

Intra-Aortic Balloon Pump Protocol

INTRODUCTION

The Intra-Aortic Balloon Pump (IABP) consists of a balloon that is inflated during diastole to increase coronary perfusion and then deflated during systole to decrease afterload.

The primary goal of IABP treatment is to increase myocardial oxygen supply and decrease myocardial oxygen demand.

DETAILS OF PROTOCOL

Indications

- Haemodynamic support during and after Percutaneous Coronary Intervention (PCI)
- Unstable angina
- Cardiogenic shock
- Pre-operatively in high risk patients
- Mechanical complications post myocardial infarction
- Refractory left ventricular failure
- Cardiomyopathy

Exceptions/contraindications

- Severe aortic regurgitation
- Abdominal or aortic aneurysm
- Aortic stent
- Aortic dissection
- Severe calcific aorta-iliac disease
- Severe peripheral vascular disease
- Previous femoral-popliteal bypass or artificial grafts

The Primary haemodynamic benefits are:

- Increases coronary artery perfusion
- Increases myocardial oxygen supply
- Decreases myocardial oxygen demand
- Decreases myocardial work by reducing afterload
- Increases blood pressure
- Decreases pulmonary artery pressure

Initial Assessment

- Check x-ray if required to check position
- Inspect insertion site
- Assess peripheral pulses of 4 limbs every 15mins for the 1st hour, every 30 minutes on 2nd hour, then hourly (Please see IABP observation chart)
- Assess lower limbs for colour, temperature and capillary refill time

IABP

- Check arterial wave form and ECG trace
- Check adequate trigger, timing, frequency and ratio set with medical team
- Check console alarms, IAB lines, pressure bag and helium tank
- Anticoagulation for IABP is not always required (consultant discretion)

Anticoagulation

Patients with an IABP insitu are at increased risk of thrombus formation, therefore anticoagulation should be considered to reduce the risk thrombus, thromboembolism and limb ischaemia.

Choice of regimen will be at consultant discretion and prescribed on EPMA by a medical prescriber.

There must be clear instructions in the patient's notes

It may include:

- **Nothing other than antiplatelets**
- **Enoxaparin (Inhixa)**

Not to be given until after consultant ward round

- **Unfractionated Heparin IV infusion**
Aim for APTT ratio 1.5 - 2.5
Monitor platelet count and signs of bleeding
- **Glycoprotein IIb/IIIa (high risk cases)**
Usually Tirofiban
Not to be given with Enoxaparin/heparin

Regular Monitoring**Patient**

- Hourly monitor BP, augmented pressure, urine output
- Hourly assess both pedal and radial pulses, insertion site
- Daily ECG and coagulation screen

IABP

- Hourly check of arterial trace and ECG,
- triggers, timings, frequency and ratio set.
- Regular check of pressure bag, IABP lines and helium tank

Complications of IABP

- **Limb Ischaemia:** absent peripheral pulses, coolness and discoloration
- **Balloon Misplacement/Migration:** absent left upper limb pulse, urine output less than 0.5ml/kg/hr, presence of blood in urine.
- **Gas or Clot Embolus:** console alarm, sudden patient instability
- **Balloon Leak:** blood or brown flecks on IABP lines, console alarm.
- **Bleeding** from insertion site

Weaning

Identifying patients ready to wean:

- Little or no pharmacological inotropic support (or significant reduction)
- Check heart function on ECHO.
- Down trending lactate.
- Strategy to wean:
Wean from 1:1 to 1:2 to 1:3 over 30 mins to a few hours.
- Decision for removal of IABP should be taken by Cardiologist/ Interventionalist

Removal of Intra-Aortic Balloon Pump

Preparation

- Removal should be performed by a competent and suitably trained person.
- If anticoagulated for IABP, stop IV Heparin 1-4 hours before removal
- Check clotting screen- if abnormal, discuss with medical team before proceeding
- Press STANDBY on IABP
- Disconnect IAB catheter from IAB pump
- With aseptic technique, remove dressings and sutures

Removal of IABP with Femoral Sheath Insitu

- Loosen the sheath seal from the hub with a twist.
- Pull just the catheter and stop once resistance is felt.
- Apply pressure just above the insertion site.
- Remove insertion sheath and IAB catheter as a single unit.
- Do not try to pull the IAB catheter through the sheath

