously prescribed (if treated in ED and Captopril used give Enalapril 20mg OD, if Hydralazine used give Carvedilol 6.25mg bd, Nifedipine XL 30mg od, if non compliant add drug from class not already given, refer to outpatient guidelines for suggestions. Follow-up in local clinic in 1 week for BP check and management
If non-compliant give already prescribed drugs, if new diagnosis or compliant: Give Nifedipine SR 20 mg or XL 30mg If already on maximum dose of this class and not on ACE inhibitor give Captopril 12.5mg, or if on both give HCTZ 25mg, if on all three give Hydralazine 10mg po
Recheck BP in two hours
SBP ≥180 or DBP ≥120
Give another dose of same drug unless HCTZ, then pick another class, if all classes used call specialist

Botswana National Guidelines for Meningitis for HIV negative or unknown patients

Defintion: Two or more criteria
- Nausea and vomiting
- Headache (new onset persistent, >72hours, change in character, worse than usual)
- Fever or hypothermia
- Acute confusional state
- Neck stiffness
- Photophobia

No → **Meningitis less likely, consider alternate diagnosis, review for meningitis again if change or patient worsens**

Yes → **Suspect Meningitis. Place iv line , draw blood cultures, give Cefotaxime 4g IV STAT within TWO hours of presentation, give 1 liter of NS, O2, if BP<95 review Sepsis protocol and continue in algorithm**

Additional Focal Neurologic signs
- Seizures
- Loss of consciousness/altered MS
- Hemiparesis
- Fixed/dilated or unequal pupil

Yes → **Consult Specialist**

No → **CT available within 1 hour?**

Yes → **Perform CT head before LP, review CVA protocol if CVA on CT; Mass effect?**

Yes → **Consult Specialist**

No → **Discuss risks and benefits with patient or family and proceed with LP, if refused discuss with specialist**

No → **No improvement after three days?**

Yes → WBC>5 but not in any other category → **Consult Specialist**

No → WBC 25-500 Neutrophils <50%

Yes → **Start TB meningitis treatment as per guidelines**

No → **Treat for HSV with:**
- **Aciclovir 10mg/kg IV q8hr**
- **Give with 3 liters of Fluids/24hr**

Yes → Acute onset of confusion and CSF glucose normal?

No → WBC 5-1000 Neutrophils <20%

Yes → WBC with neutrophil predominance, or acute onset of sickness <2 days

- **Cefotaxime 2g IV 6 hourly. Add Ampicillin 2g IV 4 hourly if age ≥ 65 or immunosuppressed (on chemotherapy)**
- **If Cefotaxime is out of stock or severe PCN allergy, give Chloramphenicol 1g IV q6h, if >65 years or immunosuppressed add Co-Trimoxazole 15-20mg/kg/day divided in 4 doses**
- **Consider empiric treatment for cerebral malaria if from an endemic area, no RDT or smear available and presents with T≥38.0, see Botswana antimicrobial guideline on dosing**
- **If signs of confusion and lymphocytic predominance treat for HSV also**

- **Perform Lumbar puncture. Note opening and closing pressure**
- **Drain CSF to achieve closing pressure of <20cmH2O**

Send CSF for: cell count and differential, MCS, AFB stain and culture, Protein and glucose

Also do: RFTs, LFTS, FBC, serum glucose, RPR, UPT if female, Blood smear or RDT for malaria if from area of known cases or fever ≥38.0, HIV test (if not known HIV+ or last HIV>1year), CXR

No → **HIV positive**

Yes → **Go to HIV positive meningitis algorithm**

National Botswana Guidelines for Meningitis in HIV Positive Patients

Definition: ONE or more criteria
- Nausea and vomiting
- Headache (new onset persistent, >72hours, change in character, worse than usual)
- Fever or hypothermia
- Acute confusional state
- Neck stiffness
- Photophobia

No → **Meningitis less likely, consider alternate diagnosis, review for meningitis again if change or patient worsens**

Yes → **Suspect Meningitis. Place iv line, draw blood cultures and give Cefotaxime 4g IV STAT within TWO hours of presentation, give 1 liter of NS, O2, if BP<95 review Sepsis protocol and continue in algorithm**

Additional Focal Neurologic signs
- Seizures
- Loss of consciousness/altered MS
- Hemiparesis
- Fixed/dilated or unequal pupil

Yes → **CT available within 1 hour?**

Yes → **Perform CT head before LP, review CVA protocol if CVA or bleed. Mass effect?**

Yes → **Consult Specialist**

No → **Discuss risk and benefits with patient or family and proceed with LP, if refused discuss with specialist**

