Abdominal Aortic Aneurysm

Patients with a leaking aneurysm are bleeding to death!

Suspect leaking aneurysm if:

- **Over 55 AND**
- **Severe Abdominal Pain/'Renal Colic' (haematuria is common)/ Low Back Pain OR**
- **Unexplained Shock OR**
- **Known AAA and pain or shock**

- **Patient is examined*** *on ambulance stretcher* by most experienced doctor in EMERGENCY DEPARTMENT IMMEDIATELY. If AAA is still suspected:**
- **Vascular Reg contacted by ringing RVH.**
- **Patient taken to A-Block Recovery RVH** for Vascular Assessment IMMEDIATELY**

***They will give alternative contact details if necessary**

****ECG should usually be done as well**

- **Doctor to accompany patient**
- **Give 100% 02**
- **Give Morphine + Metaclopramide in iv aliquots**
- **Do not give iv fluids unless unconscious**

Maximum time in Emergency Department is ten minutes – longer delays will require explanation!

Target call-to-surgery is 60 minutes maximum

Chest pain – suspected myocardial infarction and acute coronary syndromes, (see also Thrombolysis)

ACUTE ST ELEVATION MYOCARDIAL INFARCTION* and ACUTE CORONARY SYNDROME (ACS) are caused by instability/rupture of atheromatous plaques in the coronary circulation. Identifying ST Elevation MI rapidly is the first goal – referral for PCI within 15mins is the goal.

The ACS spectrum ranges from unstable angina (USA) to non-ST elevation myocardial infarction (NSTEMI). ACS is extremely common amongst ED patients and it is associated with high risk of cardiac arrest, peri-arrest arrhythmias, acute ST elevation myocardial infarction and acute LVF.
Rarely acute MI may be caused by another cause such as cocaine abuse

Should I admit to Cardiology? (Modified AEP Criterion 1)
Patients presenting to the emergency department with chest pain should be admitted to a cardiac unit if they have a history highly suggestive of acute coronary syndrome
ie pain *typical of angina pectoris* that is
(1) 1 new-onset within the preceding 5 DAYS or
(2) at rest within the preceding 5 DAYS or
(3) crescendo angina (increasing frequency and severity)
(Prolonged pain associated with cold sweat, faintness, nausea & vomiting or a sense of dread is highly suggestive of acute myocardial infarction).

OR

Should I admit to Obs? (Modified AEP Criterion 14)
Patients with an atypical but *suspicious* history and with no acute or dynamic ECG changes (see below) may be admitted to the Obs ward to rule out significant event (use the proforma).

ECGs

Now look at the patient's ECG & compare with any previous ECGs ASAP. The triage nurse will have obtained an ECG within ten minutes of the patient's arrival in Emergency Department – you must is check this for lysis-infarct (1-3 below) straight away, recording initials & time on the ECG

Ischaemic ECG changes:
1. **ST elevation > 1small square in 2 adjacent leads = myocardial infarction:**
(II, III,aVF = inferior I, aVL, V2-6 = anterior)
2. **LBBB = assume anterior myocardial infarction if new**
3. **Profound ST depression V1-3 +/- Tall R-wave in V1 = posterior myocardial infarction**
4. **Tall peaked T-waves with early slurring of ST segment= ?hyperacute ischaemic ECG: GET ADVICE**
5. **Any other ST segment depression("NSSTTW") = assume Acute Coronary Syndrome unless present on old ECGs**

HISTORY IS ALWAYS MORE IMPORTANT THAN ECG> IF THE ECG IS NORMAL BUT THE HISTORY SUGGESTIVE REPEAT AFTER 30 MINS.
Remember that pericarditis and a variety of other medical conditions can cause ST segment change: the history should fit the ECG!

TREATMENT OF ACUTE CORONARY SYNDROMES

All patients with suspected ACS should receive the following treatment (unless contra-indicated eg on warfarin).

- Continuous ECG monitor, SaO2, NIBP
- NL spray +/- Buccal Suscard (if SBP>110)
- Soluble Aspirin 300 mgs orally

Some patients may require diamorphine for pain relief and this should be given with an anti-emetic. (metoclopramide)
Patients with ECG changes or HIGHLY suggestive history should also receive Enoxaparin (1mg/Kg)

Rapid Access Chest Pain Clinic

The Rapid Access Chest Pain Clinic is designed to provide a 'one stop' service for patients presenting with a recent onset of chest pain thought to be stable angina or very low risk unstable angina. ED doctors on the advice of the ED consultant can refer patients directly to RACPC.

NOT ALL CHEST PAIN IS CARDIAC!!!!

You will see many other types of chest pain. Common causes of chest pain in order of frequency include:

Musculoskeletal pain is the commonest

take a good history!--did the patient undertake strenuous activity eg gardening?, do certain movements hurt? Is there a tender costo- vertebral junction suggesting an acutely subluxed rib at the back (common and self- limiting) – but remember that (but ~15% of patients with acute mi have marked chest wall tenderness!)

- **Upper GI –GORD, Acute Cholecystitis, Pancreatitis**
- **Stress, Hyperventilation**
- **Chest infection**
- **Rib fractures eg cough fracture**
- **Pneumothorax**
- **PE (use Canada score)**
- **Herpes Zoster- dermatomal**

THROMBOLYSIS (see previous section: Chest Pain)

…in the Emergency Department!

This is rarely given in modern practice although may be considered in exceptional circumstance eg sudden cardiac arrest, please discuss with the consultant in charge of the shift.

Acute Left Ventricular Failure

(Dia)morphine as soon as possible
Sometimes Emergency Department doctors fail to recognise LVF!

Recognition

- **Sudden onset of dyspnoea or sudden deterioration?**
- **Previous cardiac history?**
- **Pallor/sweating?**
- **Pulmonary crepitations?**
- **Hypotension/ clammy?**

Treatment

- Inform senior ED doctor immediately
- Consider arrhythmia or MI as cause – monitor, 12-lead ECG
- Give oxygen 100%*
- Diamorphine 2.5-5mg iv with metoclopramide 10mg iv
- Administer Furosemide 40-80 mg iv (repeat if necessary)
- Consider iv GTN (only if SBP >110)
- Consider CPAP if respiratory distress
- Notify Cardiac doctor ASAP

Thrombo-embolic Disease

IT IS ESSENTIAL TO UNDERSTAND THE DIFFERENCES IN APPLICATION AND NORMAL RANGE BETWEEN D-DIMER TESTING FOR PULMONARY EMBOLISM AND DVT

Pulmonary Embolism

MASSIVE PULMONARY EMBOLISM IS A CLINICAL DIAGNOSIS MADE IN THE PRESENCE OF SHOCK, RIGHT HEART STRAIN AND SEVERE HYPOXIA WITH RISK FACTORS FOR THROMBOEMBOLIC DISEASE AND NO OBVIOUS ALTERNATIVE DIAGNOSIS (EG MI). GIVE 02 via NRRM and CONSIDER IMMEDIATE LYSIS (PREFERABLY AFTER CARDIAC ECHO IN RESUS) – SEEK SENIOR ADVICE

Assessment for acute sub-massive pulmonary embolus follows the 'rule in-rule out' method outlined below. A scoring system devised by a team of Canadian physicians forms the basis for our assessment. Although this system incorporates d-dimer testing and is supported by diagnostic imaging, your clinical assessment of the likelihood of PE as opposed to some other diagnosis is crucial.

Step One: Clinical Assessment of a patient with suspected PE prior to Canadian scoring

Start with HISTORY. Acute pulmonary embolus is often a difficult diagnosis as signs are often non-specific or unreliable. Patients often complain of dypsnoea, pleuritic chest pain or collapse with shock in the absence of other causes.
97% of patients have one of the following

1. Dypsnoea
2. Tachypnoea (Respiratory rate >29/min)
3. Pleuritic chest pain

But you must consider if another diagnosis is more likely.

EXAMINATION of the cardiovascular system, chest and legs may confirm your suspicion of PE but physical findings are more often useful in suggesting an alternative diagnosis (see below).

An ECG should be taken, mainly to exclude acute MI or pericarditis. In PE tachycardia is the most common finding, non-specific ST-T wave abnormality is common, S1Q3T3 is rare.

PACXR should be also requested. Once again, it is often more helpful in identifying an alternative diagnosis such as pneumothorax, LVF or chest infection. It is normal in 10-20% of patients with PE (note that a normal CXR with hypoxia and significant dyspnoea supports a diagnosis of PE). Most of the remaining patients have non-specific findings like atelectatsis / small effusion / elevated diaphragm, cardiomegaly. Occasionally, specific findings like a pulmonary infarct will be seen (wedge shaped, Hampton's hump) or an area of oligaemia identified distal to a dilated vessel (Westermark sign).

ABG / O2 sat should be measured: Low O2 saturation or PO2 increases suspicion in the absence of alternative diagnosis but normal oxygenation does not exclude PE. Comparing ABGs with and without O2 mask is not helpful.

StepTwo: Measure Canadian Score

Clinical features of DVT	**3.0**
Recent immobility or surgery	**1.5**
Active cancer	**1.0**
Hx of DVT / PE	**1.5**
Haemoptysis	**1.0**
Resting heart rate >100/min	**1.5**
Pulmonary embolus *as likely as or more likely than* an alternative diagnosis	**3.0**

Score	**Pre-test Probability of PE**
<2	**low**
≥ 2	**Medium to high risk**

Step Three: Investigation to Rule In or Rule Out PE

RULE OUT: Patients with a low pre-test probability score can have a d-dimer test to rule out PE. IF their D-Dimer is < 350ng/ml, PE can be excluded and an alternative diagnosis should be sought.

RULE IN: Patients with a medium or high pre-test probability OR a D-dimer > 350mg/ml will probably CTPA scan to rule in PE irrespective of D-dimer result. Stable patients with a low PESI score may be investigated in the Observation Ward. Patients with a high PESI score are high risk and should be admitted for investigation and management under the medical inpatient team.

Pulmonary Embolism Severity Index (PESI)

Predictors	Points assigned
Age	Age in years
Male sex	+10
Cancer	+30
Heart failure	+10
Chronic lung disease	+10
Pulse ≥ 110 /min	+20
Systolic blood pressure < 100 mmHg	+30

Respiratory rate ≥ 30/min	+20
Temperature < 36°C/ 96.8° F	+20
Altered mental status (Disorientation, lethargy, stupor, or coma)	+60
O_2 Saturation < 90% on Room Air?	+20

Risk Class I (Very low): Points≤ 65; Risk Class II (Low): Points 66-85; Risk Class III (Intermediate): Points 86-105; Risk Class IV (High): Points 106- 125; Risk Class V (Very high): Points ≥ 126

Risk Class Ⅰ-Ⅱ (Low): Points≤85; Risk Class Ⅲ-Ⅴ (High): Points＞85

Step Four: Treatment Pending Further Investigation

HIGH RISK PATIENTS FOR SUB-MASSIVE PE SHOULD RECEIVE 1.5MG/KG ENOXAPARIN* SUBCUTANEOUSLY ASAP AND SHOULD BE ON Controlled O2, ECG, SAO2 MONITOR.

NB dose reduction in renal impairment, seek senior advice

Acute Life Threatening Pulmonary Embolism

Resuscitation — When a patient presents with suspected PE, the initial focus is on stabilizing the patient.

Respiratory support — Supplemental oxygen should be administered if hypoxemia exists. Severe hypoxemia or respiratory failure should prompt consideration of intubation and mechanical ventilation.

Hemodynamic support — Hemodynamic support should be instituted promptly when a patient presents with PE and hypotension, defined as a systolic blood pressure <90 mmHg or a drop in systolic blood pressure of ≥40 mmHg from baseline.

Intravenous fluid administration is first-line therapy. Clinicians should be wary of administering more than 500 to 1000 mL of normal saline during the initial resuscitation period.

If the patient's hypotension does not resolve with intravenous fluids, intravenous vasopressor therapy should promptly follow.

THROMBOLYSIS — Thrombolytic therapy accelerates the lysis of acute PE and improves important physiologic parameters, such as RV function and pulmonary perfusion. However, no clinical trial has been large enough to conclusively demonstrate a mortality benefit. Thrombolytic therapy is associated with an increased risk of major hemorrhage, defined as intracranial hemorrhage, retroperitoneal hemorrhage, or bleeding leading directly to death, hospitalization, or transfusion.

Persistent hypotension due to PE (ie: massive PE) is the most widely accepted indication for thrombolytic therapy.

A 50 mg bolus of alteplase is recommended.

Deep Venous Thrombosis

THE GUIDANCE BELOW MUST BE FOLLOWED METICULOUSLY AT ALL TIMES OR THE CASE DISCUSSED WITH A MORE SENIOR DOCTOR.

On the next pages you will find the following:

- **Protocol for clinical examination to rule in or out DVT**
- **Protocol for investigation to rule in or out DVT**
- **Protocol for managing definite DVT**
- **Ensure Unprovoked DVTs are referred to DAU for ongoing valuation**

- ***Step One: Clinical Examination To Rule In Or Rule Out DVT : Canada Score***

This scoring system accurately determines the pre-test probability of DVT. It is vital to consider alternative diagnoses as –2 points depend on whether another diagnosis is as likely as DVT

A previous history of DVT or PE is deemed to be high risk – IRRESPECTIVE of Canadian Score.

Active Cancer	**1**
Paralysis/paresis or recent plaster immobilization of the lower extremities	**1**
Immobilization > 3 days or major surgery within four weeks	**1**
Localised tenderness along the distribution of the venous system	**1**
Entire Leg swelling	**1**
Calf swelling > 3cm when compared with the asymptomatic leg (measured 10cm below the tibial tubercle)	**1**
Pitting oedema greater in the symptomatic leg	**1**
Collateral superficial veins (non-varicose)	**1**
Alternative diagnosis as likely or more likely than DVT (Eg sudden onset – muscle tear, *prolonged CRT – arterial insuff*iciency, OA knee – Baker's cyst, temp>38 –cellulitis)	**-2**

SCORE	INCIDENCE OF DVT	PROBABILITY
0	**5%**	**VERY LOW (RULED OUT)**
1-2	**33%**	**MEDIUM**
>2	**85%**	**HIGH**

* PATIENTS REFERRED BY THEIR GP WITH A D-DIMER NEED TO COMMENCE THE PATHWAY FROM THE BEGINNING. *i.e. AN ED D-DIMER RESULT IS REQUIRED**

- ***Step Two: Investigations to Rule in or Rule Out DVT***

Patients with a very low probability score for DVT should NOT have D-Dimer but other causes of leg pain should be excluded. The commonest mistake is to miss peripheral vascular disease – always record CRT. Also consider ruptured Baker's cyst, cellulitis, erythema nodosum, chronic venous insufficiency or lymphoedema. Diabetic patients with swollen red legs need soft tissue infection and underlying osteomyelitis to be considered.

Patients with medium probability for DVT should have D-Dimer screening to determine the need for USS. High risk patients with elevated D-Dimer should have a second Doppler done in 1 week if the first test is negative in keeping with NICE guidelines.

	Medium Pre-test Probability	**High Pre-test Probability**
D Dimer < 250 ng/ml	**NO USS**	**USS**
D Dimer > 250 ng/ml	**USS**	**USS**

- **USS**

How to request an Ultrasound scan

1. If patient has attended during working hours, speak to an ultrasound radiographer who will hopefully scan on the day of attendance.
2. If patient attends out-of-hours or cannot be scanned immediately for some other reason follow 3-7:
3. If there is a contra-indication to community treatment with low molecular weight Heparin(see below) – admit.
4. If there is no contra-indication to LMWH, Start treatment with Enoxaparin 1.5mg/kg *subcutaneously daily giving first dose in Emergency Department (1/2 dose if after 5pm).
5. Make an arrangement for patient to be given subsequent daily doses via district nursing service, giving the patient sufficient Enoxaparin syringes to last until day of USS – IF NURSING MANAGEMENT CAN'T BE ARRANGED, BRING PATIENT BACK AT 10AM FOR DAILY SUBCUTANEOUS ENOXAPARIN* VIA THE OBSERVATION WARD NURSE. If you are doing this make sure that the patient's notes and details are given to the Obs ward staff
6. Give a Heparin information sheet to patient.
7. Arrange USS appointment for patient. There is an available USS appointment slot as shown each weekday for Emergency Department patients attending out of hours ONLY. If in hours arrange directly with the radiology department for a scan that day.