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Sheathless IABP

- Apply pressure just above the insertion site
- Remove the IAB catheter
- If any unexpected or excessive resistance **stop removal** and seek advice from cardiologist

After Removal of IABP

- Apply pressure to puncture site for 30 minutes with compressive dressing or Femostop
- For management and removal of Femostop please refer to Cath lab protocol for removal of femoral sheaths
- Maintain patient flat position as per femoral sheath removal protocol
- Perform hourly check of pedal pulses, colour and temperature of both legs until 24 hours post-removal

Special circumstances - Dysrhythmias with IABP:

- Patients with tachycardia, augmentation can be hindered by insufficient balloon filling time. If IABP augmentation is necessary, treatment should be aimed at slowing the heart rate.

Evidence of balloon rupture:

- Suggested by blood in helium tubing
- Intra aortic balloon failure
- Sudden patient instability
- Console alarm

Actions – support haemodynamics, stop IABP, clamp helium line to prevent gas embolism and prepare to remove balloon.

IABP during CPR:

- The IABP does not need to be disconnected during defibrillation (but staff should be clear of the IABP and console).
- Set the IABP to pressure trigger as an arterial waveform should be generated during CPR. If the console does not recognise the arterial pressure tracing the compressions may not be adequate. If it continues to fail to trigger it may be placed in standby for duration of the arrest but for no longer due to risk of thrombosis.
- IABP transducer line is **NOT** to be used for blood sampling, as occlusion of the lumen may occur, nor is it to be used as an infusion port. It should be zeroed once per shift and re- levelled to mid chest point after position change

IABP transfers using either ACCOTS or WMAS

Balloon pump transfer with ACCOTS (Adults Critical Care Transfer Service).

It has been agreed that ACCOTS can transfer the balloon pump fully assembled so that they can charge the balloon pump whilst on transfer.

The pump must be secured during transfer. They should still take a spare battery in carry case (located in Cath Lab).

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ACCOTS will take full responsibility for transferring the pump like this and returning the pump following handover at receiving hospital. Nurse escort not usually required.

For transfers from Cath lab or CCU we will still use WMAS and put balloon pump in transfer mode using the straps supplied to secure in the ambulance. We will take spare battery in carry case (both located in Cath Lab).

It has been suggested that we take the cart in case any unforeseen incidents on the way that could cause a delay in transfer, thus allowing us to re assemble the balloon pump and plug in to main supply in the ambulance. This may also help if there is any delay at the receiving hospital in transferring balloon pumps. Nurse escort required.

Removing IABP console in preparation

<p>Release latch located below pump console (ensure wheels are locked).</p>	<p>Grab handle and slowly slide console out. Note: 3 audio tones will sound.</p>	<p>Grab handles located on top and front of console, then remove from Hospital Cart.</p>	
<p>4a Push button to release pop-up mount. 4b Pull UP pop-up mount to lock in place.</p>			
<p>Squeeze latches located below Monitor and lift to remove from Hospital Cart.</p>	<p>Squeeze latches and attach to pop-up mount, then release latches. Ensure <u>Monitor</u> is securely attached.</p>	<p>Squeeze latch below handle and lift straight up until wheels <u>extend</u> outward and handle locks into extended position.</p>	
<p>8 Tilt <u>Transport System</u> on wheels and begin transport.</p>			

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Worcestershire NHS
Acute Hospitals NHS Trust

Affix Patient Label here or record

NAME:	
NHS NO:	
HOSP NO:	
D.O.B:	<input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/>

CCU IABP INTENSIVE OBSERVATION CHART

MEDICAL RECORD NUMBER:					
DATE:					
KEY: BLACK ∇ SBP BLACK ▲ DBP RED ∇ AUG BP RED × MAP BLACK ■ HR RED ● RESPS	TIME 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 25 20 15 10 5 0				
		TEMP			
		AUG.CC			
		RATIO			
		RADIAL PULSE			
		FLUSH TRANS			
		IABP LIMB	OTHER LIMB	COLOUR	
				WARMTH	
				SENSATION	
				MOVEMENT	
CALF TENSION					
PEDAL PULSE	DP			PT	
GROIN SITE					
RHYTHM		ABBREVIATE			
PAIN		PAIN SCALE 1 - 10			
OXYGEN		O2 CONC			
		O2 SATS			

COLOUR = Pa-Pale, Pk-Pink. WARMTH = C-Cool, W- Warm. SENSATION and MOVEMENT = P-Present or Np-Not Present
 CALF TENSION = S-Soft

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Monitoring Tool

This should include realistic goals, timeframes and measurable outcomes.