No → **Consult Specialist until then treat for bacterial meningitis**

- **Treat for bacterial meningitis:**
- **Cefotaxime 2g IV 6 hourly AND Ampicillin 2g IV 4 hourly**
- **If Cefotaxime is out of stock or severe PCN allergy, give Chloramphenicol 1g IV q6h, and Co-trimoxazole 15-20mg/kg/day divided in 4 doses**
- **Consider empiric treatment for cerebral malaria if from an endemic area, no RDT or smear available and presents with T≥38.0, see Botswana antimicrobial guideline for dosing**

- **Perform Lumbar puncture. Note opening and closing pressure**
- **Drain CSF to achieve closing pressure of <20cmH2O**
- **Send CSF for:** cell count and differential, MCS, AFB stain and culture, Protein and glucose , India ink, cryptococcal culture
- **Also do:** RFTs, LFTS, FBC, serum glucose, RPR ,UPT if female, Blood smear or RDT for malaria if from area of known cases or fever ≥38.0), CXR, if LP NOT done send: BCX, cryptococcal AG from blood

India ink positive, or if no LP crypto Ag +?
- Yes → **Start cryptococcal meningitis treatment as per HIV guidelines, not improved after 3 days or >10% Neutrophils add TB meningitis treatment**
- No → WBC 25-500 Neutrophils <50%,
  - Yes → **Start TB meningitis treatment as per guidelines, if symptoms < 2days treat for meningitis**
  - No → WBC >1000
    - Yes → **Treat for bacterial meningitis:** (see above)
    - No → WBC 5-1000 Neutrophils <20%, no antibiotics prior to presentation
      - No → WBC>5 but not in any other category
        - Yes → **Consult Specialist until then treat for bacterial meningitis**
      - Yes → Acute < 2days onset of confusion and CSF glucose normal?
        - No → **Treat for HSV Aciclovir 10mg/kg IV q8hr**
          Give with 3 liters of Fluids/24hr
          No improvement after three days?
          - Yes → **Consult Specialist until then treat for bacterial meningitis**
        - Yes → **Treat for bacterial meningitis:** (see above)

Botswana National Guideline for Sepsis Management

Definition: Suspected Infection by history AND 2 or more of the following signs:
Temp (ax) > 38 or <35
Heart rate >90
Resp rate >30
Systolic BP < 90 mmHg
Sa02 < 93% on RA without chronic lung disease
Glucose >8 mmol/L without diabetes history

Immediate treatment:
Insert large cannula
Give O2
Give 2 litres of NS/RL

Diagnostic work up (should NOT hold up antibiotics):
Chest X-ray
Blood Cx
(x2 pre-antibiotics)
Urine pregnancy test if female <50 years
Urinalysis &
urine MCS, if UA has WBC
Sputum for AFB
Malaria smear, if at risk
LP, if meningitis suspected
HIV test, if last > 1 year
FBC, kidney function test, LFTs, electrolytes, peripheral blood smear, PT/PTT, if available
if in hospital, transfer to high dependency,
If in A&E keep there

Antibiotics
Goal: IV antibiotics in < 1 hr
All antibiotics are given iv unless, otherwise stated

Unknown source, or HIV+ with abdominal source:
Cefotaxime 1g q8h+
Metronidazole 500mg q8h +
Vancomycin* 1g q12h

Lung:
Cefotaxime 1g q8h
+ Doxycycline 100mg po BD (not in pregnancy) or
Erythromycin 500mg po q6h

Urine:
Cefotaxime 1g q8h

Abdomen:
Cefotaxime 1g q8h+
Metronidazole 500mg q8h ®

Skin :
Vancomycin* 1g q12h +
Amox/clav® 1 gm q6h

Meningitis:
see meningitis algorithm

Malaria risk: empiric Rx

Give first dose, then adjust dosing as per renal function

*If vanco unavailable, use clindamycin 900 mg q8h

® If Cefotaxime/Metronidazole unavailable use Chloramphenicol 1g iv q8h

For more alternatives, see antimicrobial guidelines

SBP <90

no

yes

Repeat 1 litre bolus
(up to 10 litres in 24 hours)
of NS, RL, DNS,
place urinary catheter,
monitor for pulmonary oedema,
give hydrocortisone 100mg i.v. OD if on chronic steroids or dexamethasone 4mg (>2weeks of prednisone 20mg od) in last 3 months
re-assess for other cause,
If Hgb<7g/dl transfuse, if blood available
Check Vital signs hourly
6 hours since start of resuscitation passed?