Monday	9.30	11.00	14.30
Tuesday	9.30	11.00	----------
Wednesday	9.30	----------	14.30
Thursday	9.30	----------	14.30
Friday	9.30	11.00	----------

Reserve one of these slots by writing the patient's name and number in the DVT diary and booking an appt on symphony. Order the Doppler on the PACS system. This is your responsibility. Give the patient an appointment card asking them to go to X-ray at the appointed time. If no slots are available within five days record the patient's name, number and telephone number at the foot of the next working day page in the diary and advise the patient that they will be telephoned with an appointment time. Pass the referral on to an ultrasound radiographer.

8. LMWH should be discontinued on all patients with negative USS. If a patient with a medium pre-test probability has a negative ultrasound, reassure and discharge. If a patient with a high pre-test probability

has a negative ultrasound, reassure but seek senior advice regarding a re-scan in 7-10 days time. Make a record on the Emergency Department flimsy.

**NB dose reduction in renal impairment, seek senior advice*

- ***Step Three: Management of definite DVT***

If community management is contra-indicated – admit to Medicine.

Contraindications to Community Management

1. **Ilio-femoral DVT is strongly suspected / grossly swollen limb, marked femoral vein tenderness, major risk factors, eg, metastatic disease.**
2. **Active peptic ulcer**
3. **Recent surgery**
4. **Pregnancy**
5. **Other bleeding risk**
6. **Symptoms of PE (SOB, haemoptysis, dizzy, chest pain)**
7. **BP>200 systolic or 115 diastolic**
8. **Currently on warfarin/NOAC**
9. **Patient is very frail or ill (unless from a Nursing Home)**
10. **Dialysis patient / low clearance renal patient**

If community management is not contraindicated:

Please See VTE Treatment with Apixaban for DVT/PE

- **Step Four: Unprovoked DVTs**

Following confirmation of unprovoked DVT, please ensure all patients are referred to DAU for ongoing evaluation.

Northern Health and Social Care Trust

VTE TREATMENT WITH APIXABAN FOR DVT/PE

EMERGENCY DEPARTMENT, ANTRIM AREA/CAUSEWAY HOSPITAL

Patient Addressograph	Allergies / Medicine Sensitivities	
	No Known Allergies ☐ (please tick) or	
	Medicine (generic)/Allergen	Type of reaction

Step 1: All patients should be risk assessed before commencing any oral anticoagulant therapy- see 'Oral Anticoagulant Guidelines, Pg. 4' on trust intranet for advice.

Step 2: Contra-indications for Apixaban- any tick should prompt staff to reconsider using Apixaban as unsuitable choice and to seek senior medical advice

Patient related	Tick
Active bleeding	
Significant risk of major bleeding (recent GI ulcer; varices; recent brain, spine or ophthalmic surgery; intracranial haemorrhage; malignant neoplasm; aneurysm)	
Prosthetic heart value	
Pregnancy or breast feeding (ask patient if intention of getting pregnant in next 6 months)	
Age < 18years	
Hepatic Disease associated with Coagulopathy	
Severe renal impairment (CrCl<15ml/min). **Seek Consultant review if CrCl between 15-30ml/min**	
Active cancer/chemotherapy-**discuss with ED consultant**	
If co-prescribed with **antiplatelets (NB if patient has stent, consult cardiology prior to stopping)** **carbamazepine** **dronedarone** **HIV protease inhibitors** **itraconazole** **ketoconazole** **other anticoagulant (except under specific circumstances of switching anticoagulant therapy)** **phenobarbital** **phenytoin (and fosphenytoin)** **posaconazole** **primidone** **rifampicin** **St. John's Wort** **voriconazole**	

Step 3: Drugs cautioned with Apixaban- any tick should prompt staff to seek senior medical advice

Drug	Tick
NSAIDS	
Sulfinpyrazone	

Step 4: Baseline Bloods- must check in ED prior to commencing Apixaban **(INR not required)**

Blood result	Tick
U&E inc. eGFR	
LFTs	
FBP	
Coagulation screen	

Prepared by ED Pharmacy Team. Last updated 13/03/19 Version 3

Cardiovascular

For patients with an implantable ICD

Patients may attend the ED after their de fib has fired. For the stable patients perform baseline investigations including ECG, and BP and refer to cardiology for observation and interrogation of the device.

In some cases the Defib is misfiring and in those circumstances can be temporarily abated by placing a magnet over the device (contact CCU).