How will monitoring be carried out?

Who will monitor compliance with the guideline?

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: <i>(Responsible for also ensuring actions are developed to address any areas of non-compliance)</i>	Frequency of reporting:
	WHAT?	HOW?	WHEN?	WHO?	WHERE?	WHEN?
Page 3	Appropriate patient suitability and indication for IABP insertion in the Cath Lab	Assessed and confirmed by cardiologist based on: Clinical indications Haemodynamic Assessment Contraindications	Prior to insertion	Cardiologist	Cardiology Directorate meetings DATIX	Each time a reportable issue occurs
Page 4, 7, 8	Safe insertion and setup of IABP. Handover management from Cath Lab staff to CCU/ITU nurses. Transfer of a patient on IABP to another hospital using WMAS or ACCOTS	Daily morning checks to include: Console function Alarms and battery status Helium status Compliance with transfer documentation through patients notes Scheduled servicing of IABP via Siemens Training attendance competencies	Whilst in use Once yearly	Cath Lab Nurses Cardiac Physiologists CCU/ITU Nurses Siemens	Cardiology Directorate meetings DATIX	Each time a reportable issue occurs
Page 4-5, 9	Competent staff delivering patient care in Cath Lab, CCU and ITU, including haemodynamic and	Monitoring of staff attendance through training compliance and updates	Annually	Cath Lab Nurses	Cardiology Directorate meetings DATIX	Each time a reportable

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	limb monitoring, with accurate documentation.			CCU/ITU nurses		issue occurs
Page 5	Safe escalation for complications or equipment failure	Case review in M&M and shared learning PCI database for all relevant IABP supported cases	Monthly	Cardiology Directorate	Cardiology Directorate meetings Datix monitoring and review relating to IABP use or equipment issues	Each time a reportable issue occurs

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References

All references should be 'Harvard' referenced, eg,

A book by a single author:

Seedhouse, D. (1997) *Health promotion: philosophy, prejudice and practice*. Chichester, John Wiley.

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Contribution List

This key document has been circulated to the following individuals for consultation;

Name	Designation
Dr Trevelyan	Cardiology Consultant
Dr Routledge	Cardiology Consultant
Dr Smith	Cardiology Consultant
Dr Saffy	Cardiology Consultant
Dr Goyal	Cardiology Consultant
Dr Roberts	Cardiology Consultant
Dr Mughal	Cardiology Consultant
Dr Vasiliadis	Cardiology Consultant
Dr Hewarathna	Cardiology Consultant
Cath Nicholls	Sister

This key document has been circulated to the chair(s) of the following committee's / groups for comments;

Committee
Cardiology Directorate
DMB

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Supporting Document 1 - Equality Impact Assessment Tool

To be completed by the key document author and included as an appendix to key document when submitted to the appropriate committee for consideration and approval.

Please complete assessment form on next page;



Herefordshire & Worcestershire STP - Equality Impact Assessment (EIA) Form
Please read EIA guidelines when completing this form

Section 1 - Name of Organisation (please tick)

Herefordshire & Worcestershire STP	<input type="checkbox"/>	Herefordshire Council	<input type="checkbox"/>	Herefordshire CCG	<input type="checkbox"/>
Worcestershire Acute Hospitals NHS Trust	<input checked="" type="checkbox"/>	Worcestershire County Council	<input type="checkbox"/>	Worcestershire CCGs	<input type="checkbox"/>
Worcestershire Health and Care NHS Trust	<input type="checkbox"/>	Wye Valley NHS Trust	<input type="checkbox"/>	Other (please state)	<input type="checkbox"/>

Name of Lead for Activity	Dr Smith
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Details of individuals completing this assessment	Name	Job title	e-mail contact
Date assessment completed			

Section 2

Activity being assessed (e.g. policy/procedure, document, service redesign, policy, strategy etc.)	Title: Intra-Aortic Balloon Pump Protocol		
What is the aim, purpose and/or intended outcomes of this Activity?	Please see main body of document		
Who will be affected by the development & implementation of this activity?	<input type="checkbox"/> Service User <input checked="" type="checkbox"/> Patient <input type="checkbox"/> Carers <input type="checkbox"/> Visitors	<input type="checkbox"/> Staff <input type="checkbox"/> Communities <input type="checkbox"/> Other _____	
Is this:	<input checked="" type="checkbox"/> Review of an existing activity <input type="checkbox"/> New activity <input type="checkbox"/> Planning to withdraw or reduce a service, activity or presence?		