no

yes

Goals met after 6 hours?
Systolic BP >90
urine output>30ml/hr,
SaO2 >92%
clinically improved

yes

admit or keep in High Dependency, continue antibiotics for a total of 8 days, if source or aetiology identified, **adjust** antibiotics and length of treatment, give DVT prophylaxis
give NS, RL until pulse <100/min, BP systolic >100 and patient drinking, remove urinary catheter once patient stable

No

Respiratory distress, or SaO2 <93% on maximum 02

yes

Discuss with anaesthetist or specialist at PMH or NRH
Consider transfer to higher level care

Botswana National Guideline for Status Epilepticus

Definition: person convulsing or unconscious with a continuous, unremitting seizure lasting >5 minutes, or recurrent seizures without regaining consciousness between seizures for > 5 minutes?

Check BP, temperature, resp rate, blood glucose
Look for CLUES: Signs of serious head trauma or neck injury; Pupils: dilated, pinpoint, not equal, or not reactive to light; Signs of meningitis; Focal deficits
Ask witness/family about:
Duration, previous seizures, history of trauma, medical history, seizure medications and adherence if known epileptic
Protect patient from harm

Insert cannula, if history of diabetes and on treatment **OR** unable to check finger stick glucose give 50ml 50% glucose IV , check FBC, LFT, urea, creatinine, electrolytes, urine pregnancy test if female <50 years of age, HIV test if > 6 months or unknown
give fluids slowly (normal saline or Ringer's at 30 drop/min), If available, give 100mg thiamine i.v. or po if not available iv
If bacterial meningitis suspected give Cefotaxime 2g iv once, for further management refer to meningitis guidelines
Patient still seizing: give diazepam 10mg IV (5mg/min) OR if no IV available, give diazepam 10mg rectally
If female, Check pregnancy test / examine for evidence of pregnancy

Pregnant?

Yes

SUSPECT ECLAMPSIA!
Start NS, or RL 500cc then
give Mg Sulfate 4g in 200ml of NS over 30 minutes, thereafter give 1g Mg per hour i.v.
For further management refer to emergency obstetrics guideline

No

Convulsion continuing after 5 minutes

Yes

Give 2nd dose of diazepam 10mg IV/rectal

Seizure continues after 5 min.

Phenytoin 20mg/kg mixed w 250cc Normal Saline or Ringer's Lactate; infuse over 30 min.

Seizure continues after 10 min.

Give additional phenytoin 10mg/kg mixed with 125cc Normal Saline or Ringer's Lactate; infuse slowly

Seizure continues after 10 min.

Phenobarbitone 10-15mg/kg IV (infuse <50mg/min), monitor respiratory status, transfer to ICU/higher level care

Seizure continues after 10 min.

Phenobarbitone 5mg/kg IV (<50mg/min), consider intubation, TRANSFER TO A&E or ICU

Convulsion stopped

After-Status Care

Full neuro exam
-Admit to ward
-Continue IV fluids
-Workup as directed by hx, exam, lab results
- CT of head if new onset seizures or new focal deficits, hx of head trauma, unequal pupils
-Perform LP unless clearly contraindicated

Guidelines for Acute GI Bleed

Definition: hematemesis (coffee ground vomitus), melena (black stools with a rotten odor), or hematochezia (red or maroon stools)

Take Vital signs (BP, RR, Pulse), place TWO large bore (at least TWO i.v. cannulas, examine patient , take medication history, Give 2-8L O2 if SPO2 <90%, collect blood for FBC, for cross match (continue in algorithm while waiting)

Pulse >100 and/or BP systolic <100, RR>20, or a 20% drop in BP or 20% increase in pulse when patient sits up from lying down position, still passing melena or hemaotchezia or having hematemisis?

yes

Give 2 liters NS, D5NS or Ringer's iv bolus, one through each IV

Give Omeprazole 40mg i.v. BD and Ranitidine 150mg i.v. if not available give orally, keep NPO otherwise

Order 2 units blood, while waiting for the FBC results, if no blood available try to find donors and continue NS boluses **DO NOT WORRY ABOUT DILUTING BLOOD, KEEPING CIRCULATION IS MORE IMPORTANT THAN MAINTAING HgB level**

Check BP, Pulse, postural hypotension, Monitor for signs of active bleeding (increasing pulse, dropping BP, or no response despite aggressive fluid resuscitation syncope, melena, hematemesis, hematochezia)

Continue giving fluids until Pulse<100, BP systolic >100, one through each IV

Patient continues to have signs of active bleeding or is not responding to fluid resuscitation call surgery specialist for emergency referral

no

Give 2 liters NS, D5NS or Ringer's iv over 4 hours, one through each IV

Give Omeprazole 40mg i.v. BD and Ranitidine 150mg i.v. if not available give orally, keep NPO otherwise

Monitor for signs of active bleeding (increasing pulse, dropping BP, syncope, melena, hematemesis, hematochezia)

If no signs of bleeding >24 hours discharge,

- if ascites, schedule for urgent upper endoscopy for potential esophageal varicose vein banding due to portal hypertension,
- if epigastric pain, treat for ulcer with Omeprazole 40mg BD for 1 month, Amoxicillin 1g bd for 7 days, Metronidazole 400mg TDS for 7 days
- If epigastric pain recurs after treatment for ulcer schedule upper endoscopy
- If lower GI bleed schedule for colonsocopy

Botswana Guideline for Overdose Treatment

Definition: history of overdose, chemical smell on breath or clothes, rotary nystagmus, stupor or coma, agitation, hallucinations, seizures, muscle rigidity, unexplained arrhythmias or symptoms not explained by any disease process

Review medication, do physical exam, BP, Pulse, O2 sat (if available), Respiratory Rate, place cannula, check random blood glucose (RBS)
Bloods: kidney and liver function tests, full blood count, blood culture, urine culture + analysis, HIV test if unknown or negative >6 months ago, Chest X-ray, Urine pregnancy test,

give a rapid infusion of NS, DNS or RL during further work up, **give** Thiamine 100mg orally**, if comatose give** 2mg of Naloxone i.v., 50% dextrose iv even if normal FBS, if skin exposure remove clothes (use gloves and store clothes in plastic bag), if oral exposure: **do NOT** induce vomiting or attempt gastric lavage, **Give** 1g/kg of charcoal (**not useful** in organophosphate, benzodiazepine, alcohol, Iron, DDT, Lithium, carbamates poisoning)

Pulse> 100, Bp>150, Temp>37.5, wide pupils, agitation or delirium and confusion → Consider Anticholinergics (e.g. allergex, tricyclics), Sympathomimetics (e.g. cocaine, caffeine, theophylline) as causes of overdose, treat seizures with Benzodiazepines (e.g. diazepam 10mg iv or pr), treat fever with anti-pyretics and physical cooling with ice packs

Pulse< 60, RR<10, Temp<35 → Consider organophosphates (see below), opiates (give: naloxone) barbiturates (supportive care), Benzo-diazepines (supportive care), alcohol (supportive), beta blockers (see below) as causes of overdose

Paracetamol Overdose: rapidly absorbed <1h, toxic 150mg/kg., first 24 hours malaise, nausea, vomiting, then LFT start rising (disproportionate Bilirubin over AST, ALT), recovery possible at 5 to 7 days → **Give** N-Acetylcystein (ACC) if >150mg/kg of Paracetamol ingested or elevated LFTs (even if minimal) with history of 4 -6g of Paracetamol, 140mg/kg initially then repeat Bolus of 70mg/kg every 4h also can be given po

Organophosphates: bronchospasm, bronchorrhea, lacrimation, salivation, hypotension, bradycardia, miosis, confusion, agitation, coma, sweating fasciculations, muscle weakness. Peripheral respiratory can develop after initial recovery (intermediate syndrome) → Place patient in left lateral position with neck overextended, **give** 1 to 3mg of atropine i.v. if no improvement after 5 min double dose, once patient is improving continue atropine at current dose , when goals met (BP syst. >80mmHg, pulse>80/min, chest clear) start atropine infusion at 10% of total dose given so far per hour. Watch for toxicity (fever, agitation, lack of bowel sounds, urinary retention) hold infusion and check every 30 minutes if toxicity resolved and re-start infusion at 50% of previous dose. give O2, intubate if necessary and transfer to higher level care, give i.v. NS, DNS or RL

Beta Blockers (esp. Propranolol) overdose, symptoms will occur within 6 hours, Risk of seizures high if QRS>100ms, hypotension, bronchospasm, CCF, Bradycardia
Calcium Channel Blockers in extended release form (E.g. Nifedipin Xl or ER) absorption can take up to 12hours, symptoms start by 6hours, hypotension, nausea and vomiting → For **Beta Blockers**: Give Glucagon 5-10mg iv bolus, then 1-10mg/hr infusion, if **Calcium Channel Blockers**: give fluids, then glucagon and Calcium gluconate 10%, 0.5ml/kg every 20 minutes X 4