Salisbury NHS
NHS Foundation Trust

Cardiac Suite – Operational Policy

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Post Holder responsible for Policy: CONSULTANT CARDIOLOGIST

Directorate responsible for Policy: Medicine

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1 PURPOSE AND PHILOSOPHY OF THIS SERVICE

To provide a local first class Consultant-led dedicated invasive and non-invasive cardiac service in which both investigational and therapeutic procedures are carried out. Although all cardiac interventions carry an inherent risk, the primary purpose of this unit and the role of its staff is to reduce this risk to a minimum by ensuring that patient safety and comfort is paramount. In order to achieve this all the health care professionals involved with the Cardiac Suite will have patient safety as their key objective and responsibility.

All members of the Cardiac Suite team will listen carefully to patient feedback and, where appropriate, incorporate this feedback into future developments of the service.

It is hoped that this facility will also provide earlier and easier access for both in-patients and out-patients leading to a more efficient and effective local service.

2 DIAGNOSTIC CARDIAC CATHETERISATION

Cardiac catheterisation is an invasive procedure undertaken for the diagnosis of a variety of cardiac diseases. This includes left heart catheterisation (by far the most common procedure), left and right heart catheterisation, graft studies, left ventricular angiography and aortography. The decision to recommend cardiac catheterisation must be based on a careful evaluation of the potential risks and benefits to the patient.

2.1 Indications

The main reasons to undertake elective out-patient cardiac catheterisation include:

- To establish a diagnosis of stable angina.
- In patients with significant valve disease who require valve surgery.
- In patients with heart failure and also a history of angina or where the aetiology of the left ventricular dysfunction is suspected to be ischaemic.

The main reasons to undertake urgent in-patient cardiac catheterisation (+/- proceed to PCI) are as follows:

- In patients with an acute coronary syndrome (ACS) – either unstable angina or a non ST-segment elevation myocardial infarction (NSTEMI).
- In patients with ST-segment elevation myocardial infarction (STEMI).

2.2 When should cardiac catheterisation not be carried out

Patients with the following conditions should have their cardiac catheterisation postponed (until such time that the Consultant responsible feels that it is safe to proceed):

- Uncompensated heart failure (patient unable to lie flat)
- Acute renal failure
- Acute stroke
- Active gastrointestinal bleeding
- Severe uncontrolled hypertension
- Severe electrolyte disturbances
- Unexplained febrile illness / untreated active infection

2.3 Outpatient Patient Preparation

Prior to procedure

The responsible Cardiologist or member of the Cardiology team should:

- Fully explain and discuss the possible risks, benefits and any alternatives to the patient.
- Once the patient has accepted to have the procedure the referrer should:
  - Identify if the patient has a responsible adult to accompany them after the procedure.
  - Identify preferred route of vascular access.
  - Pulses must be checked.
  - For radial access an Allens' test must be carried out and be positive.
- Radial access preferred:
  - Previous failed femoral access
  - Patients with severe peripheral vascular disease
  - Patients with abdominal aortic aneurysm
  - Patients on warfarin
  - Patients with coagulopathy
  - Obese patients
  - Patient preference

- Femoral access preferred:
  - Previous failed radial access
  - Previous CABG – especially patients with LIMA to LAD
  - Patients with severe aortic stenosis
  - Patients with significant dilatation of the aortic root
  - Patient preference

Identify if patient is suitable for a standby coronary angiogram +/- proceed to PCI (see Appendix 2.10.1 for Exclusion Criteria)

- Follow check list:
  - check all clinical detail recorded including height and weight and allergies
  - confirm not pregnant (female 12y-55y only)
  - check all relevant blood test results
  - define case type - eg DCA, valves, grafts
  - define approach - eg femoral, radial or either
  - define co-morbidity - eg IDDM, NIDDM (+/- metformin), PVD, CRF, warfarin, AVR/MVR, TIA/CVA, BMI, Age> 80
  - explain procedure
  - obtain written consent
  - give patient a local Coronary Angiogram / Cardiac Catheterisation patient information leaflet (see Appendix 2.10.2)
  - for those patients undergoing radial procedures give patient information leaflet explaining option of having procedure without the need to undress (see Appendix 2.10.3)
- Place on waiting list on TOMCAT. State 'Pre-assessment completed' in comments box
- Dictate GP letter and ensure that check list information is included in letter

The Cardiac Co-ordinator is then responsible for:

- Checking if a Pre-assessment clinic appointment is required and if so booking one (note that all patients identified for 'standby coronary angiogram +/- proceed to PCI' are required to attend a Pre-assessment clinic appointment)
- Input patient details into PiMS
- Book appointment date onto both PiMS and TOMCAT
- Send patient confirmation of appointment letter via post (see Appendix 2.10.4.1 or Appendix 2.10.4.2)

2.4 Pre-Assessment Clinic Operational Policy

2.4.1 Patient Selection and referral

All patients seen in this clinic will have been referred for coronary angiography by one of the Consultant Cardiologists at Salisbury District Hospital. They will have been seen and appropriately assessed for coronary angiography at an outpatient cardiology clinic or as an inpatient by a Cardiology Consultant, SpR or clinical nurse specialist.

Appointments for this clinic will be made by the Cardiology Co-ordinator who will also book them a place on an angiography day case list. There should be no more than 2 weeks between pre-assessment and the actual procedure.

2.4.2 Patient Preparation

The clinic will be held in the Cardiac Assessment area on Level 3.

The day before the clinic the Cardiology Co-ordinator will prepare the necessary paperwork to be completed at pre-assessment and for use on the day of the procedure.

2.4.3 Clinic Procedure

Medical notes will be 'pulled' either by the Cardiology Co-ordinator (if notes in the Cardiac Suite) or by medical records and prepared by clinic nurses.

Patient consultation will follow the required fields as indicated by the TOMCAT database.

All patients will have recent (within in previous 8 weeks) full blood count and renal functions test results available. If not, these will be requested and blood tests taken on the day of pre-assessment.

The procedure will be explained to the patient (including a discussion of risks) and a consent form completed and signed by the clinic nurse and patient.

The nurse will review the results and discuss any treatment plan with the consultant due to carry out the procedure if there are any queries.

Patients with transport problems can only be offered hospital transport home after the procedure. The Cardiology Co-ordinator should be informed and will arrange this. She/he should also be informed of any patients who will need to be admitted overnight either prior to or after the angiogram

Completed pre-assessments and patient notes will be returned to the Cardiology Co-ordinator for delivery to the Cardiac Suite as required.

Arrivals at and departures from clinic will be entered onto PiMS by the clinic nurses.

The first part of the cardiac catheterisation record should be completed (see Appendix 2.10.6)

Particular attention should be given to the following patient sub-groups who may provide a specific challenge or be at increased risk from cardiac catheterisation:

Patients with Diabetes	(see Protocol 2.11.1)
Patients with Renal Impairment	(see Protocol 2.11.2)
Patients on Warfarin	(see Protocol 2.11.3)
Patients with Previous Contrast Allergy	(see Protocol 2.11.4)
Patients with Previous Cardiac Surgery	(see Protocol 2.11.5)

Patients not requiring a Pre-Assessment appointment will be telephoned by one of the Pre-Assessment nurses to confirm their attendance and to answer any outstanding questions.

2.4.4 Day of procedure

The Patient should:

Not eat for at least 4 hours before the procedure but may drink clear fluids.

Take their usual medications except if the patient:

- Has diabetes (see Protocol 2.11.1)
- Is on warfarin (see Protocol 2.11.3)

Report to Cardiac Suite Reception either at 08.30am for a morning list or by 12.00pm for an afternoon list

The admitting nurse

Is responsible for carrying out the following checks before the patient is deemed ready for their procedure:

Confirm with patient no change in clinical condition

Reconfirm consent and that the patient is still happy to proceed

Patient's ID to be verified and an ID bracelet to be put on

Pulse, blood pressure, oxygen saturations and temperature to be documented

BMs to be documented (if patient diabetic)

Pre-assessment checks to be cross-checked with completed ICP.

Blood to be sent for INR if patient on warfarin

Intravenous cannula to be sited:

- left arm for radial cases
- either arm for femoral cases

Intravenous fluids to be set up if indicated (see Protocol 2.11.3)

2.5 Inpatient Patient Preparation

Inpatients are only to be accepted from either CCU/Tisbury or ITU.

2.5.1 Prior to procedure

The responsible Cardiologist or member of the Cardiology team should:

Fully explain and discuss the possible risks and the benefits to the patient.

Once the patient has accepted to have the procedure the referrer should:

- Identify preferred route of vascular access.
- Identify any need for special precautions (fluids, stopping metformin etc.)
- Complete referral form for cardiac catheterisation / PCI (see Appendix 2.10.6)
- Consent patient (procedure specific consent form)
- Hand completed referral form to cardiology co-ordinator

The Cardiology Co-ordinator is then responsible for:

Inputting patient details onto TOMCAT

Allocating the patient a time and date

Contacting the ward to inform them of the expected time and date

Ward nurse responsible for the patient should then:

Inform patient of expected time and date of procedure

Fill in cardiac catheterisation record (includes checking patient consented)

Ensure working cannula in situ

Ensure intravenous fluids prescribed and given (if eGFR < 60)

2.5.2 Day of procedure

The Patient should:

Not eat for at least 4 hours before the procedure but may drink clear fluids.

Take their usual medications except if the patient:

- Has diabetes (see Protocol 2.11.1)
- Is on warfarin (see Protocol 2.11.3)

Be transferred by trolley to the Cardiac Suite Recovery Area at the requested time of their procedure

The Cardiac Suite Recovery admitting nurse

Is responsible for cross checking the information on cardiac catheterisation record

On satisfactory completion of the cross-checks the patient is deemed ready for their procedure

2.5.3 Post-procedure

At the end of the procedure:

The cardiac catheter laboratory nurse is responsible for:

Escorting the patient to the recovery area immediately for observations

Handover of patient's care to the recovery nurse

The recovery nurse is responsible for:

Filling in the patient observation chart of the cardiac catheterisation record. This includes:

- Pulse and Blood pressure

- Assessment of vascular access site (see specific protocols)
- BMs (if diabetic)

The radiographer is responsible for:

Documenting radiation exposure to the patient

Archiving images onto MEDCON

Completing stock control

2.6 Radial Access

Patients will:

- Have sheath removed and TR Band applied in the catheter lab
- Be allowed to walk assisted from the catheter lab to recovery where appropriate.
- Be recovered in the specialised arm-chairs provided unless requiring a bed.
- Be allowed to be mobile and use the toilet facilities independently.
- For removal of the TR Band (see Protocol 2.11.6)

2.7 Femoral Access

Patients will:

- Have sheath removed and femoral closure device inserted (if appropriate) in the catheter lab (see Protocol 2.11.7)
- Where a femoral closure device is not inserted, patients will be transferred to recovery for removal of sheath and manual pressure applied (see Protocol 2.11.7)
- Patients will need to be transferred via a trolley.
- Regular inspection of the groin.

2.8 Discharge from the Cardiac Suite

2.8.1 Outpatient

The results of the procedure should be discussed by a senior member of the Cardiology team with the patient prior to discharge along with any plans for further follow-up or investigations.

The Recovery nurse is responsible for discharging the patient on both PiMS and TOMCAT and completing a post-procedure discharge checklist of the cardiac catheterisation record.

Clear instructions to those patients taking either warfarin or metformin should be given. In the event a blood test is required to check a patient's renal function prior to restarting metformin then the appropriate blood form will be given to the patient with instructions to have the blood test 48 hours post-procedure and identify who is responsible for checking it.

An electronic discharge letter should be given to the patient, a copy of which should be sent to the GP in the post and one filled in the patient's notes

A post-discharge information leaflet (see Appendix 2.10.7) should be given to the patient to include any contact numbers to call if there are any associated problems.

2.8.2 Inpatient

Following their procedure ALL inpatients are to be recovered initially in the Recovery Area of the Cardiac Suite - either for a minimum of 30 minutes or until Consultant review (unless the patient is intubated and from ITU)

Once the Consultant is happy for the patient to leave the Cardiac Suite the Recovery nursing staff should telephone the ward to organise transfer of the patient – the ward nursing staff are to come to the Cardiac Suite to pick up the patient

ALL patients who have had a femoral procedure and require a Femostop will need to be recovered in the Cardiac Suite Recovery area until such time as the Femostop can be removed and vascular haemostasis confirmed

2.9 Recognised complications during and post Cardiac Catheterisation

- Chest pain
- Hypotension
- Bleeding – especially vascular access site problems
- Arrhythmias
- Allergic reaction to contrast
- Myocardial infarction
- Cardiac arrest
- TIA / stroke

For how to deal with any of the above complications - see Appendix 2.11.13 [Complications Post - Coronary Angioplasty (PCI) Guidelines for Junior Medical Staff and Nursing Staff Managing Patients on Ward]

2.10 Appendices

2.10.1 Appendix - Standby Coronary Angiography +/- Proceed to PCI - Exclusion Criteria

These patients include:

Undergoing coronary angiography as part of work-up for valve surgery
Severe renal impairment (eGFR<30)
Severe LV dysfunction (EF <30%)
Previous CABG
On warfarin
Known allergy to aspirin
Anaemia (that has not been appropriately investigated)
Patient preference

2.10.2 Appendix - Coronary Angiogram Procedure Patient Information Leaflet

Patient Information Leaflet

2.10.3 Appendix - Coronary Angiography / Angioplasty Patient Information Leaflet – Option to have procedure undertaken without undressing

Patient Information Leaflet

2.10.4 Appendix - Appointment Letter Template for Cardiac Catheterisation (Pre-Assessment Clinic NOT required)

Word Letter Template

2.10.5 Appendix - Appointment Letter Template for Cardiac Catheterisation (Requiring Pre-Assessment Clinic)

Word Letter Template

2.10.6 Appendix - Cardiac Catheterisation Record

Assessment form

2.10.7 Appendix - Referral form for Cardiac Catheterisation / PCI

Referral form

2.10.8 Appendix - Cardiac catheterisation (coronary angiography) – Patient Discharge Information Leaflet

Patient Information Leaflet

2.11 Protocols

2.11.1 Protocol - Patients with Diabetes undergoing Cardiac Catheterisation / PCI

Are at increased risk of complications – especially in presence of renal impairment

All patients with diabetes should receive isomolar contrast medium (Visipaque rather than Omnipaque)

2.11.1.1 Patients taking Metformin (or Glucophage)

Elective Cardiac Catheterisation / PCI

- In patients with known renal function who have an eGFR > 60ml/min there is no need to stop metformin before or after cardiac catheterisation / PCI.
- In patients with eGFR between 30 and 60 ml/min, metformin should be stopped pre-procedure and restarted after 48 hours only once the renal function has been checked and it is known that there has not been a significant deterioration (metformin should NOT be restarted if eGFR < 30ml/min and/or creatinine > 150). If renal function has deteriorated then ongoing diabetes management should be discussed with the diabetes team or the patient's primary care team.
- In patients without an eGFR within the last 3 months ideally this should be checked to guide management. If this has not been done then metformin should be stopped for 48 hours as above.

Emergency Cardiac Catheterisation / PCI (ACS inpatients)

- Metformin should be stopped prior to the procedure irrespective of
    - baseline eGFR.
    - Metformin can be restarted after 48 hours only once the renal function has been checked and it is known that there has not been a significant deterioration (metformin should NOT be restarted if eGFR < 30ml/min and/or creatinine > 150). If renal function has deteriorated then ongoing diabetes management should be discussed with the diabetes team.

2.11.1.2 Patients taking other Oral Diabetic Medications

Elective Cardiac Catheterisation / PCI

- As patients will be having a light breakfast pre-procedure patients can continue all other diabetes drugs.

Emergency Cardiac Catheterisation / PCI (ACS inpatients)

- In light of the greater risk of left ventricular failure in these patients,
- pioglitazone or competact (pio/metformin combination) should be
- stopped on admission.
- Other diabetes oral medication can be continued.

2.11.1.3 Patients taking Insulin

Elective Cardiac Catheterisation / PCI

- As patients will be having a light breakfast (cereal and/or toast) pre-
- procedure patients can continue with their usual insulin regime.
- Where patients/care givers are uncertain about their insulin regime they should contact the in-patient diabetes nurse (Steve Nobbs) either by phone (01722 336262 ext 2176) or on his bleep (1223).

Emergency Cardiac Catheterisation / PCI (ACS inpatients)

- The ward staff should contact the in-patient diabetes nurse (Steve Nobbs) either by phone (01722 336262 ext 2176) or on his bleep (1223) for advice.

2.11.2 Protocol - Patients with Renal Impairment undergoing Cardiac Catheterisation /PCI

Risk Factors for Contrast Induced Nephropathy (CIN):

Chronic Kidney Disease (CKD) stage III - V (eGFR <60ml/min).

Diabetes

Dehydration

Nephrotoxic drugs

Critically ill patients (ie. haemodynamic instability)

Effect of risk factors is additive – the risk of developing CIN rises sharply as the number of risk factors increase (eg. If patient has CKD, diabetes and other co-morbidities – predicted risk of CIN approaches ~ 50%).

Strategies to reduce risk of CIN

IV prehydration

Use of isomolar contrast medium (Visipaque rather than Omnipaque)

Limit contrast volume (eg. avoid LV gram)

Omit nephrotoxic drugs

Consider adjunctive pharmacology (eg N-acetylcysteine 1200mg bd for day before and after procedure

Preassessment – must document

eGFR

diabetes

metformin

nephrotoxic drugs

If eGFR ≥60ml/min and diabetic

Continue metformin as normal

Use Visipaque

If eGFR 30-59ml/min (CKD stage III)

48hrs Pre-procedure:

- Discontinue nephrotoxic drugs
- Discontinue metformin

Day of procedure:

- IV prehydration – rate 1-1.5ml/kg/hr (2hrs pre-procedure – 6hrs post-procedure)
- Use Visipaque
- Limit volume of contrast – no LVgram

48hrs Post-procedure

- Reheck renal function – not to restart metformin until confirmed
- If eGFR <30ml/min or Creatinine >150 then discontinue metformin

If eGFR <30ml/min (CKD stages IV-V)

Pre-procedure – consult renal opinion and organize possible need for dialysis

Overnight admission

Recheck renal function pre-discharge

Plus strategies as used in patients with CKD stage III

2.11.3 Protocol - Patients on Warfarin undergoing Cardiac Catheterisation / PCI

2.11.3.1 Elective Cardiac Catheterisation / PCI

High-risk patients:

- Patients with metal valves
- Patients with recurrent thromboembolic disease
- Patients with AF and previous CVA
- In these patient sub-groups the warfarin should NOT be stopped for the procedure
- The warfarin dose may need to be reduced pre-procedure (aiming for a target INR 2-2.5)
- INR should be checked on day of procedure
- Patient should therefore not be listed as first case of morning session
- If INR >2.5 consider deferring patient
- If procedure is urgent then consider Octaplex (discuss with Haematology)
- Radial access is the vascular access of choice
- If femoral access has to be used – the use of a closure device is recommended
- Post-procedure – if no bleeding problems then give usual dose of warfarin on the same evening of the procedure

Low-risk patients:

- AF / PAF
- DVT
- For these patients the Consultant requesting the procedure needs to clarify on TOMCAT whether the warfarin should be continued or discontinued for the procedure
- If the warfarin is to be continued then the target INR for the day of the procedure should be between 1.5 – 2.5
- If the warfarin is to be discontinued, then it should be stopped 5 days prior to procedure and restarted at the usual dose the evening of the procedure (unless there was concerns over bleeding)
- The patient should then liaise with the anti-coagulation clinic / GP practice to organise a check INR day 5 post-procedure

2.11.3.2 Emergency Cardiac Catheterisation / PCI

- Patients admitted as an emergency and thought to have an ACS for which they are treated with aspirin, clopidogrel and dalteparin should have their warfarin stopped for their procedure.
- An INR should be checked before the procedure aiming for an INR<1.5.
- Dalteparin should not be given on the day of their procedure.
- The timing of restarting the warfarin following the procedure is up to the discretion of the operating Consultant

2.11.4 Protocol - Patients with Previous Allergy to Contrast undergoing Cardiac Catheterisation / PCI

2.11.4.1 Mild allergies:

- Day of procedure - Patients should be given 200mg iv hydrocortisone and 10mg iv piriton

2.11.4.2 More severe reactions:

- Same as for 2.11.4.1 but should also be given a 5 day course of oral piriton 10mg daily and 30mg prednisolone to go home with

2.11.4.3 Previous anaphylaxis:

- Consultant should weigh up the benefits of carrying out the procedure
- Patients should be given 3 days of oral 30mg prednisolone +/- piriton 10mg daily prior to the procedure and then same as for 2.11.4.2

2.11.5 Protocol - Patients with Previous Cardiac Surgery undergoing Elective Cardiac Catheterisation

Patients with previous CABG should have their cardiac catheterisation as a diagnostic procedure and not be offered a standby coronary angiogram +/- proceed.

Prior to their procedure the operative details should be obtained and filed in the notes.

Vascular access should ideally be via the femoral route.

If there is a contra-indication to femoral access then it should be carried out via the left radial route.

2.11.6 Protocol - Recovery of patient post Cardiac Catheterisation via radial route

All Patients will have 15mls of air inserted into the TR Band balloon in the cardiac catheter laboratory unless you are advised otherwise.

Patient allowed to mobilise *immediately* after procedure

Leave TR Band in place for 1 hour post inflation and application.

After 1 hour remove 3mls of air using the syringe:

- If bleeding occurs reinsert the 3mls of air and wait for 30 minutes before attempting to remove air again.
- If no bleeding occurs wait 10 minutes before removing a further 3mls of air.

Continue removing 3mls of air at 10 minute intervals until all the air has been removed and the balloon is deflated. This should take a total of 1 hour providing no bleeding occurs. Should bleeding occur at any point reinsert the air removed to stem the bleeding and await 30 minutes before attempting to remove air again.

Once the TR Band has been deflated await a further 10 minutes before removing the TR Band. To remove the TR Band loosen and open the TR Band velcro, reinsert 15mls of air into the balloon – this will gently ease the TR Band from the access / puncture site. Any excess blood may be gently removed using sterile water and gauze.

Once haemostasis has been achieved apply a sterile plaster and secure with gauze and tape.

Patient should remain within the Cardiac Suite for a minimum of 30 minutes following haemostasis before being considered fit for discharge (approximately 2½ hours post-cardiac catheterisation).

2.11.7 Protocol - Recovery of patient post Cardiac Catheterisation via femoral route

2.11.7.1 Manual pressure

- Patient to remain flat until return to ward area
- Baseline observations including groin / arterial access puncture check, pedal pulses and limb observation
- Sheath to be removed and haemostasis achieved. Remain flat for 1 hour post haemostasis
- Record observations every 15min for the following hour and then every 30 minutes for the remaining period of hospitalisation.
- Should femoral access point remain satisfactory at 1 hour post haemostasis, patient may sit up.
- Patient should remain on bed rest for further 1 hour.
- Patient may mobilise after 1 hour if femoral access site satisfactory.
- After 30 minutes of mobilising without complication then patient may be considered fit for discharge from the Cardiac Suite (approximately 2 ½ hours post haemostasis)

2.11.7.2 Diagnostic Cardiac Catheterisation – closure device

- Patient to remain flat until return to ward area
- Baseline observations including groin / arterial access puncture check, pedal pulses and limb observation.
- If satisfactory then patient may sit up.
- To remain on bed rest for 1 hour.
- Record observations every 15min for the following hour and then every 30 minutes for the remaining period of hospitalisation.
- Patient may mobilise after 1 hour if femoral access site satisfactory.
- After 30 minutes of mobilising without complication then patient may be considered fit for discharge from the Cardiac Suite (approximately 1½ hours post haemostasis)

3 PERCUTANEOUS CORONARY INTERVENTION (PCI)

Percutaneous Coronary Intervention is an invasive therapeutic procedure undertaken to treat coronary artery disease. This is usually carried out under local anaesthetic with intravenous sedation. The procedure is usually performed either via the wrist (radial artery) or via the leg (femoral artery) under X-Ray guidance. Small catheters are placed into the heart arteries which allow the operator to pass equipment across blockages in the arteries. These blockages are then dilated using balloons and in most cases placement of coronary artery stent(s) will then be performed.

The decision to recommend either a standby coronary angiogram (SBCA) +/- proceed to PCI, a PCI, a coronary intravascular ultrasound or a coronary pressure wire study must be based on a careful evaluation of the potential risks and benefits to the patient.

3.1 Indications

- Stable angina
- Positive functional study – exercise treadmill, MPS, stress echo, stress MRI or pressure wire study
- In patients with an acute coronary syndrome (ACS) – either unstable angina or a non ST-segment elevation myocardial infarction (NSTEMI).
- In patients with ST-segment elevation myocardial infarction (STEMI).

3.2 When should PCI not be carried out

Patients with the following conditions should have their PCI postponed (until such time that the Consultant responsible feels that it is safe to proceed):

- Uncompensated heart failure (patient unable to lie flat)
- Acute renal failure
- Acute stroke
- Active gastrointestinal bleeding
- Allergies to aspirin or clopidogrel
- Severe uncontrolled hypertension
- Severe electrolyte disturbances
- Unexplained febrile illness / untreated active infection

3.3 Case Selection of patients suitable to undergo PCI at Salisbury

It is recognized that during the initial start up of the PCI service at Salisbury Hospital that it is more appropriate that high risk patients (see Appendix 3.11.1) should continue to have their PCI performed on a Salisbury list down at Royal Bournemouth Hospital (RBH) until such time that the experience of the cardiac catheter laboratory staff allows for these procedures to be safely performed at Salisbury.

3.4 Patient Preparation

3.4.1 Outpatient Patient Preparation

Prior to Procedure

All patients will have appropriate treatment options initially discussed with them during Outpatient Clinic consultation – medical treatment, PCI or CABG.

During Outpatient consultation the Doctor will explain to the patient that there is no on-site cardiac surgery back-up and that in the rare event of the patient requiring an emergency CABG that they will need to be transferred off-site to Southampton Hospital.

Laminated copies of the exclusion criteria for patients identified as unsuitable for standby coronary angiography +/- PCI (see Appendix 3.11.2) will be available in each Outpatient Room

If a patient is undergoing standby coronary angiography +/- PCI then it will also be explained to them that there may be a chance that if complex disease is identified that PCI will not go ahead during the same sitting but that they may need to have elective PCI at Bournemouth Hospital on a separate occasion.

All patients identified by a Consultant Cardiologist as suitable to undergo either PCI at Salisbury District Hospital or standby coronary angiography +/- PCI will be required to attend a specialist pre-assessment clinic (nurse led).

Once patient has agreed to be listed for a procedure they are then given the relevant local Patient Information leaflet - either Standby

Coronary Angiography +/- proceed to angioplasty (see Appendix 3.11.3), Coronary Angioplasty (see Appendix 3.11.4), or Coronary Pressure Wire Study +/- proceed to angioplasty (see Appendix 3.11.5)

Consultant Cardiologist will enter patient details directly onto TOMCAT.

The Cardiology Co-ordinator will then:

Input patient details into PiMS

Book appointment date onto both PiMS and TOMCAT

Send Patient confirmation of appointment letters for procedure and pre-assessment clinic (see Appendix 3.11.6)

Telephone patient only if the appointment / procedure date is at short notice.

3.4.2 Pre-Assessment Clinic (nurse led)

All patients listed to undergo either elective PCI or standby coronary angiography +/- PCI are required to attend this clinic.

During this clinic the pre-clerking nurse will complete an Integrated Care Pathway (ICP) plan (see Appendix 3.11.7) and fill in relevant patient details onto TOMCAT.

The patient will be required to have:

Up-to-date blood tests including FBC, U&Es, LFTs, clotting (if >4 weeks from previous results) and a G&S (Group & Save) unless they have had one previously and the result is on the computer system

MRSA swabs

12 lead ECG (unless recent one in notes)

Clinical examination including peripheral pulses

The nurse will confirm the following:

Any special precautions required:

- Diabetic protocol
- On warfarin – confirm Consultant's instructions to either stop or continue for procedure
- Renal impairment protocol
- Previous contrast reaction

If patient suitable for:

- Day-case procedure
- Standby coronary angiography +/- PCI

Preferable route of access

If patient suitable for radial then ensure given information leaflet regarding remaining clothed for the procedure (see Appendix 3.11.8)

If patient has been given a copy of the appropriate Local Patient Information leaflet

The nurse will confirm patient already taking aspirin and give patient a prescription for clopidogrel with instructions to take loading dose of 300mg 5 days pre-procedure and then a maintenance daily dose of 75mg afterwards (including day of procedure).

It is the responsibility of the nurse to check and document the G&S result to ensure that the patient does not have antibodies

If the patient does have antibodies then the referring Consultant should be informed

Take valid consent (if competent to do so) as per Trust Consent Policy

3.4.3 Day of Procedure

Patient reports to Cardiac Suite Reception area at appointed time and date.

Patient then transferred to Recovery Area for the following:

- Insertion of intravenous cannula
- A 2nd G&S sample should be taken (and any additional bloods required – eg INR)
- However, if a patient is either on warfarin or has had antibodies confirmed on their G&S then they need to have a formal cross-match sent (request 2 units)
- ICP to be cross-checked and pre-procedure check-list to be completed by nursing staff
- If checks satisfactory the operator to complete consent process (procedure specific consent form available on ICID) unless already taken at time of pre-assessment appointment

Patient then transferred to cardiac catheter laboratory for procedure.

During the procedure, for patients undergoing standby coronary angiography +/- PCI the patient ideally should not be given any intravenous sedation until after the angiographic results and planned procedure are discussed with the patient (unless in the event that the procedure cannot go ahead without sedation)

Peri-procedure checklist (including documenting drugs given) to be completed by cath lab nursing staff

Post-procedure patient transferred back to recovery area for monitoring and further checks – to be documented in the relevant section of the ICP

3.5 Inpatient Patient Preparation

Inpatients are only to be accepted from either CCU/Tisbury or ITU.

Patients accepted as appropriate for SBCA +/- PCI from other wards should be transferred to CCU / Tisbury first

3.5.1 Prior to Procedure

Patients admitted with suspected Acute Coronary Syndromes (ACS) should be triaged using the ACS pathway (see Appendix 3.11.9)

The patient should then be reviewed by a Consultant Cardiologist who will fully discuss the possible risks, benefits and alternative treatments to the patient.

Once the patient has accepted to have the procedure the referrer should:

- Identify preferred route of vascular access.
- Identify need for special precautions (fluids, stopping metformin etc...)
- Ensure that the patient has been correctly loaded with both aspirin and clopidogrel
- Complete referral form for cardiac catheterisation / PCI (see Appendix 3.11.10)
- Hand completed referral form to Cardiology Co-ordinator

The Cardiology Co-ordinator is then responsible for:

Inputting patient details onto TOMCAT

Discussing the case with the Consultant Interventional Cardiologist working in the Cardiac Suite and then allocating the patient a time and date

Contacting the ward to inform them of the expected time and date

Handing a copy of the following days timetable (from TOMCAT) to the nursing staff on CCU / Tisbury and in the Cardiac Suite Recovery Area

Ward nurse responsible for the patient should then:

Inform patient of expected time and date of procedure

Complete the appropriate part of the ICP

Ensure working cannula in situ

Ensure that treatment dose of dalteparin is omitted the morning of the procedure

Ensure intravenous fluids prescribed and given if eGFR < 60 (see Protocol 2.11.2)

3.5.2 Day of procedure

The Patient should:

Not eat for at least 4 hours before the procedure but may drink clear fluids.

Take their usual medications except if the patient:

- Has diabetes (see Protocol 2.11.1)
- Is on warfarin (see Protocol 2.11.3)

Be transferred by trolley to the Cardiac Suite Recovery Area at the requested time of their procedure

The Cardiac Suite Recovery admitting nurse

Should contact the ward to liaise when Cardiac Suite is ready to receive the patient

Is responsible for cross checking the information on the ICP

On satisfactory completion of the cross-checks the patient is deemed ready for their procedure

3.5.3 Post-procedure

At the end of the procedure:

The cardiac catheter laboratory nurse is responsible for:

Escorting the patient to the recovery area immediately for observations

Handover of patient's care to the recovery nurse

The recovery nurse is responsible for:

Filling in the patient obs chart part of the ICP

This includes:

- Pulse and Blood pressure
- Assessment of vascular access site (see specific protocols)
- BMs (if diabetic)

The radiographer is responsible for:

Documenting radiation exposure to the patient

Archiving images onto MEDCON

Completing stock control

3.6 Radial Access

Patients will:

- Have sheath removed and TR Band applied in the catheter lab
- Be recovered in the specialised arm-chairs provided unless requiring a bed.
- Be allowed to be mobile and use the toilet facilities independently.
- For removal of the TR Band post-PCI (see Protocol 3.12.1)

3.7 Femoral Access

Patients will:

- Have sheath removed and femoral closure device inserted in the catheter lab (see Protocol 3.12.2)
- Patients will need to be transferred via a trolley.

- Regular inspection of the groin.

3.8 Discharge from the Cardiac Suite

3.8.1 Outpatient

The results of the procedure should be discussed by a senior member of the Cardiology team with the patient prior to discharge along with any plans for further follow-up or investigations.

The Recovery nurse is responsible for discharging the patient on both PiMS and TOMCAT and completing the post PCI checklist of the ICP. This includes the following:

- Clear instructions to those patients taking either warfarin or usually metformin should be given. In the event a blood test is required to check a patient's renal function prior to restarting metformin then the appropriate blood form will be given to the patient with instructions to have the blood test 48 hours post-procedure and identify who is responsible for checking it.
- An electronic discharge letter with procedural report should be given to the patient, a copy of which should be posted to the GP and a copy filled in the patient's notes
- The patient should be given a clopidogrel duration card
- A post-PCI discharge information leaflet (see Appendix 3.11.11) should be given to the patient to include any contact numbers to call if there are any associated problems.
- The patient should be collected and accompanied home by a responsible adult.

3.8.2 Inpatient

Following their procedure ALL inpatients are to be recovered initially in the Recovery Area of the Cardiac Suite - either for a minimum of 30 minutes or until Consultant review (unless the patient is intubated and from ITU)

Once the Consultant is happy for the patient to leave the Cardiac Suite the Recovery nursing staff should telephone the ward to organise transfer of the patient – the ward nursing staff are to come to the Cardiac Suite to pick up the patient

ALL patients who have had a femoral procedure and require a Femostop will need to be recovered in the Cardiac Suite Recovery area until such time as the Femostop can be removed and vascular haemostasis confirmed

If the patient has had a PCI and is from Tisbury then the ward should be informed that the patient will need to be admitted to CCU overnight for observations

3.9 Post-Discharge Contact

The patient will be contacted by one of the Cardiac Suite nurses over the telephone at regular intervals following their PCI procedure

- These intervals are:
  - Day 1 (or on the Monday if PCI carried out on the Friday)
  - Day 30
  - 6 months
  - 1 year
- The Cardiac Suite nurse should fill in the patient telephone review post-PCI form (see Appendix 3.11.12). These forms will be kept in order to collect outcome and adverse data for audit purposes.

3.10 Recognised complications during and post PCI (see Appendix 3.11.13 on how to deal with these complications)

- Chest pain
- Hypotension

- Bleeding – especially vascular access site problems
- Arrhythmias
- Allergic reaction to contrast
- Myocardial infarction
- Cardiac arrest
- TIA / stroke

3.11 Appendices

3.11.1 Appendix - High risk PCI cases not suitable to be undertaken at Salisbury

3.11.1.1 *Elective PCI Cases*

Unprotected left main stem

Last remaining vessel

Complex bifurcation

Degenerative vein graft (requires distal protection device)

Chronic Total Occlusions

Severe renal impairment (eGFR<30)

Severe LV dysfunction (EF <30%)

Extensive calcification requiring adjunctive therapies (Rotablation or Laser)

3.11.1.2 Non-Elective ACS Cases

All patients admitted with ACS may have their SBCA +/- proceed to PCI performed at Salisbury unless they fulfil any of the Standby Coronary Angiography +/- Proceed to PCI – Exclusion Criteria (see Appendix 3.11.2)

Following initial angiography if high risk coronary anatomy is demonstrated then the patient should NOT proceed to PCI at the same sitting but arrangements be made for the patient to be transferred down to RBH to undergo inpatient PCI on the next available list.

High risk coronary anatomy includes:

Unprotected left main stem

Last remaining vessel

Complex bifurcation

Extensive calcification

Degenerative vein graft (requires distal protection device)

Chronic Total Occlusions

Extensive calcification requiring adjunctive therapies (Rotablation or Laser)

3.11.2 Appendix - Standby Coronary Angiography +/- Proceed to PCI - Exclusion Criteria

These patients include:

Undergoing coronary angiography as part of work-up for valve surgery
Severe renal impairment (eGFR<30)
Severe LV dysfunction (EF <30%)
Previous CABG
On warfarin
Known allergy to aspirin
Anaemia (that has not been appropriately investigated)
Patient preference

3.11.3 Appendix - Standby Coronary Angiography +/- proceed to angioplasty - Patient Information Leaflet

Patient Information Leaflet

3.11.4 Appendix - Coronary angioplasty - Patient Information Leaflet

Patient Information Leaflet

3.11.5 Appendix - Coronary pressure wire +/- angioplasty - Patient Information Leaflet

Patient Information Leaflet

3.11.6 Appendix - Appointment Letter Template for Invasive Coronary Procedures

Word Letter Template

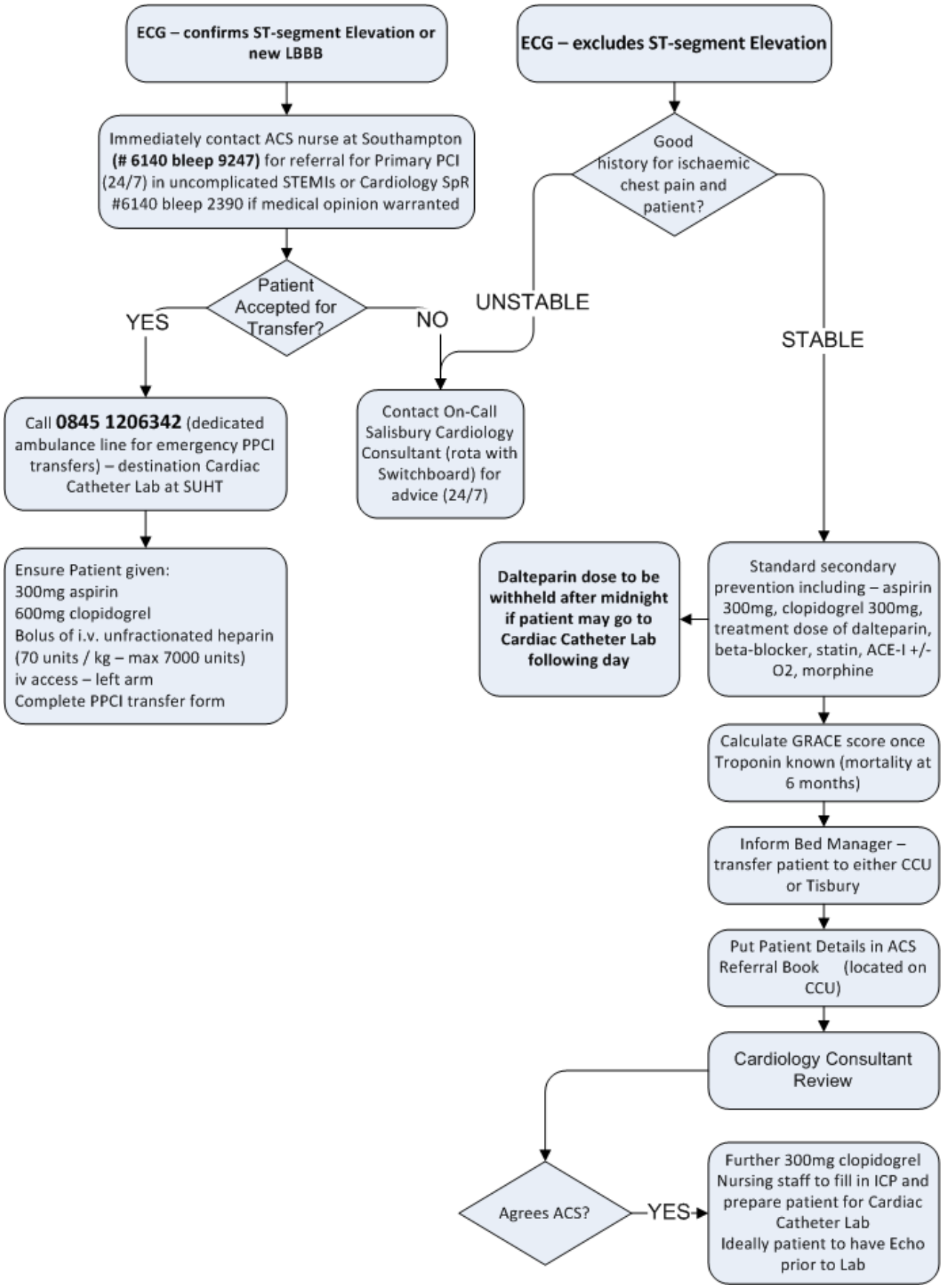
3.11.7 Appendix - Integrated Care Pathway (ICP) for PCI

ICP Template

3.11.8 Appendix - Coronary Angiography / Angioplasty Patient Information Leaflet – Option to have procedure undertaken without undressing

Patient Information

3.11.9 Appendix - ACS Pathway



3.11.10 Appendix - Referral form for Cardiac Catheterisation / PCI

Referral form template

3.11.11 Appendix - Post Coronary Angioplasty (PCI) Discharge Patient Information Leaflet

Patient Information Leaflet

3.11.12 Appendix - Telephone Review form Post PCI

Review form

3.11.13 Appendix - Complications Post PCI - Guidelines for Junior Medical Staff and Nursing Staff Managing Patients on Ward

Complications are infrequent but should be looked for and dealt with appropriately.

If you have any doubt then discuss with the responsible Consultant Cardiologist as soon as possible.

Contact details:

In-hours: Contact Extension 3214

Out-of-hours: Contact via Switchboard

Some complications may mean that the patient may need to urgently go back to the cardiac catheter laboratory for repeat coronary angiography. Please contact early either the Consultant Cardiologist responsible for the procedure (in hours) or the Consultant Cardiologist on call (out-of-hours) who will advise you.

The most frequent complications post-PCI include:

Chest pain

Hypotension

Bleeding – especially vascular access site problems

Arrhythmias

Allergic reaction to contrast

Myocardial infarction

Cardiac arrest

TIA / stroke

Chest pain post PCI

This is relatively common and does not always mean that there is a significant problem.

Causes include:

Arterial stretch

Patients may get pain related to the stent deployment and resultant arterial stretch. This is usually described as a persistent discomfort from the time of stent deployment. On occasions opiates may be needed for pain relief.

Side branch occlusion

Stent deployment may have caused a side branch to occlude. This may cause chest pain and may be associated with ECG changes. Opiates may be needed.

Coronary arterial dissection

Following stent deployment there may have been dissection of a coronary artery missed at the end of the PCI procedure. This is usually associated with typical anginal pains and ECG changes. Serial ECG's will be needed. Opiates are usually required in this situation. The patient should return to the cardiac catheter lab as soon as possible.

Acute Stent Thrombosis (AST)

This is the most serious complication and maybe life-threatening if not dealt with rapidly. This is usually associated with severe chest pain and significant ECG

changes. The patient should be given opiate relief and a further loading of clopiodgrel (300mg) and return to the cardiac catheter lab immediately.

Management

Look in notes – read operative details may state peri-procedural problem such as side-branch occlusion.

Assess patient including observations.

Review 12 lead ECG – compare with pre-procedural ECG for any changes.

Give patient oxygen and pain-relief.

If any concern / ECG changes then contact Consultant Cardiologist in Cardiac Suite or if out-of-hours via switchboard for further advice.

If there is new ST-segment elevation then the patient will need to go back to the cardiac catheter laboratory immediately.

Otherwise transfer patient to CCU.

Hypotension Post PCI (systolic BP < 100mmHg)

Causes include:

Hypotension before PCI – impaired LV function

Vasovagal

Possible allergic reaction / anaphylaxis

Drugs – antihypertensives, opiates, sedation

Heartblock

Volume depleted – bleeding / dry

Pericardial Tamponade

Of all of the possible causes bleeding and tamponade are the two that need to be excluded first as both can be life-threatening.

Management

Look in notes – read operative details may state peri-procedural problem with BP.

Lie patient flat and assess patient especially looking for signs of bleeding from vascular access site (if bleeding see Section Vascular Access Site problems within Bleeding post PCI). Stop any Reopro (abciximab) infusion.

If suspect vagal reaction (bradycardic) – give atropine (0.6-1.2mg iv)

Examine abdomen for tenderness and flex ipsilateral knee – may produce abdominal pain consistent with a concealed retroperitoneal haemorrhage (remember if procedure carried out from radial artery then it can't be a retroperitoneal bleed). May require urgent CT abdomen.

Examine patient for rash – signs of allergic reaction.

Review 12 lead ECG – exclude ST-segment changes and heart block.

Unless patient known to have poor LV systolic function then give 500mls of IV gelofusin.

Check FBC and clotting urgently (especially if patient given Reopro) – may need to X-match.

DO NOT give platelets / blood without first consulting Consultant Cardiologist.

Contact Consultant Cardiologist in Cardiac Suite or if out-of-hours via switchboard for further advice EARLY.

Tamponade to be considered if persistent hypotension despite fluid resuscitation (tachycardia, raised JVP, oligo-anuric). Will need urgent bedside transthoracic echocardiogram.

Consider urinary catheterisation.

Bleeding post PCI - especially Vascular Access Site problems

Although bleeding may be systemic (eg. GI bleed in which case urgent advice from a Consultant Gastroenterologist should be sought) it is far more common for bleeding to occur at the site of arterial access. This is more common in:

Women

Elderly

Low body mass weight

Femoral route

Obesity

More than puncture of vessel (difficult procedure)

Large sheath

If glycoprotein IIb/IIIa inhibitor (Reopro/Abciximab) given.

Bleeding may be clinically apparent, but may be concealed, especially in the case of retroperitoneal haemorrhage after femoral artery puncture.

Management

Look in notes – read operative details may state peri-procedural problem with vascular access.

Lie patient flat.

Stop any Reopro (abciximab) infusion immediately.

If patient on warfarin then consider Octaplex (after discussion with Cardiologist)

Apply firm manual pressure for minimum of 10 minutes – easily done if radial (also elevate limb). If femoral compression is needed then firm continuous pressure should be applied 2 finger widths above bleeding site.

If manual pressure successful then consider either applying a TR Band (a specific radial closure device) to radial site or a Femostop device (a specific femoral compression device) above the femoral site. For instructions on how to use these devices speak to CCU nurses.

If the patient is haemodynamically compromised by bleeding then give 500mls iv gelofusin immediately and further colloid as required

Check FBC, clotting (PT and APTT) and X-match urgently.

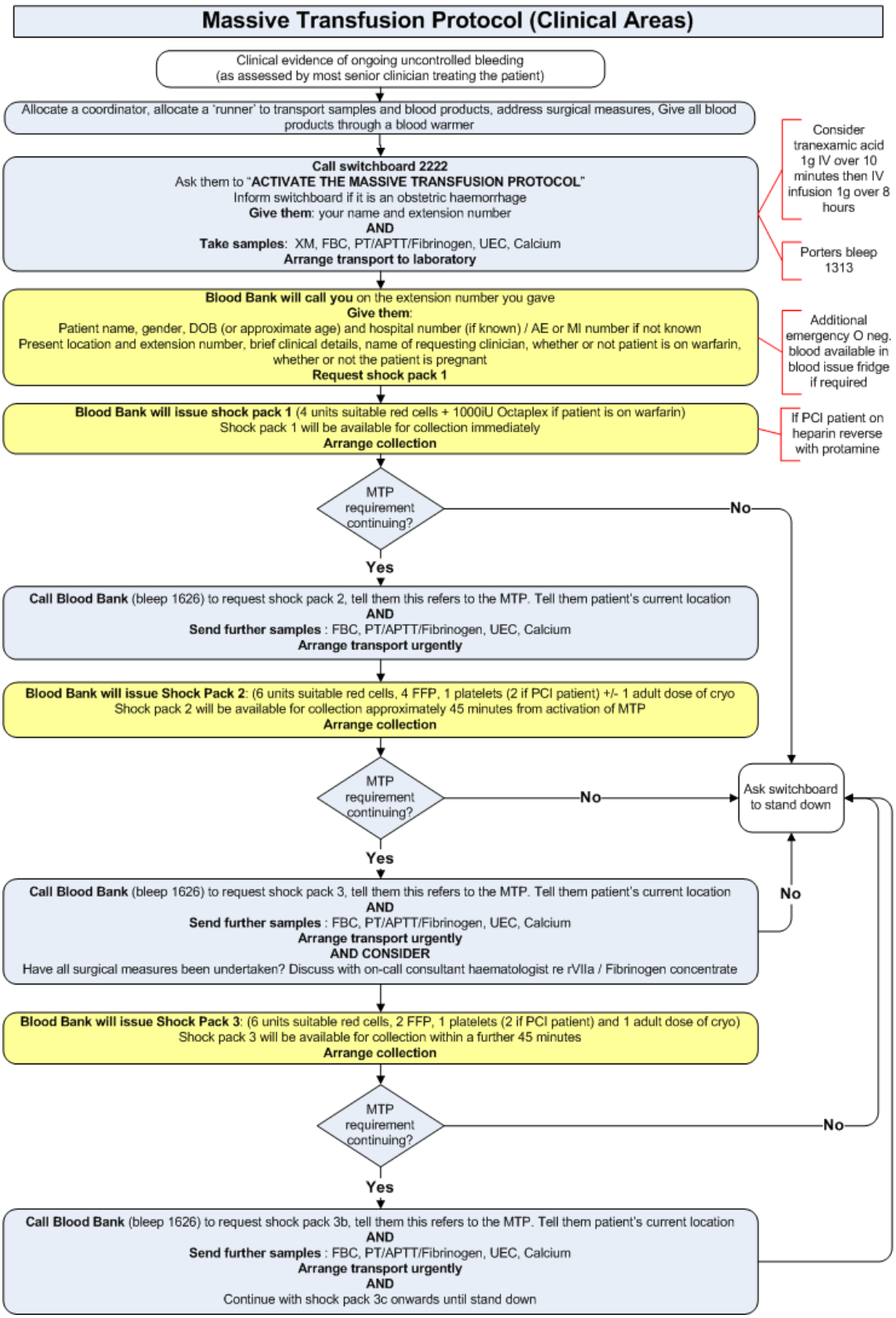
DO NOT give platelets / blood without first consulting Consultant Cardiologist.

Contact Consultant Cardiologist in Cardiac Suite or if out-of-hours via switchboard for further advice EARLY.

If there is severe bleeding or you suspect major concealed bleeding of at least 2 units then:

Call Switchboard to activate ‘Major Transfusion Protocol’ – see algorithm over next page.

If suspect retroperitoneal haemorrhage and patient relatively stable then consider urgent abdominal CT scan.


Massive Transfusion Protocol (Clinical Areas)
Clinical evidence of ongoing uncontrolled bleeding
(as assessed by most senior clinician treating the patient)
Allocate a coordinator, allocate a 'runner' to transport samples and blood products, address surgical measures, Give all blood products through a blood warmer
Call switchboard 2222
Ask them to "ACTIVATE THE MASSIVE TRANSFUSION PROTOCOL"
Inform switchboard if it is an obstetric haemorrhage
Give them: your name and extension number
AND
Take samples: XM, FBC, PT/APTT/Fibrinogen, UEC, Calcium
Arrange transport to laboratory
Consider tranexamic acid 1g IV over 10 minutes then IV infusion 1g over 8 hours
Porters bleep 1313
Blood Bank will call you on the extension number you gave
Give them:
Patient name, gender, DOB (or approximate age) and hospital number (if known) / AE or MI number if not known
Present location and extension number, brief clinical details, name of requesting clinician, whether or not patient is on warfarin, whether or not the patient is pregnant
Request shock pack 1
Additional emergency O neg. blood available in blood issue fridge if required
Blood Bank will issue shock pack 1 (4 units suitable red cells + 1000iU Octaplex if patient is on warfarin)
Shock pack 1 will be available for collection immediately
Arrange collection
If PCI patient on heparin reverse with protamine
MTP requirement continuing?
No
Yes
Call Blood Bank (bleep 1626) to request shock pack 2, tell them this refers to the MTP. Tell them patient's current location
AND
Send further samples : FBC, PT/APTT/Fibrinogen, UEC, Calcium
Arrange transport urgently
Blood Bank will issue Shock Pack 2: (6 units suitable red cells, 4 FFP, 1 platelets (2 if PCI patient) +/- 1 adult dose of cryo
Shock pack 2 will be available for collection approximately 45 minutes from activation of MTP
Arrange collection
MTP requirement continuing?
No
Ask switchboard to stand down
Yes
Call Blood Bank (bleep 1626) to request shock pack 3, tell them this refers to the MTP. Tell them patient's current location
AND
Send further samples : FBC, PT/APTT/Fibrinogen, UEC, Calcium
Arrange transport urgently
AND CONSIDER
Have all surgical measures been undertaken? Discuss with on-call consultant haematologist re rVIIa / Fibrinogen concentrate
No
Blood Bank will issue Shock Pack 3: (6 units suitable red cells, 2 FFP, 1 platelets (2 if PCI patient) and 1 adult dose of cryo)
Shock pack 3 will be available for collection within a further 45 minutes
Arrange collection
MTP requirement continuing?
No
Yes
Call Blood Bank (bleep 1626) to request shock pack 3b, tell them this refers to the MTP. Tell them patient's current location
AND
Send further samples : FBC, PT/APTT/Fibrinogen, UEC, Calcium
Arrange transport urgently
AND
Continue with shock pack 3c onwards until stand down

Arrhythmias

Patients with coronary artery disease may have rhythm disturbances independently or as a result of their PCI and they are more common in the presence of impaired LV systolic function and in the elderly. The commonest rhythm disturbance following PCI is AF and may be caused by a side-branch vessel occlusion. VT or VF may be unheralded (again as a result of a side-branch occlusion or stent thrombosis).

Management

Atrial fibrillation (AF)

Look in notes – previous ECGs to compare with. History of PAF?

Read operative details may state peri-procedural complication or rhythm disturbance.

Assess patient for signs of haemodynamic compromise (? drop in BP). Are they otherwise well? Signs of bleeding or possible tamponade. Any chest pain?

Check bloods urgently for K+ and Mg2+ levels.

If patient not compromised:

- Give a bolus of 300mg iv amiodarone through a large cannula and then review.
- Call Consultant Cardiologist if does not revert back to sinus rhythm to discuss further management.

If patient compromised (systolic BP <100mmHg):

- Call Anaesthetic SpR on call to assist (may need urgent airway assistance / sedation)
- Keep nil by mouth
- Give a bolus of 300mg iv amiodarone through a large cannula.
- Aim to cardiovert early.
- Inform Consultant Cardiologist of developments.
- Repeat 12 lead ECG post-cardioversion – if any ischaemic changes or ST-elevation then will need to return to the cardiac catheter laboratory urgently.

For sustained VT or VF – follow ALS Resuscitation Council (UK) guidelines

Allergic reactions/anaphylaxis

In the catheter laboratory the commonest reason for an allergic reaction is secondary to the administration of intravenous contrast agents. There may be a history of allergy to iodine-based agents, in which case consideration should be given to the appropriateness of angiography, and if felt to be necessary, pre-treatment for 3 days with oral steroids given, with anti-histamines on the day of the procedure (see separate protocol). A history of allergy to topical iodine has only a weak correlation with allergy to contrast agents.

Presentation in the cardiac catheter suite of allergy/anaphylaxis may be with a classical picture of rash/facial swelling and wheeze but may cause hypotension and constriction of coronary vessels only. Treatment is with steroids, anti-histamines and adrenaline (s.c. or i.v.) may also be required. Anaphylaxis should be treated in accordance with ALS protocol.

It is rare (but not impossible) for patients to develop a late contrast reaction back on the ward. It may be secondary to other agents given during the PCI (eg. heparin).

Management

Assess patient for any signs of a rash or tongue swelling.

Monitor respiratory pattern, oxygen saturations and BP.

If evidence of mild reaction only – rash / hives then give 10mg iv chlorpheniramine (piriton) and then oral course for 5 days

Anything more than mild – give 10mg iv chlorpheniramine and 200mg iv hydrocortisone and contact Consultant Cardiologist.

If any concern over airway call for urgent anaesthetic opinion.

Myocardial Infarction

If the ECG confirms a STEMI (probable acute stent thrombosis), then control pain, and discuss urgently with Consultant Cardiologist (who will usually recommend re-studying the patient's coronary anatomy urgently) and arrange urgent transfer to either the Cardiac Catheter laboratory.

Arrange bed on CCU

Cardiac Arrest

As per Resuscitation Council (UK) guidelines

Call Crash team on 222.

May indicate acute stent thrombosis.

Contact Consultant Cardiologist responsible or on-call (depending on time of day).

Repeat 12 lead ECG post-successful resuscitation.

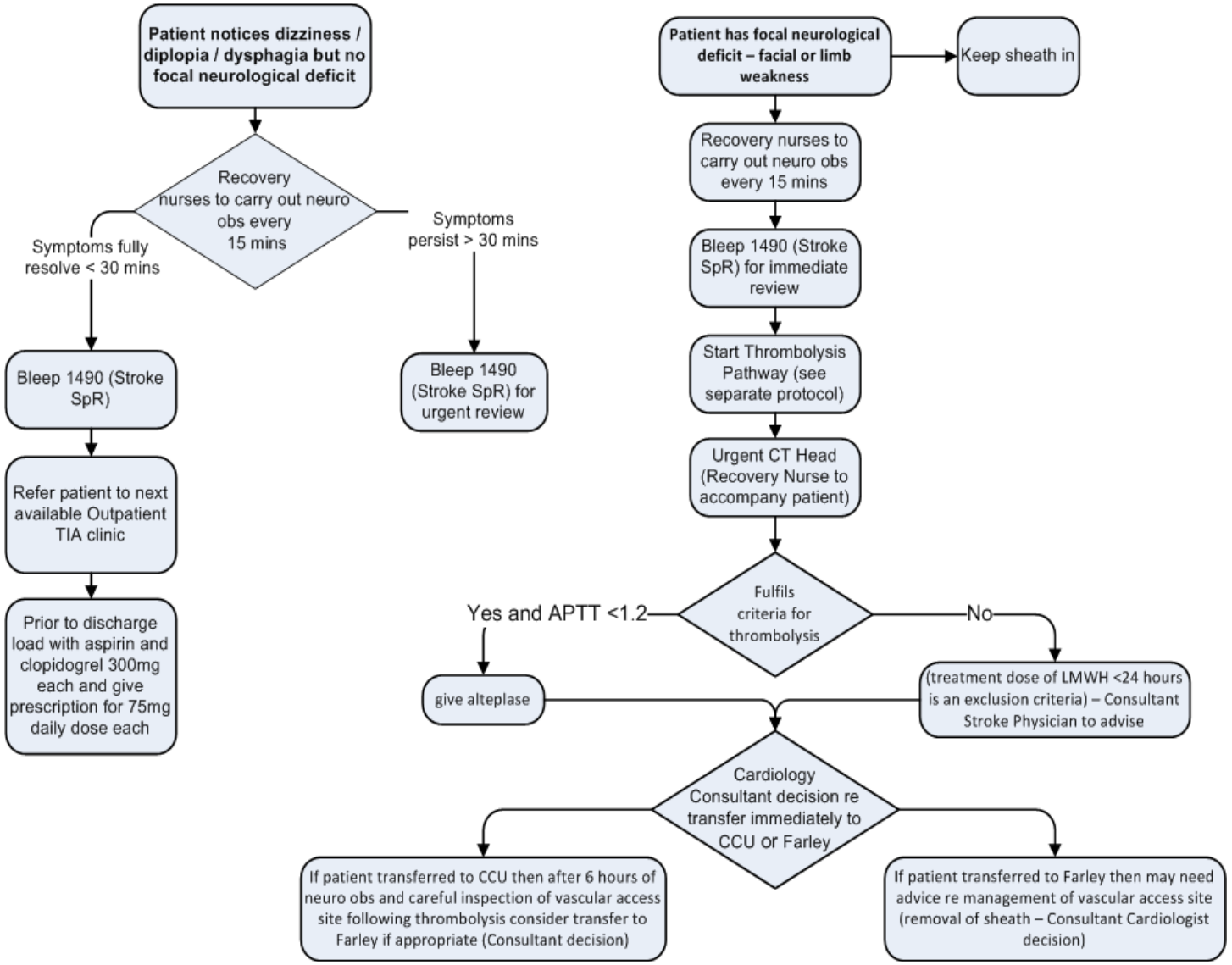
If ECG confirms either STEMI or ischaemia, then control pain, and discuss with the Consultant Cardiologist (who will usually recommend re-studying the patient's coronary anatomy urgently) and arrange urgent transfer to the Cardiac Catheter laboratory.

Send off for urgent bloods including K+ (ABG)

Arrange bed on CCU/ITU dependant on clinical condition

Suspected TIA / CVA

Follow suspected TIA / CVA post Cardiac catheterisation / PCI algorithm (laminated copy can be found on wall of CCU and Cardiac Suite Recovery Area – see overleaf)


Patient notices dizziness / diplopia / dysphagia but no focal neurological deficit
Recovery nurses to carry out neuro obs every 15 mins
Symptoms fully resolve < 30 mins
Symptoms persist > 30 mins
Bleep 1490 (Stroke SpR)
Refer patient to next available Outpatient TIA clinic
Prior to discharge load with aspirin and clopidogrel 300mg each and give prescription for 75mg daily dose each
Bleep 1490 (Stroke SpR) for urgent review
Patient has focal neurological deficit – facial or limb weakness
Keep sheath in
Recovery nurses to carry out neuro obs every 15 mins
Bleep 1490 (Stroke SpR) for immediate review
Start Thrombolysis Pathway (see separate protocol)
Urgent CT Head (Recovery Nurse to accompany patient)
Fulfils criteria for thrombolysis
Yes and APTT <1.2
No
give alteplase
(treatment dose of LMWH <24 hours is an exclusion criteria) – Consultant Stroke Physician to advise
Cardiology Consultant decision re transfer immediately to CCU or Farley
If patient transferred to CCU then after 6 hours of neuro obs and careful inspection of vascular access site following thrombolysis consider transfer to Farley if appropriate (Consultant decision)
If patient transferred to Farley then may need advice re management of vascular access site (removal of sheath – Consultant Cardiologist decision)

3.12 Protocols

3.12.1 Protocol - Management of Patients Following Radial Access Route

All Patients will have 15mls of air inserted into the TR Band balloon in the cardiac catheter laboratory unless you are advised otherwise.

3.12.1.1 Coronary IVUS or Pressure Wire study

- Leave the TR Band in place for 2 hours post inflation and application.
- After 2 hours patient allowed to mobilise
- After 2 hours remove 3mls of air using the syringe:
    - If bleeding occurs reinsert the 3mls of air and wait for 30 minutes before attempting to remove air again.
    - If no bleeding occurs wait 10 minutes before removing a further 3mls of air.
- Continue removing 3mls of air at 10 minute intervals until all the air has been removed and the balloon is deflated. This should take a total of 1 hour providing no bleeding occurs. Should bleeding occur at any point reinsert the air removed to stem the bleeding and await 30 minutes before attempting to remove air again.
- Once the TR Band has been deflated await a further 10 minutes before removing the TR Band. To remove the TR Band loosen and open the TR Band velcro, reinsert 15mls of air into the balloon – this will gently ease the TR Band from the access / puncture site. Any excess blood may be gently removed using sterile water and gauze.
- Once haemostasis has been achieved apply a sterile plaster and secure with gauze and tape
- Patient should remain within the Cardiac Suite for a minimum of 1 hour following haemostasis before being considered fit for discharge (approximately 4 hours post-procedure).

3.12.1.2 PCI – closure device (No Reopro)

The recovery protocol is the same as the recovery protocol following a coronary IVUS or pressure wire study (protocol 3.12.1.1)

- If patient received further boluses of heparin during the procedure then the patient should remain within the Cardiac Suite for a minimum of 2 hours following haemostasis before being considered fit for discharge (approximately 5 hours post-PCI).

3.12.1.3 PCI – closure device (Reopro).

Reopro bolus only

The recovery protocol is the same as the recovery protocol following a coronary IVUS or pressure wire study (protocol 3.12.1.1) with the following exceptions:

- Leave the TR Band in place for 3 hours post inflation and application.
- Allow to mobilise after 3 hours.
- After 3 hours remove 3mls of air using the syringe:
- Patient should remain within the Cardiac Suite for a minimum of 2 hours following haemostasis before being considered fit for discharge (approximately 6 hours post-PCI).
- A Full Blood Count must be taken 4 hours post-bolus and checked before patient discharge (if platelet count below 100 then Consultant must be notified).

Reopro Infusion

- If patient is given a Reopro infusion following their bolus then they must remain in overnight following their PCI.

- They should not be mobilised until the infusion has finished (usually next morning)
- A Full Blood Count must be taken 4 hours post-bolus and checked before patient discharge (if platelet count below 100 then Consultant must be notified).

3.12.2 Protocol - Management of Patients Following Femoral Access Route

3.12.2.1 Coronary IVUS or Pressure Wire study

- All patients having either a coronary IVUS or pressure wire study via the femoral artery should ideally have a vascular closure device inserted.
- Patient to remain flat until return to ward area
- Baseline obs including groin / arterial access puncture check, pedal pulses and limb observation every 15 minutes for the first hour and then every 30 minutes for the remaining period of hospitalisation
- Patient to lay flat for 2 hours.
- Patient may then sit up for 1 hour if femoral access site satisfactory
- Patient may then mobilise for 1 hour if femoral access site satisfactory.
- After 1 hour of mobilising without complication then patient may be considered fit for discharge from the Cardiac Suite (approximately 4 hours post haemostasis)

3.12.2.2 PCI (No Reopro)

- All patients having a PCI via the femoral artery should ideally have a vascular closure device inserted.
- The recovery protocol is the same as the recovery protocol following a Coronary IVUS or pressure wire study (Protocol 3.12.2.1)
- However, if patient received further boluses of heparin during the procedure then the patient should remain within the Cardiac Suite for a minimum of 2 hours following haemostasis before being considered fit for discharge (approximately 5 hours post haemostasis).

3.12.2.3 PCI (Reopro)

Reopro bolus only

- All patients having a PCI via the femoral artery should ideally have a vascular closure device inserted.
- The recovery protocol is the same as the recovery protocol following a Coronary IVUS or pressure wire study (Protocol 3.12.2.1) with the following exceptions:
    - Patient to lay flat for 3 hours.
    - Patient may then sit up for 1 hour if femoral access site satisfactory
    - Patient may then mobilise for 2 hours if femoral access site satisfactory.
    - Patient should remain within the Cardiac Suite for a minimum of 2 hours following haemostasis before being considered fit for discharge (approximately 6 hours post haemostasis).
    - A Full Blood Count must be taken 4 hours post-bolus and checked before patient discharge (if platelet count below 100 then Consultant must be notified).

Reopro Infusion

- If patient is given a Reopro infusion following their bolus then they must remain in overnight following their PCI.
- They should not be mobilised until the infusion has finished (usually following morning)
- A Full Blood Count must be taken 4 hours post-bolus and checked before patient discharge (if platelet count below 100 then Consultant must be notified.

4 PACEMAKER INSERTION

This includes both temporary and permanent pacing. Ideally this should be carried out in Cardiac catheter laboratory 2.

4.1 Temporary Pacing Wire (TPW) Insertion

4.1.1 Indications

Syncope from idiopathic conducting system disease [SA, AV nodal or BB disease].

Complete heart block with inferior myocardial infarction

- and rate <40bpm which is unresponsive to atropine, or
- poor haemodynamic state, or
- pauses of >3sec, or
- a broad complex escape rhythm

Complete heart block developing after anterior infarction (the prognosis is poor)

Development of bifascicular block or Mobitz II block after admission with ACS

4.1.2 Patient Preparation

Patients must be managed on CCU before transfer to catheter laboratory for the procedure

Patients must have continuous cardiac monitoring at all times

Patients with haemodynamic compromise as a result of their brady-

arrhythmia should be given intravenous atropine (up to maximum dose of 3mg) and external pacing pads be applied so that external pacing can be delivered

Ideally patients should give written consent where possible but verbal

consent is acceptable if the procedure is done as an emergency

4.1.3 Daytime hours:

The patient will be transferred to the catheter lab and an emergency space made available as soon as possible

It may be necessary on occasion to set up the second lab if the first lab is going to be unavailable for an inappropriately long time

4.1.4 Out-of-hours:

The on-call Cardiology Consultant must be called to discuss the need for the procedure and will return to the Hospital in order to carry out the procedure with immediate effect

4.2 Role of Staff

4.2.1 Daytime hours

Nurse Assistant (will be catheter lab scrub nurse)

- Ensure all necessary equipment needed to carry out the procedure is immediately available
- Establish satisfactory monitor trace
- Ensure familiarity with controls of pacing box
- Place patient in comfortable position with neck support. Sedation may be required.

Radiographer

Arrange fluoroscopy to give minimum magnification

Check image orientation

Adjust image to provide optimum soft tissue contrast

Store final image and transfer to PACS

4.2.2 Out-of-hours

Nurse Assistant (will be seconded from CCU)

Be familiar with the catheter lab set up and be competent in turning on both the monitoring and fluoroscopy equipment prior to the arrival of the Cardiology Consultant (will need to be have signed off as competent)

Ensure all necessary equipment needed to carry out the procedure is immediately available

Establish satisfactory monitor trace

Ensure familiarity with controls of pacing box

Place patient in comfortable position with neck support. Sedation may be required.

Radiographer

Unless the Radiographer on call is familiar and competent with catheter Lab then there will be no Radiographer involvement with the Cardiology Consultant being responsible for safe fluoroscopy and acquisition of Images

4.3 Procedure

To be carried out by or under direct supervision of Consultant Cardiologist

- Use right subclavian or right internal jugular vein if possible
- Iodine skin preparation, pacing drape and towels
- Use correct size sheath with cuff and sleeve for pacing wire
- Check image orientation with instrument laid on chest pointing to apex of the heart
- Use intermittent screening and stop screening when not looking at monitor
- Advance wire across TV with preformed bend, or in reverse loop
- Beware lead in coronary sinus or inferior cardiac vein
- Place tip of wire in RV apex pointing 15°-30° below horizontal
- Connect wire to box using loop through sheathed connector and checking correct polarity
- Check satisfactory pacing threshold (usually <2mA, but <4mA acceptable if difficult placement
- Check adequate sensing of intrinsic R wave (if present)
- Check stable position by asking patient to cough, sniff and pant – check position and pacing
- Stitch wire and sheath securely.
- Dress wire in a loop

4.4 Post-Procedure

- Complete audit form and log screening time
- Transfer patient back to CCU for ongoing monitoring
- Request Chest X-Ray
- Check pacing threshold daily
- Change pacing wire with antibiotic cover if any signs of infection.

Possible Complications

- Pneumothorax
- Wire dislodgement – loss of capture
- Wire perforation – leading to cardiac tamponade
- Infection

4.5 Permanent Pacemaker (PPM) Implantation

4.5.1 Patient Preparation

4.5.1.1 Prior to Procedure

- All patients considered for pacing for bradycardia should be referred to Cardiology. Clinically urgent cases will be seen immediately as inpatients. Non urgent cases will be seen within two weeks as outpatients.
- Patients referred for a pacemaker should have a Pacemaker referral form completed (see Appendix 4.6.1) and countersigned by a Consultant cardiologist.
- The completed form should be handed into the Cardiology Co-ordinator who will book the patient onto both TOMCAT and PIMS which will automatically add the patient onto the waiting list and generate an appointment letter (see Appendix 4.6.2).
- Patients referred for a REVEAL device (implantable loop recorder) should be sent the appropriate appointment letter (see Appendix 4.6.3).
- Patients referred for a pacemaker generator box change should have a Pacemaker Box Change referral form completed (see Appendix 4.6.4) and countersigned by a Consultant cardiologist.
- Full documentation of symptoms and arrhythmia (resting or ambulatory ECG or tilt table test) is required.
- Efforts should be made to exclude a transient cause (eg. AMI, drug effect, electrolyte disturbance) or medically treatable cause (eg. hypothyroidism).
- All patients should have a new 12 lead ECG, CXR, U+E, FBC INR and TFT.
- Where it is considered safe, temporary pacing should be avoided and permanent pacemaker implantation should be the primary procedure.
- Warfarin or aspirin treatment and any coagulation disorder should be clearly stated in referral.
- INR must be 1.3 or less for elective procedures. Patients requiring anticoagulation should be switched to adjusted dose IV heparin and have heparin stopped 12 hours before the procedure.

4.5.1.2 Day of Procedure

- Patients requiring an overnight stay will be admitted to Tisbury ward following the procedure (if not already inpatient on a medical ward).
- Day case patients will be admitted to the Cardiac Suite.
- Patients should not eat after a light breakfast at 08:00hrs. Fluids and regular medication may be taken.
- Emergency list patients should take no food for four hours.
- Admission clerking will be done by Cardiology FY1 and will include identification of allergy to antibiotics.
- FY1 will check that documentation of arrhythmia, recent U+E, FBC, INR, ECG and CXR are available.
- FY1 will prescribe prophylactic antibiotics. (Amoxicillin & Flucloxicillin single IV dose pre and 48 hours oral treatment post procedure. Penicillin allergic patients - single dose of Teicoplanin 200mg IV).
- Cardiac Suite nurse will place IV cannula on implantation side (left arm if right-handed).
- Cardiac Suite nurse will admit patient and take baseline observations.
- Cardiac Suite nurse will fill out pre-op checklist, dress patient in gown.
- Cath. Lab. nurse will call for first patient 30 minutes before list starts. Subsequent patients to be called when pacing leads secured in current patient.

4.5.2 Implant Procedure

Procedures will take place in Cardiac Suite.

Equipment immediately available will include; fluoroscopy, ECG monitor, pacemaker programmer, full resuscitation equipment including defibrillator with external pacing facility.

The Cardiac Physiologist will ensure that appropriate pacemaker, leads, introducers, screwdrivers, alum keys, jump leads and PSA leads are available for the planned procedure.

Drugs available will include; Prilocaine 1% 60mls, Atropine IV 1mg, Midazolam IV 10mg, Prochloperazine IV 12.5mg, , Adrenaline 1:10,000 10mls.

Standard operating theatre protocol will apply to sterile technique and instrument and swab checking.

Lead position will be checked by X-ray, electrical and stability testing.

An X-ray image of final electrode position will be taken and stored on PACS.

Operation details will be recorded in the patient notes.

The Cardiac Physiologist will record implantation data and complete the CCAD return.

Once satisfactory pulse and BP recordings are made in recovery area, patient will be transferred Tisbury ward for postoperative monitoring.

4.5.3 Post-Operative Care and Discharge

Contact the implanter or the on-call cardiologist directly if any post implant problems occur.

Patient will be advised to rest and avoid elevation of arm on implant side.

ECG monitoring will be continued overnight for patients staying in hospital.

4 hourly pulse, BP and temperature record for patients staying in hospital.

Oral prophylactic antibiotics to be given for 48 hours.

Standard pacemaker checks to be made by Cardiac Physiologist before discharge.

Departmental PA chest X-ray before discharge.

IV cannula to be removed before discharge.

The cardiac physiologist will give patient the pacemaker information booklet and answer any questions.

Patient will be advised to inform DVLA and not to drive a car until 1 week after the procedure

Day Case patients

must have satisfactory post-implant pacing checks and CXR before being allowed to mobilise

will be observed for a minimum of 3 hours before discharge

will be given a 48 hour supply of oral antibiotics to go home with

4.5.4 Patient Information re: Post-Operative Care and Discharge

Follow up of all patients with pacemakers living in Salisbury will be carried out in Salisbury.

Checks will be made post operatively, at one month, then annually.

Data will be entered into Salisbury database and sent to CCAD

Pacemaker checks will be made at the hospital (or at home by arrangement for older or frailer patients).

Equipment in the follow up clinic will include full resuscitation equipment, an ECG recorder, magnet, apparatus for measurement of stimulus intervals and device specific pacemaker programmers.

Patient demography (name, sex, date of birth, address, telephone number, national insurance number and national health number). Clinical diagnosis and indication for system implant will be recorded.

Patient evaluation. Symptoms will be recorded and implant site reviewed. Tests will be performed for lead stability with breathing, generator manipulation and for myo-inhibition.

Patient notes. A record of the pacemaker check will be entered into patient medical notes and a separate complete pacing record will be maintained on the database including implant report, discharge summary, details of pacemaker programming and record of all pacemaker checks.

System demography. Manufacturer's name, generator name and serial number, lead name, serial and coding number, sensing and pacing parameters will be noted and projected system life flagged.

System evaluation. Evaluation of ERI and EOL criteria, lead characteristics, emergency pacing facilities review of generator status and programmed parameters will be made. (System parameters - pulse duration, pulse interval, magnet interval, pulse rate, magnet rate, A-V interval, pacing amplitude

4.6 Appendices

4.6.1 Appendix - Referral Form for Pacemaker

Referral Form

4.6.2 Appendix - Appointment Letter for Pacemaker

Word Letter Template

4.6.3 Appendix - Appointment Letter for REVEAL device (implantable recorder)

Word Letter Template

4.6.4 Appendix - Referral Form for Pacemaker Box Change

Referral Form

5 TRANSOESOPHAGEAL ECHOCARDIOGRAPHY (TOE)

A Transoesphageal echocardiogram (TOE) is an ultrasound scan of the heart performed by passing a flexible tube down into the patient's oesophagus. As this is a semi-invasive procedure the patient will require local anaesthetic throat spray and may require intravenous sedation. A TOE study is usually carried out on an out-patient basis but may be indicated for some inpatients.

5.1 Indications

A TOE study is indicated for the following:

- Native valve disease
- Congenital heart disease
- Stroke
- Prosthetic valve dysfunction
- Atrial fibrillation
- Suspected endocarditis
- Cardiac masses
- Aortic dissection

5.2 Patient Preparation

5.2.1 Outpatient Patient Preparation

5.2.1.1 *Prior to procedure*

The responsible Cardiologist or member of the Cardiology team should:

- Fully explain and discuss the possible risks and the benefits to the patient.
- Identify if the patient has the following:
  - Previous surgery to throat or neck
  - Difficulty in swallowing food
  - Previous haemoptysis
- For these patients it may be necessary to organise an examination of the throat and oesophagus before the TOE.
- Identify if the patient has a responsible adult to accompany them after the procedure.
- Identify if the patient definitely requires an intravenous cannula. This is required if:
  - Patient wishes to have sedation.
  - There is an indication to perform a 'bubble' or contrast study.
- Put patient's details directly onto TOMCAT.
- Obtain written consent (pre-filled consent form available on ICID)

The Cardiology co-ordinator should then:

- Input patient details into PiMS
- Book appointment date onto both PiMS and TOMCAT
- Send Patient the following information via post:
  - Confirmation of appointment letter (see Appendix 5.5.1)
  - A local Transoesophageal Echocardiography Patient Information Leaflet (see Appendix 5.5.2)

5.2.1.2 Day of procedure

The patient should:

- Not eat or drink anything for at least 4 hours before the test.
- Take medications as normal (including warfarin).

- Report to the Cardiac Suite reception at the time stated in the appointment.
- Recovery nurse will then fill in the TOE pre-procedural checklist part of the nursing record (see Appendix 5.5.3)
- Confirm with patient no change in clinical condition.
    - Patient's ID to be verified and an ID bracelet to be put on
    - Pulse, blood pressure, oxygen saturations and temperature to be recorded.
    - Blood sugar (BM stix) to be recorded if patient diabetic.
- Blood to be sent for INR if patient on warfarin for procedure (if INR >3.5 TOE may be postponed).
- Intravenous cannula to be sited where indicated.
- Remove patient dentures

5.2.1.3 Inpatient Patient Preparation

Inpatients must be reviewed and assessed by a member of the Cardiology team who is to discuss with a Cardiology Consultant as to whether a TOE is appropriate. Once the decision has been made to go ahead with a TOE then the patient details are given to the Cardiology Co-ordinator.

The procedure will be done on the next available list unless the patient is unstable and requires potentially emergency intervention. If so the procedure should be done either at the bedside if patient on CCU or on ITU. In this scenario verbal consent is acceptable.

If the patient is intubated and ventilated on ITU then Anaesthetic co-operation will be required for introduction of the TOE probe and all naso-gastric feeds must be discontinued at least 4 hours prior to the procedure.

The Cardiology Co-ordinator will then:

- Enter patient details onto TOMCAT
- Inform ward staff as to the expected date and time of the TOE and any other required instructions.

5.3 Patient Information

Confirmation of appointment letter

Local Transoesphageal Echocardiogram Patient Information Leaflet

5.4 Post-Procedural Care and Discharge

If the patient has not had sedation then following one set of nursing observations they can be discharged but should not eat or drink for up to one hour.

The patient should be advised to check that the local anaesthetic has worn off using cold water before eating anything hot.

If the patient has had sedation the patient should be monitored in Recovery until they are awake enough to travel home and should be accompanied by an adult

Prior to discharge a senior member of the Cardiology team should discuss the results of the test with the patient and confirm the need for any further follow-up arrangements

5.4.1 Post-Discharge Advice

On discharge the patient should be given a post-TOE discharge information leaflet (see Appendix 5.5.4) Included in this leaflet is both advice as to what to avoid following any sedation given as well as important contact numbers in case of any complications or concerns following their TOE.

5.5 Appendices

5.5.1 Appendix 5.5.1 Appointment letter for Transoesophageal Echocardiogram

Word Letter Template

5.5.2 Appendix 5.5.2 Local Transoesophageal Echocardiogram Patient Information Leaflet

Patient Information Leaflet

5.5.3 Appendix Transoesophageal Echocardiogram Nursing Record

Nursing Record

5.5.4 Appendix Transoesophageal Echocardiogram - Patient Discharge Information Leaflet

Patient Information Leaflet

6 INTRA-AORTIC BALLOON PUMP (IABP) INSERTION

An IABP is a mechanical device that is inserted percutaneously through the femoral artery under X-Ray guidance as a temporary measure to help support cardiac performance. It does so by increasing coronary perfusion and reducing left ventricular afterload which in turn increases overall cardiac output.

- It is the responsibility of the cardiac physiologist that whenever a PCI is being undertaken the IABP must be on, fully charged and 'primed' for use at all times.
- No PCI may be undertaken if there are no IABPs available within the Cardiac Suite for immediate use.
- There are a total of 2 IABPs (models CS100) located in the Cardiac Suite – one in each catheter lab.

6.1 Indications

There are several indications for inserting an IABP. However, an IABP is to ONLY be inserted either following a complication during PCI or post-MI / ACS in order to help stabilise the patient's condition prior to emergency transfer for cardiac surgery. For any other reason it is up to the discretion of the On-Call Consultant Cardiologist responsible for the management of the patient.

6.2 Contra-indications to IABP Insertion

An IABP should NOT be inserted if the patient has any of the following conditions:

- Severe aortic regurgitation.
- Abdominal or aortic aneurysm.
- Severe calcific aorta-iliac disease or peripheral vascular disease.
- Introduction of the IABP catheter without the use of an introducer sheath is not recommended in patients with severe obesity, scarring of the groin or other contraindications to percutaneous insertion.

6.3 Patients who have an IABP inserted

Usually the need for an IABP only becomes apparent at the time of a PCI. If an IABP is to be inserted for any other reason, then this must be discussed first with a Consultant Cardiologist who will then arrange for the procedure to take place at an appropriate time. If this is in within working hours then the patient details will be passed onto the Cardiology Co-ordinator to input them onto TOMCAT. Outside of working hours it is the responsibility of the Consultant Cardiologist to make arrangements for the procedure to take place.

If a patient is ventilated and requires an IABP, then the Consultant Cardiologist must liaise with the Consultant Intensivist from ITU with regards to appropriate transfer of the patient both to and from the Cardiac Suite.

6.4 Patients who require emergency transfer to Southampton for cardiac surgery

Where a patient is identified as needing an IABP and subsequent emergency transfer to Southampton for cardiac surgery the cardiac catheter laboratory team should activate and follow:

- Emergency transfer action plan (see Protocol 6.8.1)
- Great Western Ambulance Service transfer request procedure (see Protocol 6.8.2)
- Laminated copies of these pathways are available in each lab and in the Recovery Area
- The IABP is the responsibility of the cardiac physiologist during emergency transfer.

6.5 Patients who remain at Salisbury

Where a patient has an IABP inserted but does not require transfer to Southampton, then they will be transferred from the Cardiac Suite directly to ITU for ongoing management.

Once the IABP has been removed and the patient is in a stable condition then they will be transferred back to the Cardiology ward.

Any queries regarding the care of the IABP during working hours may be directed to any of the Cardiology Consultants, CIU, or one of the Cardiology SpRs.

All queries out-of-hours should be directed to the Cardiology Consultant on call.

A copy of the *CS100 IABP Concepts of Counterpulsation Therapy* which includes a module on clinical aspects of timing and 'Troubleshooting' will be available in the Cardiac Suite at all times for reference.

6.6 Insertion, Setting up and Removal of IABP

See relevant protocols (Protocol 6.8.3, Protocol 6.8.4 and Protocol 6.8.5 respectively)

6.7 Possible Complications

6.7.1 Balloon Membrane Perforation

Balloon membrane perforation may be caused by:

Contact with a sharp instrument

Fatigue failure due to unusual (biaxial) folding of the balloon membrane during use.

Contact with calcified plaque resulting in abrasion of the surface and eventual perforation.

If perforation occurs, blood may be visible in the IABP catheter.

If balloon membrane perforation is suspected, as may be evidenced by:

IABP leak alarms

dried blood particles or serosanguineous fluid seen in the extracorporeal tubing or catheter extender or

a sudden change in the diastolic augmentation pressure waveform

Then immediately:

Stop IABP

Remove the IABP catheter

Placing the patient in the Trendelenburg position should be considered if a leak

Consider IABP catheter replacement if the patient's condition warrants.

6.7.2 Limb Ischemia

During or after IABP, limb ischemia may result. It can be caused by an obstruction of flow due to:

Thrombus formation.

Creation of an intimal layer separation or flap.

The presence of the introducer sheath or IAB catheter.

After IABP catheter removal, if limb ischemia is observed, a vascular procedure may be indicated and an expert opinion from a member of the Vascular team should be sought immediately.

The distal limb should be monitored at all times looking for the development of compartment syndrome.

6.7.3 Bleeding at the Insertion Site

Bleeding at the insertion site may be caused by:

Trauma to the artery during insertion of the IABP

Excessive catheter movement at the insertion site.

Anticoagulation.

Bleeding at the insertion site may be controlled with direct pressure at the insertion site, assuring adequate distal blood flow. If bleeding persists, surgical repair of the insertion site may be indicated.

6.7.4 Infection

Infection may occur due to interruption of normal skin integrity at the IABP catheter insertion site. Sterile technique should be used during IABP catheter insertion and during dressing changes.

Assess the patient for the development of IAB catheter related infection and treat, if necessary.

6.7.5 Thrombocytopenia

Thrombocytopenia may develop due to mechanical damage to the platelets. Monitor platelet count and replace platelets, if necessary.

6.7.6 Aortic Dissection

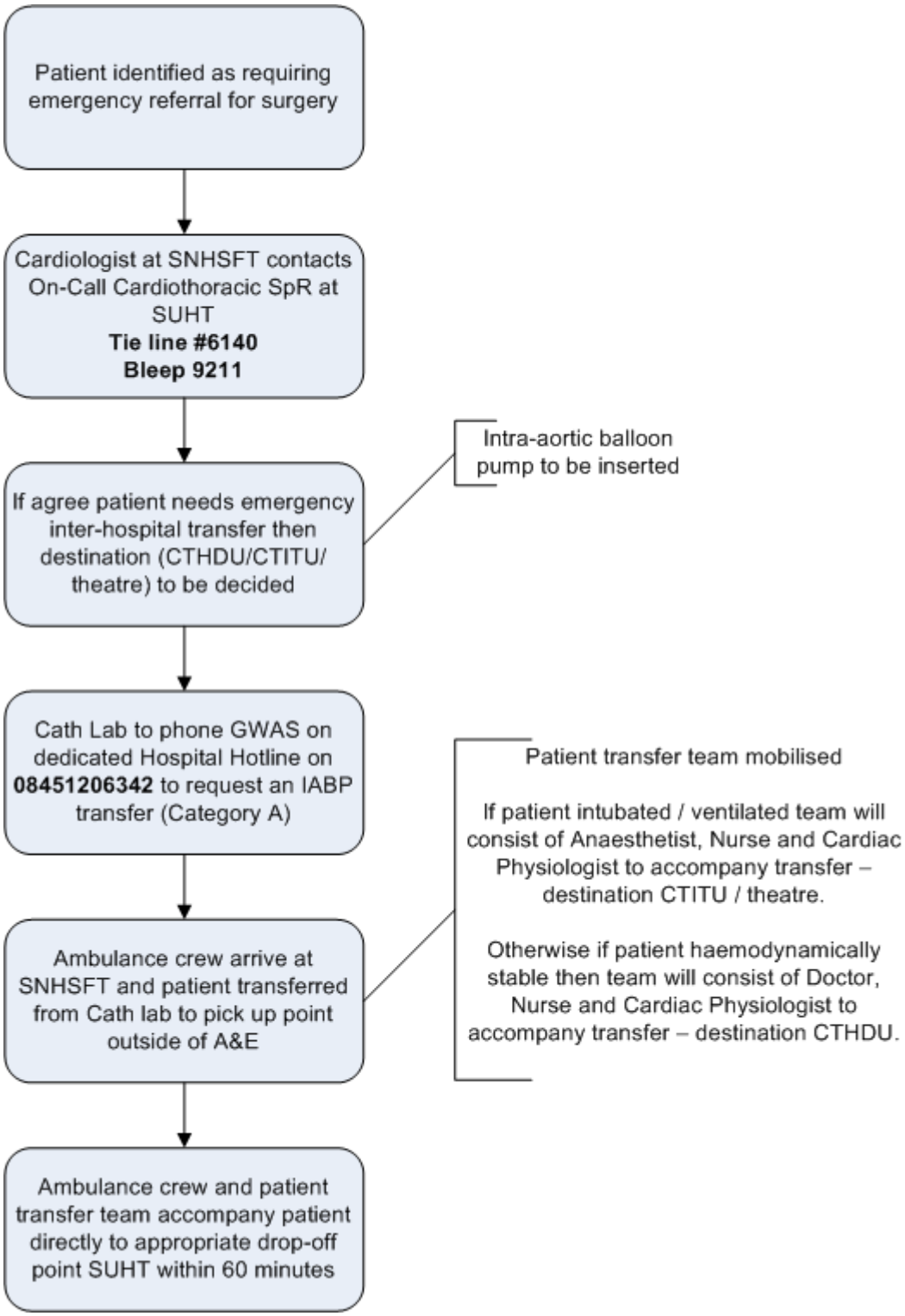
Aortic dissection may occur during insertion of the IABP catheter. Symptoms can include back and/or abdominal pain, a decreased hematocrit, and hemodynamic instability.

6.7.7 Thrombosis

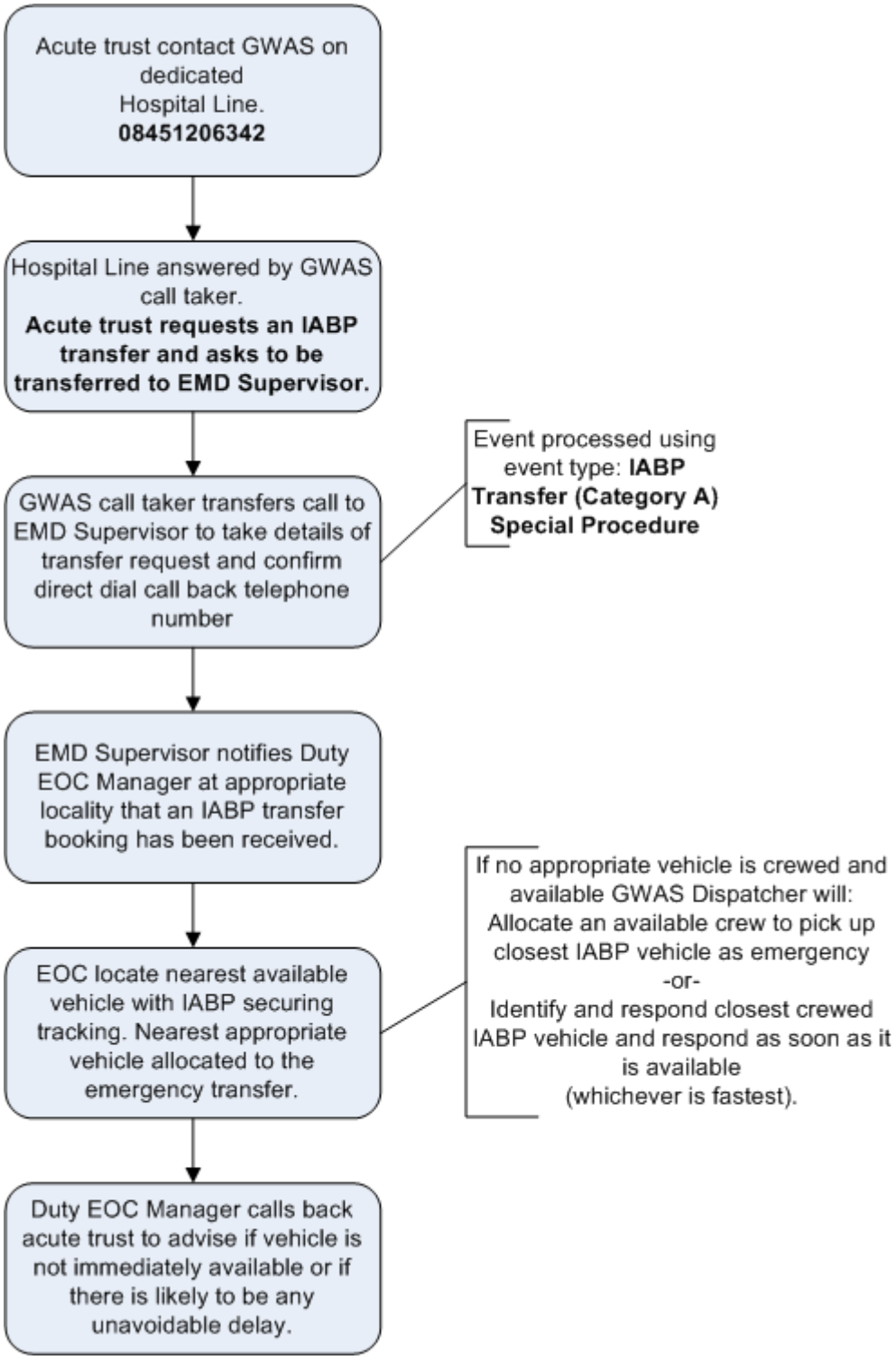
Thrombus formation may occur during counterpulsation. The symptoms associated with thrombosis formation and treatment will depend on the organ system involved.

6.8 Protocols

6.8.1 Transfer of Patients to Southampton for Emergency Cardiac Surgery Transfer Action Plan



6.8.2 Great Western Ambulance service – Emergency Transfer Request for Patient with an IABP



6.8.3 Protocol - Insertion of IABP

Make the customary preparations for percutaneous catheterization and administer appropriate local anesthesia.

Insert the angiographic needle into the common femoral artery at a 45 degree or less angle. (See Figure 1)

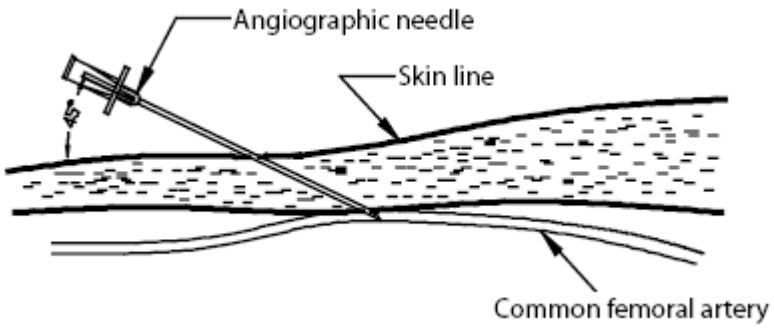


Figure 1

Insert the J-tip end of the supplied 0.025" (0.06 cm) guide wire through the angiographic needle and advance into the thoracic aorta.

Keeping the guide wire in place, remove and discard the needle.

Wipe the blood from the guide wire with a wet, lint-free sponge.

Make a small incision at the exit of the guide wire to facilitate inserting the vessel dilator through the skin.

Place the tapered end of the vessel dilator over the exposed guide wire and dilate the artery by pushing the vessel dilator into the arterial lumen.

Keeping the guide wire in place, remove and discard the vessel dilator. Apply pressure at the wound site to control bleeding.

Wipe the blood from the guide wire with a wet, lint-free sponge.

For sheathless insertion: Spread the tissue at the incision with a tissue dilator.

Whenever possible, use fluoroscopy during IABP catheter insertion to ensure proper placement.

Do not insert the IABP catheter unless the inner lumen is supported by a guide wire.

Maintain vacuum on the IABP catheter throughout insertion. Do not remove the one-way valve.

Remove the IABP catheter tray from the sterile packaging.

Firmly attach the one-way valve to the male luer fitting of the extracorporeal tubing.

With the 30cc syringe, slowly aspirate a full 30cc. Remove the syringe while leaving the one-way valve in place.

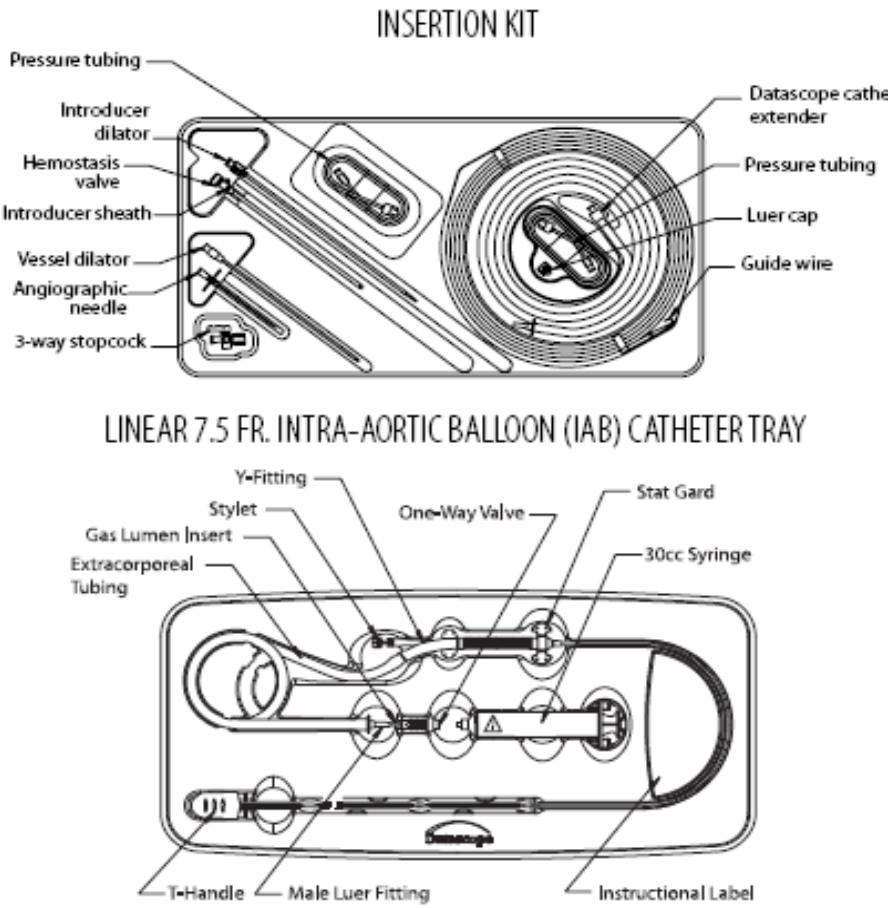


Figure 2

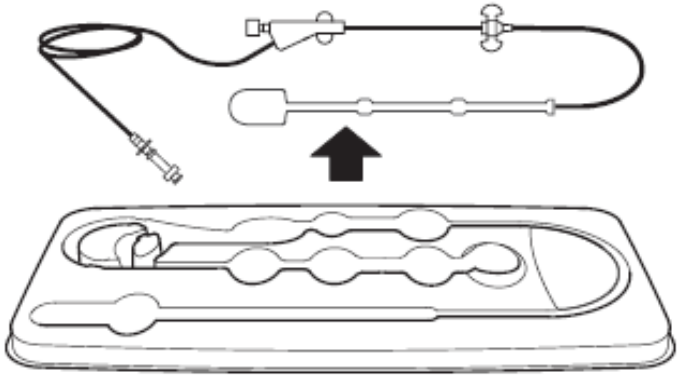


Figure 4

Carefully remove the extracorporeal tubing, Y-fitting and IAB catheter WITH

T-handle from the tray – (DO NOT disconnect one-way valve when removing the extracorporeal tubing from the tray.) (See figure 4)

6.8.3.1 PRECAUTIONS:

- Do not remove the T-handle or packaging stylet until immediately prior to insertion.
- Take care not to kink or place undue force on the IAB catheter.

NOTE: Maintain a vacuum on the IAB catheter throughout insertion. Do not remove the one-way valve.

Balloon Membrane Volume (cc)	Balloon Membrane Dimensions		Patient Height	
	Length (mm)	Diameter (mm)	(ft)	(cm)
25	165	15	<5′	<152
34	221	15	5′0″–5′4″	152–162
40	258	15	5′4″–6′0″	162–183

NOTE: This information is to be used only as a guideline. Clinical judgment and patient factors(i.e., torso length) should be considered when selecting the most appropriate size IAB catheter.

NOTE: This information is to be used only as a guideline. Clinical judgment and patient factors (i.e.,torso length) should be considered when selecting the most appropriate size IAB catheter.

Cut-off gas lumen insert P/N 0065-00-0680-02 R0 – 6

Remove the stylet wire from the inner lumen (Figure 5). Do not attempt stylet reinsertion.

PRECAUTION: The stylet wire provides support to the IAB. Handle the IAB with care and be sure to support the t-handle so as not to kink or place undue force on the catheter.

Manually flush inner lumen with 3-5cc flush solution.

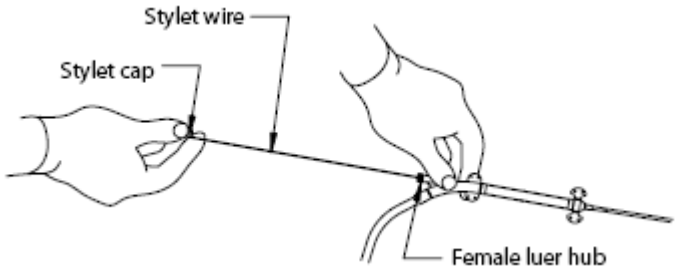


Figure 5

Withdraw the balloon membrane from the protective T-handle by PULLING THE CATHETER STRAIGHT OUT OF THE T-HANDLE (See Figure 6).

PRECAUTION: Remove the IAB catheter from the T-handle by pulling STRAIGHT OUT to avoid damaging it.

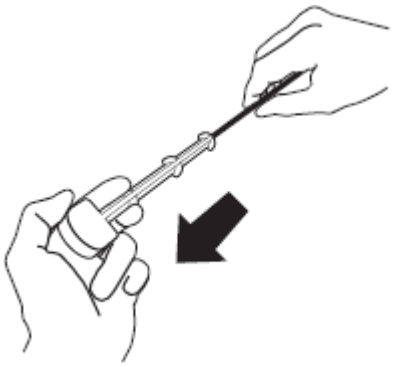


Figure 6

It is not necessary to lubricate the IAB catheter by passing it through a basin of sterile saline solution. If the IAB catheter is dipped into a basin of sterile saline solution, do not wipe the catheter prior to insertion.

PRECAUTION: DO NOT handle the IAB membrane or wipe the catheter prior to insertion.

Insert the supplied 0.025" (0.6 cm) guide wire through the inner lumen (See Figure 7.) Advance the IAB catheter over the guide wire until the guide wire exits the female luer hub. Always ensure the operator has complete control of the guidewire.

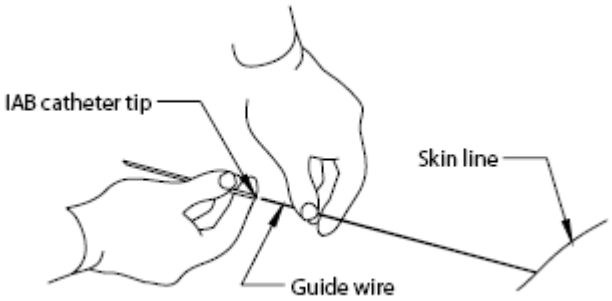


Figure 7

WARNING: Do not use excessive force when inserting the IAB catheter. If you use excessive force when inserting the IAB catheter, arterial tearing, dissection, or balloon membrane damage may occur.

NOTE: During insertion of the IAB catheter, arterial blood under pressure may run down the length of the folds in the balloon membrane and drip or be expelled under arterial pressure from the balloon membrane/catheter junction. THIS "CHANNELING" IS NOT A LEAK. As the IAB catheter is advanced the bleeding will diminish.

While controlling the proximal end of the guide wire, advance the IAB catheter over the guide wire into the artery. Always grasp the IAB catheter no more than one inch (2.5cm) from the insertion site or sheath hub and advance in short continuous strokes to avoid kinking the IAB catheter while maintaining complete control of the guidewire.

PRECAUTIONS:

Always advance in short, continuous, one inch (2.5cm) strokes to avoid kinking the IAB Catheter.

DO NOT twist the catheter during insertion.

WARNINGS:

Any kinking or damage to the inner lumen may result in subsequent fatigue failure to the inner lumen when pumping.

Do not insert the IAB catheter unless the inner lumen is supported by a guidewire.

Advance the IAB catheter to the proper position in the descending thoracic aorta, with the IAB catheter tip just distal (approximately 2cm) to the left subclavian artery. (See Figure 8)

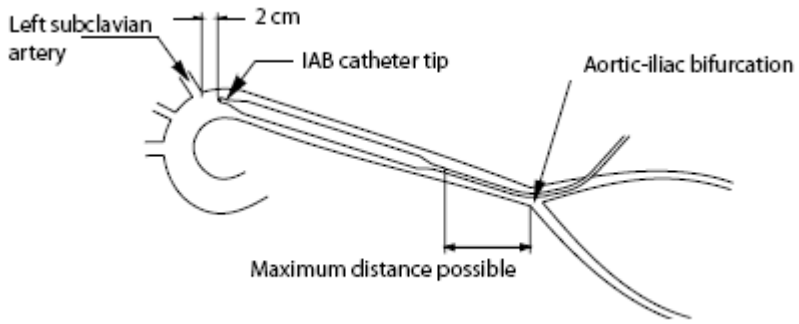


Figure 8

WARNING: If you do not use fluoroscopy during IAB catheter Insertion, you MUST take an X-ray as soon as possible to ascertain that the IAB catheter is properly positioned.

PRECAUTION: When using a chest X-ray to identify the location of the IAB Catheter, it is recommended to place the IABP in stand-by to improve visualization while the X-ray is taken and then immediately resume pumping.

6.8.4 Protocol - Setting up of IABP

Turn on CS100 (on button is located under the handle on the main console just above the CS100 label

Set up a single pressure transducer set (CCU set) and connect.

Connect patient to the ECG - make sure that you avoid placing it the wrong side if the Transducer pole on the bed!

Level the transducer to the patient in the usual way and zero.To zero transducer depress the **zero button** for 2 seconds (zero button is located on the top row, dark blue section, to the left of the start button. The 'Zero' label changes to 0,0,0.

Turn the balloon augmentation up to maximum (augmentation is located on the middle row, pale blue section) by pressing the ↑ button until all the green indicator lights are lit.

Once the balloon is positioned connect the flushing line in the usual way and FLUSH WELL. You MUST see a clear diacrotic notch.

Connect the balloon tubing to the protected port on the back of the CS100; make sure you have a good connection.

Once the balloon is filled you are ready to start, the **green start button** is located on the top row (dark blue section). The CS100 defaults to a 1:1 augmentation. You will see that the augmented pressure has a lower systolic and diastolic pressure but and overall increase in mean pressure.

Set augment alarm to 10 less than the augmented pressure.

If IABP is indicated prior to PCI place the CS100 on standby while the guide catheter is being position but it will be ok for it to augment during the actual procedure.

6.8.5 Protocol - Removal of IABP

Consider tapering or discontinuing anticoagulation therapy prior to removal.

Stop IAB pumping.

Disconnect the IAB catheter from the IAB pump permitting the IAB catheter to vent to atmosphere. Patient blood pressure will collapse the balloon membrane for withdrawal.

Remove all securement devices and/or sutures and dressings.

PRECAUTION: To avoid cutting the IAB catheter or the Introducer, do not use scissors to remove the dressing.

Remove the IAB Catheter.

If an introducer sheath is used: Loosen the sheath seal from the hub and withdraw the IAB catheter through the introducer sheath until resistance is met.

WARNING: Do not attempt to withdraw the balloon membrane through the introducer sheath.

Remove the IAB catheter and the introducer sheath as a unit.

WARNING: If you feel any undue resistance during withdrawal of the IAB catheter, discontinue withdrawal and consider removal of the IAB catheter via an arteriotomy.

Difficult removal may be a result of entrapment, due to a dried blood clot having formed within the balloon membrane from a balloon membrane leak.

Apply digital pressure below the puncture site during IAB catheter removal.

Allow free proximal bleeding for a few seconds, then apply pressure above the puncture site and allow a few seconds of back bleeding. Establish hemostasis to the puncture.

Carefully examine the limb distal to the insertion site for adequate perfusion.

WARNING: If limb ischemia is observed after IAB catheter removal, a vascular procedure may be indicated.

PRECAUTION: Inspect the entire Introducer sheath and IAB catheter to be certain the entire device has been removed.

7 PERICARDIOCENTESIS

Pericardiocentesis is a potentially life saving intervention. It can be performed as part of a cardiac arrest situation; otherwise it is to be performed only by or under the direct supervision of the consultant cardiologist responsible for the patient. It is an invasive technique that may allow restoration of adequate cardiac output by relieving pericardial tamponade. This procedure should not be carried out as an outpatient procedure (unless at the Consultant's discretion).

7.1 Indications

- Emergency relief of pericardial tamponade with severe haemodynamic compromise
- Cardiac arrest

7.2 Patient Preparation

- It is imperative that blood tests for clotting, full blood count and platelets are known and if required correction of any abnormalities may be needed.
- During working hours the patient will be booked onto an operating list.
- Out-of-hours patients will be transferred to the Catheter Laboratory.
- In the event of a cardiac arrest or pre-arrest where there is no time to safely transfer the patient to the Catheter Laboratory then the procedure should be undertaken immediately at the bedside.

7.3 Patient Information

For an elective procedure written consent must be obtained.

In an emergency situation verbal consent is adequate.

7.4 Post-Procedure Care

Following successful insertion of a pericardial drain, the patient must be transferred to the CCU for ongoing care and observations including monitoring for any signs of complications.

7.5 Potential Complications

- Cardiac arrythmias;
  - Ventricular fibrillation
  - Asystole
- Cardiac trauma
  - Laceration of coronary artery
  - Laceration of cardiac chambers
- Pneumothorax
- Haemothorax

7.6 Procedure

- place patient in the supine position or torso elevated at 30-45degrees using a wedge
- prepare site with betadine and follow strict aseptic surgical technique
- administer local anesthetic and then select 4'' 16G needle (pre-supplied in Cook pack) with syringe attached
- Insert the needle between the xiphoid process and the left costal margin at a 30-45 degree angle to the skin
- advance the needle towards the left shoulder aspirating constantly. A distinct 'give' or 'pop' may be felt as the needle enters the pericardium. Contact with the

pericardium may produce some pleuritic pain or dysrhythmias. Bloody fluid from the pericardial space should not clot.

- Pass the 0.025 gauge wire through the needle and then dilate over the wire before inserting the pericardial drain using the seldinger technique. Aspirate fluid using a 3 way tap and then allow free drainage.
- If there is a concern as to whether the drain is in the pericardium fluroscopy can be performed or a small amount of agitated saline can be injected through the needle under echo guidance.
- Repeat the echocardiogram once the drain has been secured with silk suture to the skin and a mepore dressing.

8 APPOINTMENTS

The Cardiac Catheter Laboratory Co-ordinator (Extension 3568) will send all appointment letters via the post to patients giving adequate notice of the date of their procedure whilst ensuring that both local and national waiting targets are met.

As far as it is possible elective lists will be single sex lists comprising of either male or female lists (in accordance with the Trust's single sex policy) even allowing for procedures where patients do not have to undress. In the event that this is not possible then a patient's dignity and modesty will be respected at all times.

9 SESSION TIMES

9.1 Opening Times

The Cardiac Suite will be open from 08.00am until 18.00pm. This will allow adequate time for patients both to arrive before the start of the operational list and to be recovered at the end of the operational list.

Elective procedures will take place in either of the catheter laboratories from 09.00am to 17.00pm Monday to Friday. The morning session will start at 09.00am prompt and will finish at 12.30pm approximately. The afternoon session will start at 13.30pm approximately and will finish by 17.00pm approximately.

Each Catheter Laboratory will need to be closed for 2 days each year for essential maintenance. These will be planned in advance to minimise any operational disruption.

9.2 Proposed Timetable for Cardiac Catheter Laboratories (as from May 2011 until further notice)

LAB 1	Monday	Tuesday	Wednesday	Thursday	Friday
AM	PCI (MKS)	PCI (TAW)	PCI (TAW)	Training	PCI (MKS / TAW)
PM	-	-	-	PCI (MKS)	-

In addition to the above timetable, there will be a Consultant Interventional Cardiologist available every afternoon during the week who may activate the Catheter Laboratory for appropriate emergency standby coronary angiogram +/- proceed to PCI cases.

LAB 2	Monday	Tuesday	Wednesday	Thursday	Friday
AM	Inpatient Pacing	Pacing (ALJ)	-	ERCP	Inpatient Pacing
PM	ERCP	Angiography (ALJ)	Angiography (SJL)	Education	TOE* (MKS / TAW)

Inpatient Pacing	Lists can be created when capacity is required
TOE*	Lists will be on a fortnightly basis

9.3 Out-of-hours work

Elective cases – the unit will be closed between 17.00pm and 09.00am Monday to Friday, weekends as well as Bank Holidays.

Emergency cases – the unit will be opened for appropriate emergencies as required.

For patients that require either temporary pacing wire placement or pericardiocentesis emergency Consultant cover will be provided 24 hours a day, 365 days a year.

The up-to-date Consultant Cardiology On-Call rota will be available at all times with Switchboard so that it is clear who needs to be contacted in case of emergency. It is the nominated Consultant on-call's responsibility to be contactable and available to come into the Hospital with immediate notice. If the Consultant is unable to cover their on-call commitment then it is their responsibility to organise cover and that this information is conveyed to Switchboard.

For patients that have had a PCI carried out during the daytime and then need to go back to the catheter laboratory for whatever reason the Cardiac Suite will be reopened out-of-hours from 17.00pm until 09.00am the following morning. If this occurs on a Friday then the catheter laboratory will be reopened if the Consultant Cardiologist on call that night is one of the Interventional cardiologists. If the on call Consultant is a non-interventionist then the patient will be transferred to Southampton.

9.4 Case Workload

9.4.1 Elective Diagnostic Cardiac Catheterisation

It is anticipated that there will be four cases per afternoon session. This can include a maximum of two bypass graft cases or one left and right heart case per session.

9.4.2 Elective Pacemaker Insertion / Generator Box Change

It is anticipated that there will be a maximum of three cases per session depending on the type of pacemaker being implanted.

9.4.3 PCI / Standby coronary angiography +/- PCI / IVUS / Pressure wire studies

It is anticipated that there will be on average three cases per session. Any expected difficult cases will be booked for the morning session with especially long cases possibly booked for two or even three ‘slots’ (Consultant discretion).

Within this proposed framework there is scope for flexibility. However, due to unexpected emergencies lists may be severely disrupted and patients may even on occasion have to be postponed to a different session. The details of any patient postponed will be given to the Cardiac Co-ordinator so that they can be rescheduled for the next available list. A multidisciplinary approach to decisions regarding changes in workload will be adopted at each session as required

10 MINIMAL STAFFING REQUIREMENTS

The roles of the various healthcare professionals involved in the Cardiac Suite has been described elsewhere (see Section 2).

10.1 Elective Diagnostic Cardiac Catheterisation

1 Consultant Cardiologist
1 Radiographer
1 Cardiac Technician
2 Nurses within Cath Lab – 1 scrub nurse + 1 'runner'
2 Nurses within Recovery Area.

10.2 Pacemaker Implantation

10.2.1 Emergency Temporary Pacing Wire (out-of-hours)

1 Consultant Cardiologist
1 CCU Nurse
1 Junior doctor

10.2.2 Elective Permanent Pacemaker Insertion

1 Consultant Cardiologist
1 Radiographer
1 Cardiac Physiologist
1 Scrub nurse

10.2.3 Elective Transoesophageal Echocardiography

1 Consultant Cardiologist
1 Cardiac Physiologist
1 Nurse

10.2.4 Emergency Pericardiocentesis (out-of-hours)

1 Consultant Cardiologist
1 CCU Nurse

10.2.5 Emergency Intra-Aortic Balloon Pump Insertion (in hours)

1 Consultant Cardiologist
1 Radiographer
1 Scrub nurse
1 Cardiac Physiologist (competent in IABP)

10.3 PCI

10.3.1 Elective PCI/ Standby coronary angiography +/- PCI / IVUS / Pressure wire studies

1 Consultant Interventional Cardiologist
1 Radiographer (competent in Coronary IVUS)
1 Cardiac Physiologist (competent in Pressure Wire)
2 Nurses (PCI competent – see Appendix 10.4.1) within Cath Lab – 1 scrub nurse + 1 'runner'
2 Nurses within Recovery Area.

10.3.2 Out-of-hours (OOH) PCI

The OOH PCI on-call team will consist of:

1 Consultant Interventional Cardiologist
1 Radiographer
1 Cardiac Physiologist (competent in Pressure Wire)
2 Nurses within Cath Lab – 1 scrub nurse (PCI competent) + 1 'runner' (from CCU)

10.4 Appendices

10.4.1 Appendix - PCI Nurse Competencies

Nurse Competencies

11 ADMISSION, RECOVERY AND DISCHARGE

Patients admitted for their elective procedure will report to the reception desk in the Cardiac Suite at either 08.15am or 12.30pm (for morning and afternoon sessions respectively).

Recovery and discharge will be in accordance with the respective protocols.

12 MULTI-DISCIPLINARY RESPONSIBILITIES

12.1 Consultant Cardiologist

Patient safety
Assessment of referrals and risk stratification
Performing procedure
Analysis of results
Review of patient post procedure and discussion of results
Data Protection
TOMCAT

12.2 Radiographer

Radiation Protection
Lead Aprons/Collars
Film Badges
Testing/ Servicing of Radiographic Technical Equipment
Health & Safety
Fluoroscopy during procedures
Coronary Intravascular Ultrasound
Stock control including:
scanning all consumables used during a case
ensuring consumable levels do not fall below minimum identified
MEDCON / Archiving

12.3 Cardiac Physiologist

Patient safety – including Defibrillation (if necessary)
Cardiac Monitoring during procedures
Testing / Servicing of Haemodynamic Equipment
TOMCAT – data input
Intra-aortic balloon pump management

12.4 Cardiac Nurses

Pre-admission
Admission checks
Post Procedure Care
Discharge
Pharmacy
Stock materials
Sterile Services materials
Defibrillation Trolley (and associated drugs)
Infection Control
Fire

12.5 Cardiac Co-ordinator

Entering patient details onto PIMS
Booking patient onto TOMCAT
Requesting relevant medical notes to be sent to Catheter Lab
Sending appointment letter and procedure information leaflet to patient
Ensuring mechanism of response in place for patients
Handling telephone queries
Waiting list management
Typing PCI procedural reports
Compiling Cardiac suite On-call rota

12.6 Cardiac Suite Receptionist

Ensure patient's notes (including previous folders) are present
Welcome patient to Cardiac Suite

Inform Recovery staff of patient's presence

13 PHARMACY

Medication requirements and stock levels of all medications and intravenous drugs will be agreed by the Consultant Cardiologists, Catheter Lab Senior Nurse and Pharmacy Department.

It will be the responsibility of the Senior Nurse (or delegated to another nurse at the discretion of the Senior Nurse) to check and maintain these stock levels and regularly monitor and adjust according to usage and demand.

Ordering, safekeeping and administration of controlled drugs will be in accordance with Trust Protocol.

Written protocols for the administration of drugs within the Catheter Laboratory will be agreed and then reviewed every 3 years.

13.1 Appendices

13.1.1 Abciximab (Reopro)

Therapeutic indication

Abciximab (Reopro®) is a potent anti-platelet agent (class Glycoprotein IIB/IIIA inhibitor) indicated as an adjunct to heparin and aspirin for the prevention of ischaemic cardiac complications in patients undergoing non-elective percutaneous coronary intervention (PCI). It is not normally given to patients undergoing elective PCI unless there is a significant complication.

Presentation

Vial containing 10mg in 5ml

Contraindications

Active internal bleeding

Recent (within 6 weeks) gastrointestinal (GI) or genitourinary (GU) bleeding of clinical significance

History of cerebrovascular accident (CVA) within 2 years, or CVA with a significant residual neurological deficit

Bleeding diathesis

Administration of oral anticoagulants within 7 days unless prothrombin time ≤1.2 times control

Thrombocytopenia (<100,000 cells/μL)

Recent (within 6 weeks) major surgery or trauma

Intracranial neoplasm, arteriovenous malformation, or aneurysm

Severe uncontrolled hypertension

Presumed or documented history of vasculitis

Use of intravenous dextran before percutaneous coronary intervention, or intent to use it during intervention

Known hypersensitivity to any component of this product or to murine proteins

Prescribing

Abciximab should only be prescribed at the discretion of the Consultant Interventional Cardiologist in charge of the case who will also decide on the timing of when to give the abciximab (see summary of product characteristics).

Abciximab is prescribed as an initial bolus intravenous injection of 250microgram/kg to be given over one minute.

It is usual practice that the bolus injection is then followed by a continuous intravenous infusion of 0.125microgram/kg/minute (maximum 10microgram/minute) over 12 hours.

Unfractionated heparin (UFH) is also prescribed to be given concurrently with the abciximab. Intravenous UFH is to be given at the start of every PCI as a weight-adjusted bolus (70 units/kg). Further boluses may be given during the case as guided by ACT levels (target ACT 250 – 300 seconds). If abciximab is given then the target ACT should be lowered (200 – 250 seconds).

Method of administration

The infusion can be prepared in either a 50ml syringe or a 250ml infusion bag. The concentration within the 50ml syringe or 250ml infusion bag will vary depending on the patient's weight, but the rate will remain constant. The rate is 4ml/hour over 12 hours (50ml syringe driver) or 19ml/hour over 12hours (250ml infusion bag)

Instructions for dilution and suitable diluent

Calculate the total amount (in mL) of abciximab required for the intravenous injection and the intravenous infusion using the table on page 4.

For example;

A 70kg patient having a 50mL infusion will require a total dose of abciximab 8.8mL (for intravenous injection) + 3.3mL (for intravenous infusion) = 12.1mL (for total dose).

A 70kg patient having a 250mL infusion will require a total dose of abciximab 8.8mL (for intravenous injection) + 3.4mL (for intravenous infusion) = 12.2mL (for total dose).

Using a suitably sized syringe, inject 5mL of air into the vial before withdrawing the solution. Draw up sufficient volume for both the intravenous injection dose and the 12 hour infusion.

Intravenous injection

2. Connect the 0.2 or 0.22 micron filter and connector provided. Draw the volume for the intravenous injection dose into another syringe through the filter and connector from the original syringe and give over one minute.

Intravenous infusion

3. Then draw the remaining volume for the infusion through the filter and connector from the original syringe into either:

a 50mL syringe (for infusion in a syringe driver) diluting to 50mL with sodium chloride 0.9% or glucose 5%, and administer at a rate of 4mL/hour. OR

add to a 250mL infusion bag of sodium chloride 0.9% or glucose 5%, and administer at a rate of 19mL/hour.

4. Lines can be flushed with sodium chloride 0.9% or glucose 5%. No incompatabilities have been shown with IV fluid or commonly used cardiovascular drugs, but do not mix with other medicines and administer in a separate IV line whenever possible.

Table to calculate dosage for intravenous injection and infusion (for 50mL and 250mL)

Weight (kg)	Injection (mL)	50mL Infusion (mL)	250ml Infusion (mL)	Weight (kg)	Injection (mL)	50mL Infusion (mL)	250mL Infusion (mL)
45	5.6	2.1	2.2	71	8.9	3.3	3.5
46	5.8	2.2	2.3	72	9	3.4	3.5
47	5.9	2.2	2.3	73	9.1	3.4	3.6
48	6	2.3	2.3	74	9.3	3.5	3.6
49	6.1	2.3	2.4	75	9.4	3.5	3.7
50	6.3	2.3	2.4	76	9.5	3.6	3.7
51	6.4	2.4	2.5	77	9.6	3.6	3.8
52	6.5	2.4	2.5	78	9.8	3.7	3.8
53	6.6	2.5	2.6	79	9.9	3.7	3.9
54	6.8	2.5	2.6	80	10	3.8	3.9
55	6.9	2.6	2.7	81	10.1	3.8	3.9
56	7	2.6	2.7	82	10.3	3.8	3.9
57	7.1	2.7	2.8	83	10.4	3.8	3.9
58	7.3	2.7	2.8	84	10.5	3.8	3.9
59	7.4	2.8	2.9	85	10.6	3.8	3.9
60	7.5	2.8	2.9	86	10.8	3.8	3.9
61	7.6	2.9	3	87	10.9	3.8	3.9
62	7.8	2.9	3	88	11	3.8	3.9
63	7.9	3	3.1	89	11.1	3.8	3.9
64	8	3	3.1	90	11.3	3.8	3.9
65	8.1	3	3.2	91	11.4	3.8	3.9

66	8.3	3.1	3.2	92	11.5	3.8	3.9
67	8.4	3.1	3.3	93	11.6	3.8	3.9
68	8.5	3.2	3.3	94	11.8	3.8	3.9
69	8.6	3.2	3.4	95	11.9	3.8	3.9
70	8.8	3.3	3.4	96	12	3.8	3.9

The volumes of abciximab listed in this table allows for a 2ml excess of the infusion that will be left in the giving set after the 12 hour infusion

Possible adverse effects

1. Most frequent adverse events are back pain, hypotension, nausea, chest pain, vomiting, headache pain, bradycardia, fever, puncture site pain and thrombocytopenia.

2. A platelet count must be requested and reviewed 2-4 hours following abciximab administration. Thrombocytopenia (platelet counts below 100) occurs in approximately 2% of cases with severe thrombocytopenia occurring in 1% of cases. If the platelet count falls below 100 then the Consultant Interventional Cardiologist on call must be contacted for advice.

3. Hypersensitivity reactions should be anticipated. If symptoms of an allergic reaction or anaphylaxis appear, the infusion should be stopped immediately.

4. Abciximab is associated with an increase in bleeding rate, particularly at the site of arterial access for femoral artery sheath placement. It is also common to see oral bleeding – especially the gums. See the summary of product characteristics for recommendations for access site care.

5. To prevent spontaneous GI bleeding, the summary of product characteristics recommends pre-treatment with H_2-histamine receptor antagonists or liquid antacids. Anti-emetics should be given as needed to prevent vomiting.

Monitoring

Coagulation

Before administration, platelet count, activated clotting time (ACT), prothrombin time (PT), and activated partial thromboplastin time (APTT) should be measured. Additional platelet counts should be taken 2-4 hours following the intravenous injection dose and at 24 hours. Haemoglobin and haematocrit measurements should be obtained prior to administration, at 12 hours, and again at 24 hours following the intravenous injection dose.

Cardiovascular

Twelve lead ECG should be obtained prior to the intravenous injection dose, and repeated once the patient has returned to the ward, and at 24 hours following the intravenous injection dose. Vital signs (including blood pressure and pulse) should be obtained hourly for the first 4 hours and then at 6, 12, 18 and 24 hours following the intravenous injection dose.

General Nursing Care

Unnecessary arterial and venous punctures, intramuscular injections, routine use of urinary catheters, nasotracheal intubation, nasogastric tubes, and automatic blood pressure cuffs should be avoided. When obtaining intravenous access, non-compressible sites (e.g. subclavian or jugular veins) should be avoided. Sodium chloride 0.9% sterile flush solution or heparin (10units/ml) locks should be considered for blood drawing. Vascular puncture sites should be documented and monitored. Gentle care should be provided when removing dressings.

13.1.2 Adenosine

13.1.3 Intra Coronary

Prepared only when asked by the operator

Equipment needed are:

Vial of Inj Adenosine 6Mg in 2ml
500 Ml bag of Normal Saline
2 Ml syringe and needle
2 x 20 Ml syringe

Draw up 5Mg (1.7 Ml) of Inj Adenosine into the 2 Ml syringe

Add the Inj Adenosine to the bag of Normal Saline on the sterile trolley

The bag of Normal Saline now contains 5Mg of adnosine in 500 Ml (10 Mcg per Ml of Normal Saline)

Label the bag of Normal Saline

Draw up 20 Ml (200 Mcg in 20 Ml) of the infusion into the 20 Ml syringe which is labelled

13.1.4 Infusion

Intra Venous

Femoral or Arm (Preferably Left Ante cubital Fossa)

If small cannula (pink or blue) used – then should give 'high-dose' infusion

Requirement

Normal Saline - 1 bag of 100 ml
Inj Adenosine - 3 Ampoules of 30 Mg in 10 Ml
Intravenous Infusion Set
Infusion Pump

Preparation of Infusion

Remove 40 ml of Saline from the 100 ml bag of Normal Saline Using syringe and needle which leaves 60 ml in the bag.

Draw up Adenosine from the vials and make sure it is 90 Mg in 30 Ml.

Add the drawn up Adenosine to the bag of Normal Saline which makes the solution of 90 Mg Adenosine in 90Ml and label the bag.

Prepare the infusion set and get the infusion set up using the infusion pump.

Infusion is done according to the weight of the patient. Refer to the weight chart for the rate of infusion.

Preparation of the Patient and infusion of the drug

Inform the patient about the infusion and what they might experience during the infusion

Connect the infusion to the existing venous access.

Start the infusion on the instruction of the operator at the recommended rate.

Provide support to the patient.

Stop the infusion when instructed by the operator.

Assure the patient that the discomfort will pass off quickly.

Disconnect the infusion at the end.

Hyperemic Stimuli
Fractional Flow Reserve

INTRAVENOuS ADENOSINE*

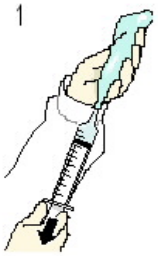
DOSAGE [1,2,7]

I.V. infusion: 140 µg/ kg/ min

PREPARATION

1 vial = 30 ml = 90 mg adenosine
1 saline bag = 100 ml NaCl

1



WITHDRAW
40 ml NaCl from 100 ml saline IV bag and discard.

2

WITHDRAW
30 ml (=90 mg adenosine) from vial/ ampules (use 15 x 2 ml vials or 3 x 10 ml vials).

3

ADD
30 ml (=90 mg adenosine) to saline bag.

LABEL
and hang IV bag 90 mg in 90 ml normal saline.

DOSAGE TABLE

Adenosine intravenous infusion
1 mg/ ml (90 mg/ 90 ml)
140 µg/ kg/ min = 8.4 mg/ kg/ hr

Weight (kg)	Weight (lbs)	Infusion Rate (ml/ hr)
45	99	378
50	110	420
55	121	462
60	132	504
65	143	546
70	154	588
75	165	630
80	176	672
85	187	714
90	198	756
95	209	798
100	220	840
105	231	882
110	242	924
115	254	966
120	265	1008
125	276	1050
130	287	1092
135	298	1134
140	309	1176

1 mg/ ml

* The dosage for Adenosine Triphosphate (ATP) is the same as for adenosine.

Coronary Pressure Measurement
Based on routine clinical practice at Catharina Hospital, Eindhoven, The Netherlands and OLV Hospital, Aalst, Belgium.

CATHARINA-ZIEKENHUIS

14 CARDIAC ARREST

14.1 Non-Procedure Related

In the event of a cardiac arrest within the Cardiac Suite but outside of the Catheter Laboratory then the standard UK Resuscitation Council Guidelines including the Advanced Life Support (algorithm) should be followed.

http://www.resus.org.uk/pages/guide/htm%20

14.2 Procedure Related

Cardiac arrest can occur in the Cardiac Catheter Laboratory and the complexity of treatment relates to the cause. The majority of cases are short and due to ventricular fibrillation these are treated promptly by the team with immediate DC shock. Prolonged arrest is more serious.

The common causes of cardiac arrest in the Cardiac Catheter Laboratory are:

- Vessel Occlusion due to dissection/thrombus;
- Tamponade;
- Malignant arrhythmias.

The Cardiac Catheter Laboratory is a highly monitored environment with invasive haemodynamics and ECG running.

Staff normally present are; 2 nurses, 1 physiologist, 1 radiographer and at least 1 cardiologist.

In the event of a cardiac arrest a 2222 call will go out.

An extra nurse should be available from recovery.

Guidance on radiation for those attending the 2222 call should be sought from / offered by Catheter Laboratory staff.

There are 2 aims during a procedural-induced arrest:

- Maintain circulation to the body and brain by providing BLS/ALS
- Resolving the heart problem (eg. placing a stent, draining the pericardium or placing a transvenous pacing wire)

An appropriate ALS provider will lead on aim 1.

The cardiologist will be in overall charge of the situation and will focus his/her efforts on resolving the heart problem - aim 2.

VF/VT arrest

An initial attempt of up to 3 back to back shocks may be given, which if unsuccessful, should then be followed by the standard UK Resuscitation Council ALS algorithm

Interrupting BLS / CPR

At the discretion of the operating Cardiologist manual chest compressions may be temporarily stopped for a minimal time as possible whilst the Cardiologist attempts to resolve the heart problem (aim 2) which is deemed responsible for the initial arrest

If this is unsuccessful then manual chest compressions should be restarted before any further attempt is made to resolve the heart problem.

The Anaesthetic team will be expected to manage the airway and liaise with ITU as necessary

Location of defibrillation trolleys will be – one per Catheter Laboratory (with pacing facility) and one in Recovery.

Defibrillation trolleys will be checked and stock maintained in accordance with Trust Protocol by qualified nursing staff in the Catheter Lab.

It will be the responsibility of all multidisciplinary staff working within the Catheter Lab and Recovery Area to complete and maintain up-to-date training in the relevant level of resuscitation.

Expected level of training:

Consultant Cardiologists – Advanced Life Support (ALS)
Cardiology Registrars – ALS
Radiographers – Nil
Cardiac Technicians – ALS
Nurses in Cath Lab – at least one with ALS
Nurses in Recovery Area – at least one with a minimum of Intermediate Life Support (ILS)

Supervised Cardiac Arrest Scenario based training for Cardiac Suite staff will take place twice a year and will be part of ongoing staff competencies

Any new staff working in the Cardiac Suite are expected to contact the Resuscitation Department within 2 weeks of starting to book a date for resuscitation training

15 INFECTION CONTROL

15.1 Maintenance of Environment

The doors to the catheterisation labs will be kept closed except as necessary for passage of equipment, personnel and the patient. After a procedure has started the number of personnel allowed to leave or enter should be kept to a minimum.

15.2 Cleaning

It is the responsibility of the housekeeping department to provide a cleaner each weekday evening between the hours of 5pm and 8pm to do a general clean of all areas in the cardiac suite. Cleaning will be provided in labs 1 and 2, recovery area, clean and dirty utility rooms, toilets and the reception area.

Cardiac suite staff will clean the ward area: patient trolleys, recliners, and bed space areas between each patient as per hospital policy. Damp dusting will be carried out on all medical equipment/resuscitation trolleys daily prior to morning list commencing.

Catheter lab 1 and 2 will be spot cleaned between each patient as per hospital policy. The floor will be wet mopped if gross spillage is evident.

Blood contaminated drapes, gowns and gloves will be discarded of in clinical waste bags between each case. Needles and blades will be disposed of in sharps containers.

Cleaning of X-ray equipment will be the responsibility of Radiology staff. Equipment will be cleaned each morning before the lists commences.

Control rooms will be kept free of clutter and cleaned daily.

15.3 MRSA

The Trust MRSA policy should be adhered to at all times. All staff must read and familiarise themselves with the policy and new staff asked to read within 1 week of commencing employment in the cardiac suite.

All elective patients will have MRSA swabs taken during a combined cardiology clinic or pre-assessment appointment, to include nose and groin, any wounds and catheter; specimen of urine (CSU) as appropriate, as per Trust policy. Nursing staff will check MRSA results for diagnostic angiogram/PCI patients the day before their procedure.

If a patient is found to be MRSA positive a nurse will contact the GP in order that treatment can be started immediately. The patient will also be contacted. The nurse will discuss the patient's treatment plan and further procedure date with the relevant consultant.

Elective patients for permanent pacemaker systems will have their MRSA results checked by the cardiology coordinator when the patient's appointment is made.

It is the coordinators responsibility to contact a cardiology consultant if a patient has a positive result and cancel the patient if necessary. The nurse will contact the GP in order that treatment can be started immediately and the patient will also be contacted

Procedures for inpatient MRSA positive patients should be carried out at the end of the list where appropriate. Cleaning of lab area and recovery bed space will take place as per protocol. Patients will return to ward as soon as clinically possible. If patient needs to go to recovery area housekeeping will be contacted to change curtains in recovery bay around patients bed space.

15.4 Clostridium Difficile and Diarrhoea and Vomiting

It is the responsibility of the ward staff to inform the cardiac suite if there are patients awaiting a procedure that have Clostridium Difficile or Diarrhea and Vomiting.

The clinical needs of the patients will be discussed with the consultant.

If clinically stable the procedure will be cancelled and the patient will be re-scheduled when they have negative specimens as per trust policy.

Should the procedure be urgent the patient will be placed on the end of the procedure list. Nursing staff will clean the lab and housekeeping will be called for a further clean

All staff must adhere to hand washing and personal protective equipment (PPE)

15.5 ERCP lists

ERCP lists are carried out twice per week in Lab 2. It is the responsibility of Endoscopy staff to clean lab 2 when the list is complete. The lab will be left clean and free of clutter ready a cardiac list to be carried out.

If there is gross bodily spillage or colonic stents are carried out endoscopy staff will arrange for housekeeping to do a deep clean. This will be funded by the Endoscopy department.

Radiology staff will clean X-ray equipment following an ERCP list.

15.6 Audit

Monthly bare below the Elbow audits and Hand hygiene audits will be carried out and submitted by the 20th of each month as per hospital policy. All staff must be aware of the BBE and hand hygiene policy.

All staff must complete the infection control MLE as per hospital policy. It is the responsibility of each member of staff working in the Cardiac suite to ensure this is complete. This will be reviewed at your annual appraisal.

15.7 Miscellaneous

It is the responsibility of the Estates Department to ensure all air vents are cleaned as per trust policy. These are cleaned on a Pre Planned Maintenance System annually.

The person to contact regarding this is Marcin Scieplik (Asset Support Officer) on ext 4097.

16 INTERVENTIONAL ENDOSCOPY

This operational policy is an addition to the operational policies of the Endoscopy Unit and the Cardiac Unit and should be read together with them.

16.1 Location

Cardiac Catheter Lab 2, Level 4

16.2 Sessions and times

2 sessions a week:

Monday pm – 1330hrs to 1700hrs
Thursday am – 0900hrs to 1300hrs

Any change to these list times will be negotiated between the Lead Clinician for Cardiology and the Lead Clinician for Endoscopy.

The Endoscopists will make every effort to start and finish their lists on time. However, it is implicit that, on rare occasions, there may be a delay due to a complex case or to the addition of an emergency to the list, which will make it impossible to finish on time. Similarly, the Endoscopists expect the Cardiologists to make every effort to finish their lists on time so as to not delay the start of the Endoscopy list, but appreciate that complex or emergency cases may on rare occasions make this impossible. It is expected that as a routine the lab will be available 30mins before list start times to enable the room to be set-up.

16.3 Emergency cases outside the above times and failed ERCP's.

ERCP's are occasionally required as an emergency in patients with ascending cholangitis and with acute pancreatitis. When such patients present and can't be accommodated in Radiology Room 7, the responsible Endoscopist will consult with the Lead Clinician for Cardiology to establish an appropriate emergency slot in the schedule of either lab. Similarly, patients with acute colonic obstruction due to a tumour will rarely need to have a colonic stent placed urgently and the same procedure will apply.

Patients who require urgent percutaneous biliary drainage (PBD) following a failed ERCP will be accommodated on the list, if there is adequate list time remaining, or will be booked into the next available interventional list slot in

Radiology Room 7 or on Dr Frost's Wednesday a.m. slot (whichever is soonest). Either option must first be discussed with Senior Nurse/Sisters in Endoscopy.

Consultant responsible for sessions

Monday pm – Dr Ben Colleypriest and Dr Roger Frost
Thursday am – Dr Juliette Loehry and Dr Roger Frost

16.4 Management of lists

The lists will be booked by Karmon Hall (Booking Clerk).

Monday pm – Maximum of 4 patients to be booked. List to be prioritised with identification of specific scopes/dilators required by consultant responsible for session by 1100hrs Monday morning.

Thursday am – Maximum of 5 patients to be booked. List to be prioritised with identification of specific scopes/dilators required by consultant responsible for session by 1600hrs Wednesday afternoon.

Number of patients on lists agreed by Endoscopy Management Group October 2009.

16.5 Nursing staff

These sessions will be staffed by nurses from the Endoscopy/Radiology nursing team. There will be 3 nurses in the procedure room (may be 2 if not ERCP case) and 1 nurse in recovery.

16.6 Anaesthetic cover

Although most procedures are carried out using intravenous sedation, some patients require GA and the consultants responsible for the list will ensure this has been organised. An Anaesthetist and ODA are always available for the Monday pm list. The Endoscopists believe that it would be beneficial for patients to have GA available on the Thursday list. Negotiations are ongoing with the Anaesthetic Department. The Anaesthetist will take responsibility for ensuring that the patient is safe to leave the procedure room before being taken into

Cardiac Suite recovery. All anaesthetic equipment and necessary drugs will be brought to the lab for each list by the ODA.

16.7 Preparation and Recovery of the patients

All out-patients will report to the Cardiac Suite Reception. On Monday afternoons the Receptionist for the Cardiac Suite will admit the patients onto iPMS. The Endoscopy nurse allocated to recovery is responsible for transferring patients to Endoscopy Unit on iPMS if patient is to complete recovery there, or discharging from system. Similarly, on Thursdays, the Endoscopy nurse allocated to recovery is responsible for admitting and discharging/transferring (where appropriate) all out-patients onto iPMS. In-patients will be teletracked directly to the Cardiac Suite recovery.

Out-patients/in-patients will be made ready by the Endoscopy nurse, utilising the Endoscopy checklist. Out-patients who are mobile enough can walk into Cath Lab 2, hence only requiring a trolley post procedure.

Recovery space is to be managed by effective communication, negotiation and flexibility between Cardiac and Endoscopy staff.

16.8 Managing flow of the lists

Consultants will be responsible for ensuring that ALL in-patients are pre-consented on the ward before the date/time of their appointment. They will ensure out-patients are consented in a timely manner and when requested.

Nursing staff are to use a time management tool i.e. a timer, to ensure the turn-around time of 8 minutes between patients is achieved, as per practice in the Endoscopy Unit.

Radiographers will be responsible for helping to transfer patients onto bed/trolley, taking patient out to recovery, wiping down/making up procedure table and mopping floor between cases if indicated (as agreed by Lead Radiographer for Screening and as per Radiology Room 7 role profile).

16.9 Equipment

Consumables – These will stored in two mobile trolleys located outside Cath Lab 1 when not in use and both transferred into Cath Lab 2 for sessions. Stock levels will be maintained by Materials Management. No additional kit is to be ordered without prior discussion with the Senior Nurse for Endoscopy/Radiology. A mobile trolley with consumables/administration will be taken up into recovery for each session and kept at the back of Room 3 Endoscopy when not in use. This will be re-stocked on Thursday afternoons.

Scopes – A Dry Storage Cabinet has been installed in Cath Lab 2, SDU will be responsible for this. A scope trolley to remove dirty scopes from the Cath Lab to SDU will be made available only at the start of each session and this will be the responsibility of SDU. The Endoscopy nurse co-ordinator will be responsible for ensuring that a copy of the list for the sessions is sent to SDU on Monday morning and Wednesday afternoon after list prioritising/scope identification.

Stacks – These will be taken from Endoscopy Room 1.

16.10 Medication

A supply of pethidine and midazolam will be stored in Cath Lab 2 CD cupboard and Endoscopy nurses covering the ERCP sessions will be responsible for ensuring adequate supplies. They will do a check of the CDs when in the Lab. On a routine basis, the pethidine will be included in the daily CD check (Trust policy) carried out by the Cardiac Cath Lab nursing staff. The Senior Nurse for the Cardiac Suite will be responsible for weekly CD signatory checks.

Other medication for the ERCP list, including narcan and flumazenil will be kept in a Cupboard in Cath Lab 2. Endoscopy nurses will be responsible for ensuring adequate supplies. When workload permits on a Monday morning, the nurse co-ordinator in Endoscopy will ensure medication is drawn up in preparation for the list, which is then to be transferred up with the equipment.

Oxygen – a portable oxygen cylinder will be available for each session for the transfer of patients and clearly labelled for ERCP service. It will be kept in the Store Room when not in use. Nursing staff involved with the session will be responsible for ensuring that the oxygen cylinder does not run out.

17 FIRE

Each discipline will be responsible for familiarising themselves with the locations of nearest 'break glass call points', fire exits, fire extinguishers and meeting point. The person discovering a fire will break the nearest glass call point and follow the Fire Emergency Plan (see section 20.2). All members of the multidisciplinary team will follow the Trust Policy and Protocol in the event of a fire and also be responsible for keeping themselves up-dated with mandatory fire training as required by Trust Policy and Protocol.

In the event of a fire developing outside the Catheter Laboratory but within the location of the Cardiac Suite during a cardiac procedure, the 'runner' nurse must liaise with the Senior Nurse in the Cardiac Suite. Skeleton staff should remain with the patient to complete the procedure if in the middle of a case. Everyone should leave as soon as possible on completion.

In the event of a fire developing within the Catheter Lab, the procedure must be abandoned in as safe a way as possible for the patient and staff, as identified by the Consultant Cardiologist at the time.

17.1 Fire Emergency Plan

Address of premises:	Salisbury District Hospital		
Ward/Dept:	Cardiac Suite, Level 4 sector 0		
Date plan produced and/or amended:		May 2010	
Name of person producing plan (Print name):		A R Andrews	
Job Title:	Fire Safety Manager	Signature:	
Description of Dept:	A daytime only dept with a 9 bedded ward and 2 cardiac investigation laboratories. Minimum of 2 staff present at all times		

Action to be taken by person discovering a fire Operate the nearest break glass fire alarm call point Dial 2222 and inform switchboard of the details of the incident If possible fight the fire with the appropriate fire extinguisher but only if safe to do so Start to move any patient in imminent danger away from the fire
How the Fire Brigade is to be called and who is responsible By the switchboards using the 999 service
Description of fire warning system and location of system panels 2 stage alarm with electronic sounders, sounding continuously in the affected compartment and intermittently in adjacent areas. The main indicator panel located in the switchboard.
Evacuation procedures Leave by the nearest exit and proceed to assembly point, all patients can be moved on beds with minimal manual handling required.
Assembly points Whiteparish and await instruction

Duties and identities of employees with specific responsibilities Porters to direct Fire Service to location of incident. Fire warden to collect patient notes and check that toilets are unoccupied. Nurse in charge to direct evacuation and take control of the incident untill site covers arrival.
Arrangements for safe evacuation of patients and disabled persons. All patients to be moved initially behind 1 fire door in an adjoining compartment and then to the assembly point. Site cover to arrange for assistance and any additional services as required
Fire fighting equipment provided? (locations and details) a) 9 lt Pressurised Water and 2kg CO2 extinguishers adjacent to nursing station and reception entrance. b) Fire blanket in pantry c) Rising main in street d) 1x2kg co2 extinguisher in each Laboratory
Specific arrangements for high fire risk areas Not High Risk
Procedures for liaison with Fire Brigade on arrival Porters will meet Fire Brigade and direct them to the location of the incident b) Nurse in charge to make themselves known to senior officer present c) Engineers to liaise with Fire Brigade regarding interuption or disconnection of any services
Training required CBT at induction Dept procedures by fire warden or dept manager on the first day at work. Annual fire drill with trust Fire Safety Advisor present.

18 SECURITY

During working hours access to the Cardiac Suite Reception area will be unlocked but will be locked at all times when not in operational use.

Staff access will be via Hospital ID approved swipe key. Approval for access must be made via a person's Line Manager to Facilities HQ.

It is the responsibility of individual staff to ensure that they have their Hospital ID with them at all times and that it is up-to-date.

- Access to the Cardiac suite will be via 2 doors. The access to Reception (via the hallway to Tisbury / Whiteparish) also has a video camera link.
- In case of emergency their will be a spare swipe key held on CCU.

The link for the Trust's formal security policy can be found on the Intranet

19 ACRONYMS

ACC	American College of Cardiology
AHA	American Heart Association
ACS	Acute Coronary Syndrome
NSTEMI	Non ST-segment Elevation Myocardial Infarction
STEMI	ST-segment Elevation Myocardial Infarction
PiMS	Patient Information System
ICID	Integrated Clinical Information Database
TPW	Temporary Pacing Wire
PPM	Permanent Pacemaker
TOE	Transoesophageal Echocardiogram
DCCV	Direct Current Cardioversion
IABP	Intra-Aortic Balloon Pump
PCI	Percutaneous Coronary Intervention
CCU	Coronary Care Unit
BCIS	British Cardiovascular Interventional Society
IVUS	Intravascular Ultrasound
MRSA	Methicillin-Resistant Staphylococcus Aureus
OOH	Out-Of-Hours
ID	Identification
ALS	Advanced Life Support
ILS	Intermediate Life Support
CPR	Cardio-Pulmonary Resuscitation