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What information and evidence have you reviewed to help inform this assessment? (Please name sources, eg demographic information for patients / services / staff groups affected, complaints etc.)	Please see main body of document
Summary of engagement or consultation undertaken (e.g. who and how have you engaged with, or why do you believe this is not required)	Please see main body of document
Summary of relevant findings	Please see main body of document

Section 3

Please consider the potential impact of this activity (during development & implementation) on each of the equality groups outlined below. **Please tick one or more impact box below for each Equality Group and explain your rationale.** Please note it is possible for the potential impact to be both positive and negative within the same equality group and this should be recorded. Remember to consider the impact on e.g. staff, public, patients, carers etc. in these equality groups.

Equality Group	Potential <u>positive</u> impact	Potential <u>neutral</u> impact	Potential <u>negative</u> impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Age		X		IABP monitoring supports safe and consistent care for adult patients of all ages. Older patients may benefit from clear monitoring and escalation due to increased risk and co-morbidities
Disability	X			Patients with disabilities may have high higher rates of co-morbidities
Gender Reassignment		X		This guideline applies equally to all patients regardless of their gender identity and does not impact on treatment
Marriage & Civil Partnerships		X		Marriage and civil partnerships are not affected by this guideline
Pregnancy & Maternity		X		This guideline applies to adult patients undergoing coronary angioplasty. Pregnant patients would be managed under specialised pathways
Race including Traveling Communities		X		This guideline applies equally to all patients regardless of their race, ethnicity or cultural background
Religion & Belief		X		This guideline applies equally to all patients regardless of their religion and beliefs
Sex		X		Both male and female patients are supported equally by this guideline
Sexual Orientation		X		This guideline applies equally to all patients regardless of their sexual orientation

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Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Other Vulnerable and Disadvantaged Groups (e.g. carers; care leavers; homeless; Social/Economic deprivation, travelling communities etc.)		X		This guideline applies to adult patients undergoing coronary angioplasty
Health Inequalities (any preventable, unfair & unjust differences in health status between groups, populations or individuals that arise from the unequal distribution of social, environmental & economic conditions within societies)		X		This guideline applies to adult patients undergoing coronary angioplasty

Section 4

What actions will you take to mitigate any potential negative impacts?	Risk identified	Actions required to reduce / eliminate negative impact	Who will lead on the action?	Timeframe
	Inconsistent use of guideline	Staff education and awareness of IABP assessment and monitoring requirements	Clinical lead	ongoing
	Variation in monitoring compliance	audit	Clinical lead/governance	As per audits
How will you monitor these actions?	Compliance will be monitored through audits, and Datix reporting and routine governance meetings within cardiology			
When will you review this EIA? (e.g in a service redesign, this EIA should be revisited regularly throughout the design & implementation)	If there is a change in national guideline, local policy or service redesign			

Section 5 - Please read and agree to the following Equality Statement

1. Equality Statement

1.1. All public bodies have a statutory duty under the Equality Act 2010 to set out arrangements to assess and consult on how their policies and functions impact on the 9 protected characteristics: Age; Disability; Gender Reassignment; Marriage & Civil Partnership; Pregnancy & Maternity; Race; Religion & Belief; Sex; Sexual Orientation

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1.2. Our Organisations will challenge discrimination, promote equality, respect human rights, and aims to design and implement services, policies and measures that meet the diverse needs of our service, and population, ensuring that none are placed at a disadvantage over others.

1.3. All staff are expected to deliver services and provide services and care in a manner which respects the individuality of service users, patients, carer's etc, and as such treat them and members of the workforce respectfully, paying due regard to the 9 protected characteristics.

Signature of person completing EIA	
Date signed	
Comments:	
Signature of person the Leader Person for this activity	
Date signed	
Comments:	



Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	NO
2.	Does the implementation of this document require additional revenue	NO
3.	Does the implementation of this document require additional manpower	NO
4.	Does the implementation of this document release any manpower costs through a change in practice	NO
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	NO
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval