Guideline Title: Intra-Aortic Balloon Pump Management

Summary:
The IABP is a circulatory cardiac assist device that is used in ICU to support the left ventricle and improve coronary perfusion.

Approved by: ICU Medical Director Prof Michael Parr

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1. Background Information: The intra-aortic balloon counterpulsation system is composed of two principal parts:
   i. A flexible catheter with one lumen that allows for distal aspiration/flushing or pressure monitoring. A second that permits the periodic delivery and removal of helium gas to a closed balloon.
   ii. A mobile console contains the system for helium transfer as well as computer control of the inflation and deflation cycle.

The balloons are manufactured in sizes between 20 and 50 cc. The catheter is inserted in most cases through a common femoral artery and advanced under guidance such that the distal end is positioned in the proximal descending aorta, usually about one centimetre distal to the origin of the left subclavian artery.
Pumping is initiated and controlled by the console using input from both the aortic pressure and the electrocardiogram. Inflation occurs immediately after aortic valve closure and deflation just before aortic valve opening.

Inflation and deflation of the balloon has two major consequences:

i. Blood is displaced to the proximal aorta by inflation during diastole and hence perfuses the coronary arteries.

ii. Aortic volume (and thus afterload) is reduced during systole through a vacuum effect created by rapid balloon deflation.

2. Definitions

- **Augmentation IAB**: refers to the ability of the balloon to be fully expanded and contain the full amount of helium in the catheter. During normal pumping it should be maintained on full to prevent clots forming on the end of the catheter.

- **Assisted Aortic End-diastolic Pressure (AOEDP)**: the diastolic pressure in the aorta just prior to the onset of systole, which is affected by deflation of the IAB.

- **Assisted Systole**: systolic pressure, which follows an assisted aortic end diastolic pressure. On arterial pressure balloon waveform it should be lower than the unassisted systolic pressure.

- **Auto fill**: IABP automatically refills the closed gas system with a preset volume of helium when the IAB auto fill button is pressed.

- **IABP**: Intra Aortic Balloon Pump. Actual pump machine.

- **IAB**: Intra Aortic Balloon. Polyurethane balloon attached to a vascular catheter which is put into the aorta for counterpulsation.

- **Counterpulsation**: Refers to the alternating of inflation and deflation of the balloon, during diastole and systole.

- **Suprasystolic Augmentation**: diastolic augmentation greater than systolic pressure.

- **Timing**: refers to the exact points of IAB inflation and deflation in relationship to the systolic and diastolic events of the mechanical cardiac cycle. Accurate timing of the balloon with the cardiac cycle is critical to achieve the beneficial effects of counterpulsation.
  - Inflation of the IABP should occur on the dicrotic notch of the arterial waveform.
  - Deflation should occur prior to systole as indicated by the downward stroke where pressures are low.

![Relationship between Trigger and Timing of IABP](Maquet.com)
- **Trigger**: is the source the IABP uses to identify the beginning of the cardiac cycle. There are 5 Triggers that the IABP uses:
  - **ECG**: the R wave is used to identify beginning of cardiac cycle. (Most commonly used)
  - **Pressure**: on the arterial pressure wave the trigger is the systolic upstroke
  - **Internal**: is used when there is no mechanical cardiac cycle i.e. asystole or cardiopulmonary bypass.
    - It is an internal signal generator that allows asynchronous assistance and is set at 80 bpm.
    - Only available in the SEMI AUTO mode
    - Never leave in this mode if patient generating a cardiac output
  - **Pacer V/AV**: the ventricular spike or an AV pacemaker is the trigger event.
    - Patient must be 100% paced.
    - Only available in SEMI AUTO mode
  - **Pacer A**: the R wave of the ECG trace is the trigger
    - Only available in SEMI AUTO mode
    - Only recommended to use when atrial pacer spikes interfere with R wave detection when using the ECG trigger
    - Fixed or demand atrial pacing can be used with this trigger never to be used with ventricular paced rhythm

- **Unassisted Aortic End Diastolic Pressure**: aortic end diastolic pressure without IABP intervention

- **Unassisted systole**: systolic pressure which does not follow deflation of IAB

### 3. Introduction:

**The risk addressed by this policy:**

- Patient Safety

**The Aims / Expected Outcome of this policy:**

- Staff will have the knowledge and skills to be able to manage and care for a patient who requires Intra Aortic Balloon Pump therapy

**Related Standards or Legislation**

- NSQHS Standard 1 Governance

**Related Policies**

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<th>Description</th>
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<tbody>
<tr>
<td>LH_ICU_2015</td>
<td>Femstop 11 Plus: Femstop Compression Device use in ICU</td>
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<td>Cardiac Monitoring in ICU</td>
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<td>LH_ICU_2014</td>
<td>Arterial Line Monitoring and Management</td>
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### 4. Policy Statement:

- All care provided within Liverpool Hospital will be in accordance with infection prevention/control, manual handling and minimisation and management of aggression guidelines.
- If the patient becomes haemodynamically compromised, commence resuscitation procedures call a MET if criteria is met and commence CPR if no signs of life
- Patient must be on strict bed rest and the head of the bed no higher than 30 – 45 degrees
- Care of the patient receiving IABP support should only be undertaken by accredited staff able to safely monitor and titrate changes in IABP timing and augmentation.
- IABP management in cardiac surgical patients is collaborative between the Surgeon and the ICU Staff Specialist.
ECG and arterial monitoring must be maintained whilst patient is on IABP therapy

Whilst in use, the IABP console must be plugged into the isolated power supply at all times. When not in use IABP must be plugged into power supply and ON/Off switch at bottom of pump switched ON

Whilst in use, the IABP is to be continually transduced via the arterial insertion site. A good arterial trace is essential for proper timing of the IABP

The IABP must not be put on standby for longer than 30 minutes as this will increase the likelihood of emboli.

Catheter removal is to be done by the cardiothoracic surgical team, or other accredited medical staff

A Femstop device must be utilised when removing the Intra-aortic balloon in ICU.

5. Indications 1, 2
   - Cardiogenic shock (left ventricular failure or mechanical complications of an acute myocardial infarction)
   - Intractable angina
   - Low cardiac output after cardiopulmonary bypass
   - Adjunctive therapy in high risk or complicated angioplasty
   - Prophylaxis in patients with severe left main coronary arterial stenosis in whom surgery is pending
   - Intractable myocardial ischemia awaiting further therapy
   - Refractory heart failure as a bridge to further therapy
   - Intractable ventricular arrhythmias as a bridge to further therapy
   - Ischemia related intractable ventricular arrhythmias
   - Septic Shock
   - Weaning from bypass
   - Cardiac support for non-cardiac surgery
   - Prophylactic support in preparation for cardiac surgery
   - Myocardial contusion
   - Mechanical bridge to other assist devices
   - Cardiac support following correction of anatomical defects

6. Contraindications 1
   - Severe aortic regurgitation
   - Abdominal, aortic or thoracic aneurysm.
   - Severe calcified aorta-iliac disease or peripheral vascular disease.
   - Sheathless insertion with severe obesity, scarring of the groin.
   - Uncontrolled bleeding disorder
   - Uncontrolled sepsis

7. Complications 1
   - Vascular complications
     - Limb (and visceral) ischemia
     - Spinal cord ischemia
     - Renal ischemia
     - Vascular laceration necessitating surgical repair
   - Major hemorrhage from arterial dissection
   - Cholesterol embolisation is an infrequent occurrence that may result in limb loss
   - Cerebrovascular accident is a rare complication
   - Sepsis is uncommon unless counterpulsation continues for more than seven days.
   - Balloon rupture is an uncommon event, and is generally related to the balloon pumping against a calcified plaque.
     - Rupture may be followed by thrombus formation within the balloon, which may complicate removal
     - In order to prevent helium gas embolisation from the IABP, the balloon console will withdraw helium from the balloon and shut down the system with an alarm when it detects a loss of pressure.
   - Fall in platelet count, haemolysis, seromas, groin infection, and peripheral neuropathy.
8. Guidelines
   a) Equipment
      - IAB catheter: 2 types, Sensation Plus and Linear
        - Sensation Plus catheter has fibre optic catheter that measures arterial pressure from the end of the IAB.
        - Linear catheter: measures arterial pressure via transducer cable

      - IAB catheter: size is determined by the patient’s height.
      - The sizes are displayed on the IAB catheter box

<table>
<thead>
<tr>
<th>SIZE</th>
<th>LENGTH</th>
<th>PATIENT HEIGHT</th>
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<tbody>
<tr>
<td>7.5Fr: 30cc</td>
<td>16mm</td>
<td>&lt;152cms (5 ft)</td>
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<tr>
<td>7.5Fr: 40cc</td>
<td>16mm</td>
<td>152-162cms (5.4ft)</td>
</tr>
<tr>
<td>8.0Fr: 50cc</td>
<td>17.4mm</td>
<td>&gt;162cms (&gt;5ft 4inches)</td>
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- IAB catheter insertion tray (Doctors room ICU 3)
- IABP console (ICU 3, OT or Cardiac Cath Lab)
- Mask, sterile gloves gowns
- Sterile drapes
- Chlorhexidine 0.5% with alcohol 70%
- 2 large transparent occlusive dressings
- Scalpel
- Suture material
- Combines
- Large dressing pack
- Pressure bag with 500ml 0.9% sodium chloride
- Extension tubing for transducer
- Transducer cable for IABP
- ECG cable for IABP

b) Insertion
   - Explain procedure to patient emphasising the importance of keeping the leg that the IAB catheter is being inserted straight at all times
   - Position patient flat
   - The catheter is inserted into patient’s femoral artery then into the descending thoracic aorta, such that the balloon is distal to the subclavian artery and proximal to the renal arteries.
Position of IAB catheter
www.cabggroupassignment.com

- Reassure patient and monitor haemodynamics during insertion. Connect ECG cable form IABP to patient

**Insertion steps** for sheathed insertion (Sensation Plus fibre optic):
- Make the customary preparations for percutaneous catheterisation and administer local anaesthesia.
- Insert the angiographic needle into the common femoral artery at a 45 degree or less angle.
- Insert the J-tip end of the 0.035" guide wire (labelled with orange tab “FOR SHEATH”) through the angiographic needle and advance into the femoral artery.
- Keeping the guide wire in place, remove and discard the needle.
- Wipe the guide wire with a wet, lint free sponge.
- Make a small incision at the exit of the guide wire to facilitate inserting the sheath introducer through the skin.
- Insert the introducer dilator into the sheath hub and twist lock into place.
- Place the tapered end of the introducer dilator over the exposed 0.035" sheath guide wire and advance the introducer with a rotary motion into the arterial lumen.
- Remove the introducer dilator and 0.035" guide wire leaving the sheath in place.
- Insert the J-tip end of the 0.018" guide wire (labelled with white tab “FOR IAB”) through the introducer and advance into the thoracic aorta.

**Catheter Preparation:**
1. Firmly attach the 30cc syringe with one-way valve to the male luer fitting of the extracorporeal tubing.
2. With the 30cc syringe, slowly aspirate a full 30cc.
3. Remove the syringe while leaving the one-way valve securely in place on the tubing to ensure vacuum is maintained.

- Carefully remove the contents from the tray.
- Remove the stylet from the inner lumen.
- Flush the catheter's inner lumen with 3-5cc of "flush solution.
- Remove the blue T-handle from the catheter pulling straight out.
- DO NOT handle the IAB membrane, wipe the catheter prior to insertion, or twist the catheter during insertion.
Insert catheter over 0.018” guide wire to proper position (2cm distal to the left subclavian artery): While maintaining control of the guide wire, advance in short, continuous, one inch (2.5cm) strokes to avoid kinking the IAB catheter.

- **Initiating IAB Pumping (IABP):**
  1. Remove the guide wire. Aspirate and discard 3cc of blood from inner lumen
  2. Perform a manual “flush with 3-5cc of “flush solution.
  3. Connect a pressure bag and transducer line to the hub of the inner lumen.

- Insert the optical sensor connector into the IABP’s Sensor input on the Sensor Module.

**Post Insertion**
- 12 lead ECG post insertion
- Check limb circulation observations and document on ICU flowchart
- Check CXR for proper positioning of catheter 2 cm below the origin of the left subclavian artery, or between the second and third ribs and above the renal arteries
c) Set up

Set up of IABP console:

- Ensure console is plugged in to power and power switch on front and rear of machine are “on”
- Confirm initial pump settings:
  - Mode: AUTO
  - ECG trigger
  - IAB frequency 1:1.
  - Augmentation: MAX
- Ensure that the auxiliary controls are switched ON:
  - Slow gas loss alarm - On.
  - IAB fill - Auto.
  - Timing - Auto.
  - ECG gain – Normal
- Open helium tank and verify helium pressure (the range is within the green area on the helium pressure gauge).
- Connect ECG and pressure cables from console to patient.
- Prepare pressure bag with 0.9% sodium chloride and transducer tubing to keep arterial line patent and to monitor arterial pressure
- Once catheter is inserted connect and Zero femoral arterial IAB catheter, press ZERO PRESSURE on IABP console and hold for 2 seconds
- Connect IAB catheter coming from patient to clear plastic tubing which then connects to the front of the IABP machine where it says “Balloon” inside the safety chamber
- Turn machine to ‘Standby’, and you will hear five balloon inflations which uncoils the balloon once in place
- Check ECG and pressure tracings and decide on appropriate trigger
- Press ‘Start’ button to commence pumping
- Set Augmentation to MAX slowly as balloon expands
- Set Augmentation alarm limits
- Set operation mode (balloon inflation and deflation) to AUTO, unless timing is not accurate then put in semi auto mode and adjust timing appropriately
- Set IAB frequency to 1:1
Rear view of IABP. Adapted from Maquet

Control panel IABP. Adapted from Maquet

9. Clinical Issues
a) Management
- Perform full physical assessment
- Educate patient on not being able to bend leg with IAB
- Special attention to recording groin bleeding/ooze, peripheral perfusion, colour, bilateral pulses, temperature, capillary return, movement and sensation. **This should be attended on lower extremities and circulation observation chart every hour.** Any evidence of ischemia needs to be immediately communicated to the cardiothoracic surgical team.
- Pressure area care – 4hourly as patient immobile
- Hourly haemodynamic observations recorded
- Patient nursed supine 30-45 degrees head up. May be nursed on side as long as leg with IABP is kept straight
- Daily CXR to ensure correct placement of IABP and ensure that it has not migrated.
- Daily pathology for electrolytes, coagulation, urea, creatinine.
- Daily ECG and more frequently as indicated by patients clinical status.
- Monitor IABP tubing for blood. If blood present inform Senior registrar immediately and stop pump.
- Careful monitoring of renal function (The balloon sits above the bifurcation of the renal arteries - backward migration may compromise blood flow to the kidneys).
- Pump should not be put in standby for longer than 20 minutes due to increase risk of thrombus formation.
- Check IAB site regularly for signs of infection and change occlusive clear dressing PRN.
- Adjust augmentation alarm to patients augmented blood pressure.
- Document hourly on ICU chart:
  - I. Site of catheter insertion, whether there is oozing
  - II. Catheter size
  - III. Mode
  - IV. Trigger mode
  - V. Frequency of IAB ratio
  - VI. Augmentation of balloon
  - VII. Augmented blood pressure.

**IABP machine management:**

- The helium cylinder should be replaced whenever pressure drops below the preset level as indicated by the LOW HELIUM message. There is no need to interrupt IABP therapy.
  - The cylinder should be replaced as soon as possible to avoid a potential AUTO FILL failure, which can delay pumping.
  - Replacement of the Helium Cylinder:
    - Close helium cylinder valve fully clockwise
    - Slowly loosen cylinder handle
    - Remove cylinder
    - Check that the plastic washer is present and in good condition on cylinder yoke
    - Install fresh helium cylinder
    - Tighten cylinder yoke
    - Slowly open helium cylinder valve
    - Verify the helium gauge needle is on full.
- Always aspirate 3cc initially if the central aortic pressure line becomes damped. Should resistance be met upon aspiration, consider the lumen to be occluded.
- Discontinue use of the central aortic pressure line, if occluded by placing a sterile male luer lock cap on the port.
- Arterial blood sampling should be performed cautiously with careful technique by expert staff.
- Maintain optimal augmentation and afterload reduction by adjusting timing PRN.
- Re-zero and level transducer (to phlebostatic axis) of arterial IAB catheter once per shift and PRN.
- Ensure 0.9% sodium chloride in pressure bag is replaced every 24hrs and pumped up to 300mmHg.
- Plug balloon console into power point.
- Ensure tubing from IAB to console is not kinked.
- Alarms: the HELP screen can be utilised by staff for step by step instructions on troubleshooting alarms. See troubleshooting section below.
Timing

- Balloon must be timed accurately to give full benefit of augmentation to the patient
- Incorrect timing will cause the heart to work harder
- Balloon is timed by comparing the arterial pressure waveform while the balloon is augmented with the cardiac cycle
- A good arterial trace is essential for proper timing to occur
- Timing should be checked on a 1:2 or 1:3 ratio so you can see a normal beat

Inflation

- Inflation occurs during diastole when the aortic valve closes and the left ventricle relaxes
- This period is when blood is not being pumped forward by the heart, therefore with the balloon inflated at this time the flow of blood will not be impeded
- Aortic valve closure is represented on the arterial trace by the dicrotic notch
- Inflation of the balloon is timed to occur at the dicrotic notch on the arterial pressure trace

Deflation

- Deflation is timed to occur just before the next systole
- It is the depression of the balloon and the transfer back of helium into the console
- Can be seen on the IABP monitor as half way down the down slope after the dicrotic notch, prior to the aortic valve opening
b) Weaning
When the hemodynamic and clinical state of the patient who has undergone IABP therapy has improved to the point where assistance is no longer required, the IABP must be weaned and removed
- CI > 2.2 - 2.5
- MAP > 65mmHg
- Stable heart rate and hemodynamics
- Decreasing the IABP frequency from 1:1 then 1:2 then 1:3 commences weaning. The augmentation of the balloon should never be decreased for weaning due to the increased risk of thrombus.
- When the ratio of the balloon is decreased each time the patient's hemodynamics should be assessed before the next stage of weaning is commenced.

c) Removal
- Ensure patient is hemodynamically stable.
- For those IABP’s placed via the open method, either by femoral or proximal aorta, the removal needs to be done in the operating theatre.
- Check INR and APPT are within normal range.
- Explain the sheath removal procedure to the patient: include the function of the manual compression device (Femstop), the approximate time that it will be in place and activity restrictions during, and following the procedure.
- Equipment:
  - Dressing pack
  - Stitch cutter
  - Chlorhexidine 0.5% & alcohol 70%
  - Femstop dome and arch clamp
  - Gauze and combines
  - Gloves gown and protective eyewear
  - Transparent occlusive dressing
- Wash hands and apply PPE.
- Patient to lie supine.
- Put IABP on STANDBY then turn off as this will allow for balloon to deflate passively.
- Position Femstop arch clamp (See Femstop guideline)
- Disconnect tubing from IAB to pump as this will also help deflate the balloon passively.
- The balloon must be empty before it is pulled from the femoral artery. Apply a 3-way tap and attach a 50ml syringe to draw back on the balloon and create a 30ml vacuum to ensure the balloon is completely deflated prior to pulling it out.
- Remove the IAB, let site bleed for 2 seconds to help remove any thrombus.
- Apply digital pressure for 2-3 minutes then pump up femstop device and ensure in proper position over the site.
- Apply sufficient pressure to achieve haemostasis while maintaining adequate distal limb circulation.
- Inflate dome to 20mmHg above SBP after removing sheath.
- Maintain initial pressure for 2-3mins when artery is occluded and pedal pulses absent. Do not exceed 3 minutes.
- Reduce pressure to attain strong pedal pulse.
- Maintain that pressure for 30mins.
- Lower pressure by 15mmHg every 15minutes until pressure of 40mmHg.
- Ensure skin does not become trapped as the dome folds and pressure is being released.
- Maintain 40mmHg pressure for 30mins, and then completely deflate the dome.
- Ask patient to cough observing for bleeding.
- If not bleeding, remove the femstop pressure device.
- Monitor HR, BP, RR, and SpO2, neurovascular limb observations (colour, warmth, sensation, movement, pulses, and capillary return), puncture site (bleeding,
haematoma). Every 15mns for 1 hour. Every 30 minutes for 2 hours. Hourly until removal of femstop pressure device.

- Head of bed elevated 30º for 1 hour, 45º for 1 hour, 60º for 1 hour then, as patient desires.
- Patient may commence ambulation 6 hours after the IAB catheter removal.
- Instruct the patient to inform the nurse immediately of any obvious bleeding, or sensation of wetness, burning, tearing, tingling and numbness, either at the puncture site or the affected limb

Complications post removal
- Limb ischaemia.
- Excessive bleeding from insertion site.
- Immobility of balloon catheter.
- Balloon leak.
- Infection.

Compartment syndrome may develop after IABP removed

d) Troubleshooting
- Loss of trigger: check
  - ECG trace
  - Replace ECG electrodes
  - ECG cable
  - Choose an alternate ECG lead
  - Check pressure trace

- Loss of pressure trace: check
  - Pressure bag inflated to 300mmhg
  - Patency of arterial line by withdrawing blood then flushing
  - Transducer is level to phlebostatic axis

- Alarms:
  - Leak in IAB circuit / Rapid Gas Loss / IAB disconnected
    - Ensure catheter tubing is not leaking
    - Check connections along catheter and at IABP console safety disk, auto fill tubing and drain port
    - Check catheter is not kinked
  - Blood detected
    - Blood detected in IAB catheter
    - Check for blood in tubing if seen stop the pump and notify Senior Registrar and cardiothoracic registrar.
    - Blood in the inflation catheter could imply rupture of the balloon. It needs to be notified immediately to the cardiothoracic surgical team. If the situation is not promptly attended to and clots form in the balloon it will not be able to be removed without causing femoral artery injury.
  - Auto fill failure / No helium
    - Check helium tank is not empty, relace if necessary
    - Fill the IAB by pressing the IAB fill button for 2 seconds

Resume pumping by pressing START
e) Timing

Timing errors:
- Can occur due to improper inflation and deflation of IAB

Early Inflation:

Waveform Characteristics:
- Inflation of IABP prior to dicrotic notch.
- Diastolic augmentation encroached onto systole (may be unable to distinguish).

Physiologic Effects:
- Potential premature closure of aortic valve.
- Potential increase in left ventricular end diastolic volume (LVEDV) and left ventricular end diastolic pressure (LVEDP) or PCWP.
- Increased left ventricular wall stress or afterload.
- Aortic Regurgitation.
- Increased myocardial oxygen delivery (MVO2) demand

Late Inflation:

Waveform Characteristics:
- Inflation of the IABP after the dicrotic notch.
- Absence of sharp V.
- Sub-optimal diastolic augmentation.

Physiologic Effects:
- Sub-optimal coronary artery perfusion

Early Deflation:

Early Deflation of IABP: Premature deflation of the IAB during the diastolic phase.
Waveform Characteristics:
- Deflation of IAB is seen as a sharp drop following diastolic augmentation.
- Sub-optimal diastolic augmentation.
- Assisted aortic end diastolic pressure may be equal to or less than the unassisted aortic end diastolic pressure.
- Assisted systolic pressure may rise.

Physiologic Effects:
- Sub-optimal coronary perfusion.
- Potential for retrograde coronary and carotid blood flow.
- Angina may occur as a result of retrograde coronary blood flow.
- Sub-optimal afterload reduction.

Increased MVO2 demand

Late Deflation:

![Figure 13: Late deflation of IABP](image)

Waveform Characteristics:
- Assisted aortic end-diastolic pressure may be equal to the unassisted aortic end diastolic pressure.
- Rate of rise of assisted systole is prolonged.
- Diastolic augmentation may appear widened.

Physiologic Effects:
- Afterload reduction is essentially absent.
- Increased MVO2 consumption due to the left ventricle ejecting against a greater resistance and a prolonged isovolumetric contraction phase.
- IAB may impede left ventricular ejection and increase the afterload.

f) Cardiac Arrest
- If counter pulsation is to be continued and synchronised to the CPR effort, then arterial trigger should be selected.
- If CPR generates sufficient blood pressure, then in most cases, the IABP will pump and may improve perfusion to coronary and carotid arteries. In the event that the CPR cannot generate a consistent and reliable trigger, then additional steps should be taken as follows.
  - A trigger signal generated by the IABP is available through the use of the INTERNAL TRIGGER mode.
  - To select INTERNAL, the INTERNAL TRIGGER key must be depressed TWICE.
  - In most cases the clinician may decrease the assist interval or decrease the volume of the IAB.
  - This trigger will maintain movement of the catheter and therefore reduce the risk of thrombus formation.
WARNING: The use of INTERNAL TRIGGER will produce asynchronies counter pulsation & therefore should never be used in the event that the patient has an ECG or arterial pressure source available.

Once the ECG or arterial signal has been re-established, the trigger mode must be changed from INTERNAL to an acceptable patient trigger.

- If the IABP is not used in one of the above methods & the IABP is turned off, the IAB should be manually inflated.
  - Aspirate with a large Luer lock syringe to check for blood.
  - Inject 10cc of air greater than the total balloon volume (i.e. 50 ml for a 40 ml IAB) into the balloon connector and aspirate it immediately.
  - Manual inflation should be done 4 to 5 times every 30 minutes that counter pulsation is discontinued.

g) Defibrillation

- If patient needs to be defibrillated the IABP has protection and is isolated from the patient and the defibrillators electrodes
- Staff still need to stand clear of patient and the IABP

10. Performance measures

- All incidents are documented using the hospital electronic reporting system: IIMS and managed appropriately by the NUM and staff as directed.

11. References


Author: ICU CNE (P.Nekic)
Reviewers: ICU Staff Specialists, NM, NUM’s ICU – CNC, ICU-CNE’s, CNS’s, Cardiothoracic Surgeons
Endorsed by: ICU Medical Director – Prof Michael Parr,