Royal Cornwall Hospitals
NHS Trust

Haematoma Management Clinical Guideline

V1.0

June 2025

Summary

This guideline provides information on the management of radial artery, femoral artery and device site haematomas following a procedure in the Cardiac Catheter Lab. This applies to those patients being cared for in hospital, both elective and inpatients.

This guideline should be used in conjunction with the company guidance for equipment such as TR band, SafeGuard and FemoStop. Please note that copies of the manufacturer's instructions for these compression devices are found in the Appendix section. These instructions are the most recent versions at the time of writing this guideline however may be updated by the relevant companies prior to the update of this guideline. Please ensure to check you are following the most up to date guidance when using a TR band, SafeGuard or FemoStop.

Flowcharts can be found summarising the steps for haematoma management on pages 10-15.

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Data Protection Act 2018 (UK General Data Protection Regulation – GDPR) Legislation.

The Trust has a duty under the Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed, and documented. We cannot rely on opt out, it must be opt in.

Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 please see the Information Use Framework Policy or contact the Information Governance Team.

Royal Cornwall Hospital Trust rch-tr.infogov@nhs.net

1. Aim/Purpose of this Guideline

1.1. This guidance is for nursing staff and junior doctors working in Cardiology.

1.2. This guidance is intended to provide necessary information to enable early recognition and treatment of haematomas to avoid deterioration.

1.3. This version supersedes any previous versions of this document.

2. The Guidance

2.1. Definitions / Glossary

- ACT – Activated Clotting Time, a test performed to measure Heparin's effect on the time it takes blood to clot
- Angiogram – a procedure that looks at the blood supply to the heart
- Angioplasty – a procedure to help improve the blood supply to the heart through the use of balloons and stents
- Anticoagulation – medications to prevent blood clot formation, such as: Apixaban, Dabigatran, Edoxaban, Rivaroxaban
- Antiplatelets – medications to prevent abnormal clotting, such as: Aspirin, Clopidogrel, Prasugrel, Ticagrelor, Tirofiban
- BMI – Body Mass Index
- Complex Procedure – Left Main Stem (LMS) PCI, Multivessel PCI, Rotablation, Shockwave, ICD, CRT
- Device – Cardiac Resynchronisation Therapy Defibrillator (CRT-D), Cardiac Resynchronisation Therapy Pacemaker (CRT-P), Implantable Cardioverter Defibrillator (ICD), Implantable Loop Recorder (ILR), Permanent Pacemaker (PPM), Subcutaneous Implantable Cardioverter Defibrillator (S-ICD)
- Femoral – artery in the groin supplying blood to the lower leg and foot
- Haematoma – a collection of blood formed under the skin
- LMWH – Low Molecular Weight Heparin, such as: Dalteparin, Enoxaparin, Fondaparinux
- Radial – artery in the wrist located above thumb
- Sheath – thin flexible tube inserted into the artery
- TR Band – Trans-Radial Band, the chosen method of closure for radial and ulna arterial access
- Ulna – artery in the wrist located above the little finger

https://www.bhf.org.uk/ and https://bnf.nice.org.uk/

2.2. Risk factors for developing a haematoma following a cardiac procedure

- Female.
- Age >70 years.
- Blood pressure after the procedure >160mmHg.
- Arterial puncture >1.
- Sheath time >16 mins.
- ACT ≥175s.
- Tirofiban administration.
- LMWH before procedure.
- Personnel change during compression.
- BMI >25 (Angio).
- Low BMI (Device).
- Anticoagulation and antiplatelets.
- Complex procedure.
- Repeat procedures.

Women are 2.6 times more likely to develop a haematoma than men [1].

Patients who have a PCI are more likely to develop a haematoma than those who have a diagnostic angiogram [1].

There is around a 10% chance of developing a radial haematoma after a coronary angiogram/angioplasty [2].

The rate of haematoma in patients who have device procedures is 1.2-9.5% [3].

Antiplatelet therapy doubles the risk of haematoma for patients undergoing device procedures [3].

The three main mechanisms for the development of a haematoma are; continuous bleeding from the puncture site, perforation along the length of the artery/vein, or perforation of a side branch of an artery/vein [4].

2.3. How to recognise a haematoma

2.3.1. Radial haematoma

- Arise above the puncture site.
- Often present as a defined lump.

- The radial artery is relatively superficial [5].

2.3.2. Ulna haematoma

- Often present as a general firming of the skin around the puncture site.
- Ulna artery is usually deeper than the radial and therefore haematoma may be harder to notice.
- It is important to compare both the patient's forearms for any difference in softness to prevent delay to recognition [6,7,8].

2.3.3. Forearm haematoma

- Pain or tightness is often reported due to general firming and swelling of the forearm.
- Can occur due to continued bleeding from access site as a progression of one of the above, or perforation of the artery or of one of the side branches.
- As above, it is important to compare both the patient's forearms for any difference in softness and to assess the whole area from elbow to fingertips [8,9,10].

2.3.4. Femoral haematoma

- Arise in the area of the arterial puncture.
- Present as a noticeable lump at skin level formed by an accumulation of blood.
- A drop in the patient's blood pressure may also be noted.
- Pseudoaneurysms may be seen as a pulsating mass at the puncture site.
- Haematomas/haemorrhage can be difficult to recognise if they are retroperitoneal, as there may be no external visual changes.
- Symptoms for retroperitoneal complications may be hypotension, lower abdominal or back pain and excessive sweating [1,11,12].

2.3.5. Device haematoma

- Encompass the pocket area where the device is positioned.
- Swelling is present with or without tenderness/pain.
- May increase in size if bleeding remains unmanaged [13].

2.4. How to prevent deterioration of haematoma once identified

- Early detection, diagnosis and treatment are key factors.
- Immediate compression once a haematoma is suspected. Due to the arterial nature of angiography related haematomas swelling will increase quickly.
- Analgesia. This enables patients to remain compliant with the required compression and assessments.
- Early escalation to senior staff.
- Regular and thorough education in postprocedural care for new team members and refresher training for experienced staff [14].

2.5. The possible complications of haematoma/unmanaged bleeding

2.5.1. Following radial/ulna cardiac angiography

- Bruising.
- Blood transfusion.
- Compartment Syndrome.
- Ischaemia/necrosis of fingers.
- Neuropathy.
- Pain.
- Prolonged hospital stay.
- Radial/ulna occlusion.
- Reflex sympathetic dystrophy.
- Surgery.
- Swelling.

2.5.2. Following femoral cardiac angiography

- Bruising.
- Blood transfusion.
- Ischaemia/necrosis of the lower leg or foot.
- Neuropathy.
- Pain.

- Prolonged hospital stay.
- Reflex sympathetic dystrophy.
- Retroperitoneal bleed.
- Surgery.
- Swelling.

2.5.3. **Following device procedure**

- Bruising.
- Infection.
- Ischaemia/necrosis of tissues.
- Pain.
- Prolonged hospital stay.
- Further procedure to evacuate haematoma.

2.6. **References**

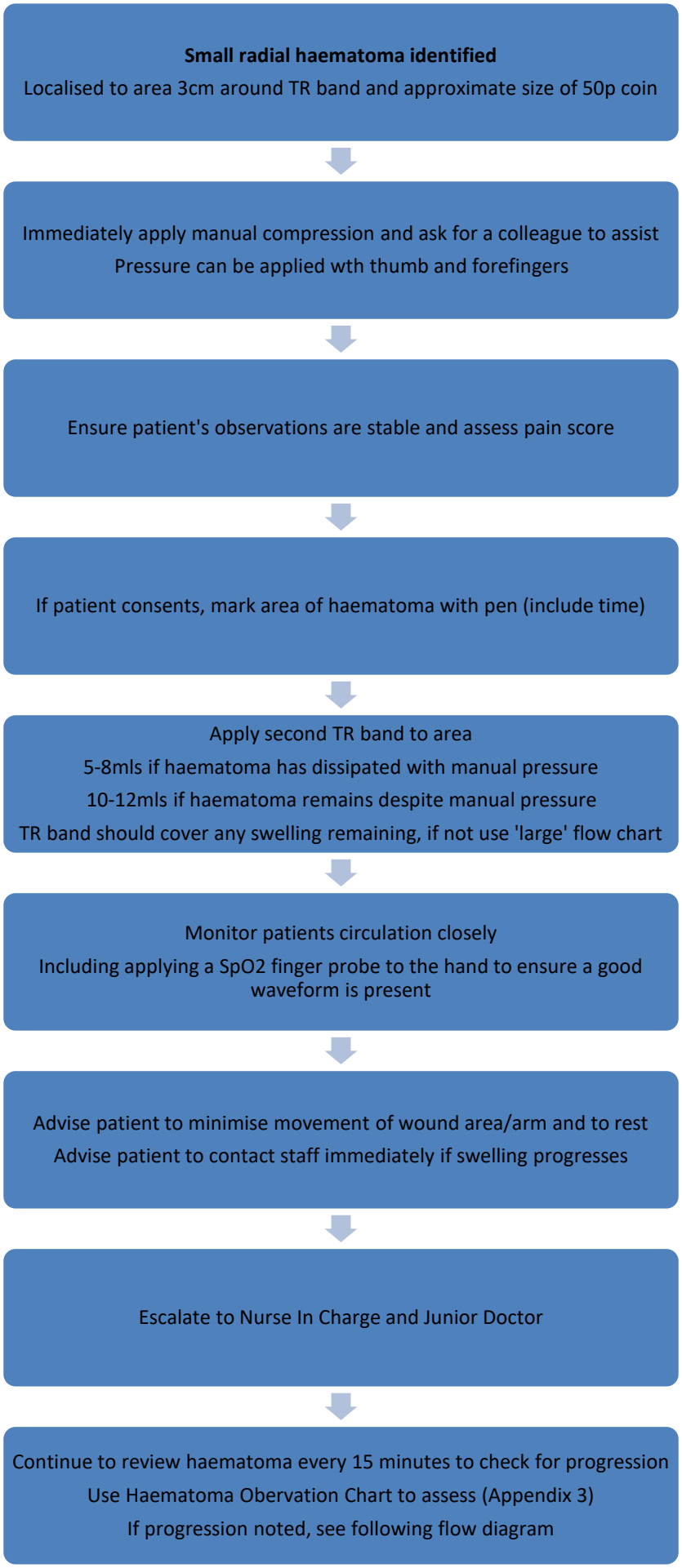
- https://academic.oup.com/eurjcn/article/4/2/123/5928824?login=false
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- https://www.sciencedirect.com/science/article/pii/S0914508713001044#:~:text=Hematoma%20was%20defined%20as%20a,increasing%20in%20size%20were%20evacuated.
- Transradial Artery Access Complications | Circulation: Cardiovascular Interventions (ahajournals.org)

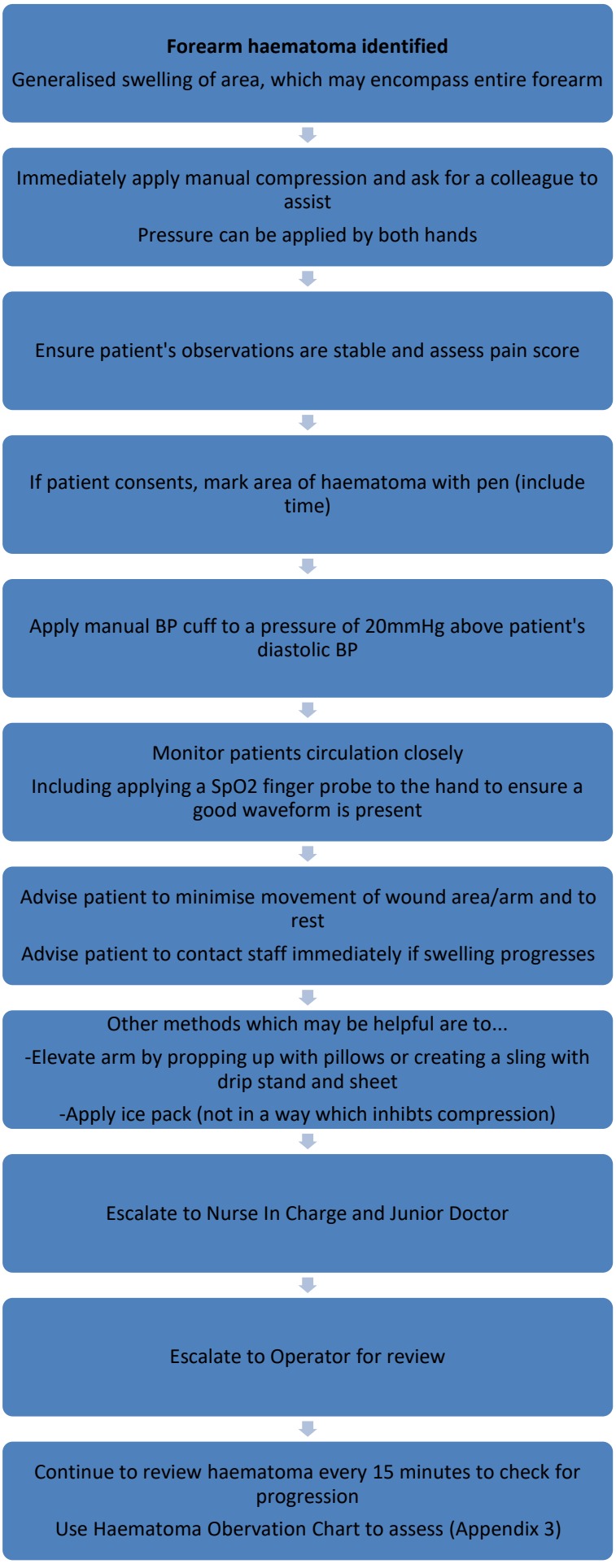
2.7. **If haematoma identified follow relevant flow chart (found on next page)**

Wrist Haematoma

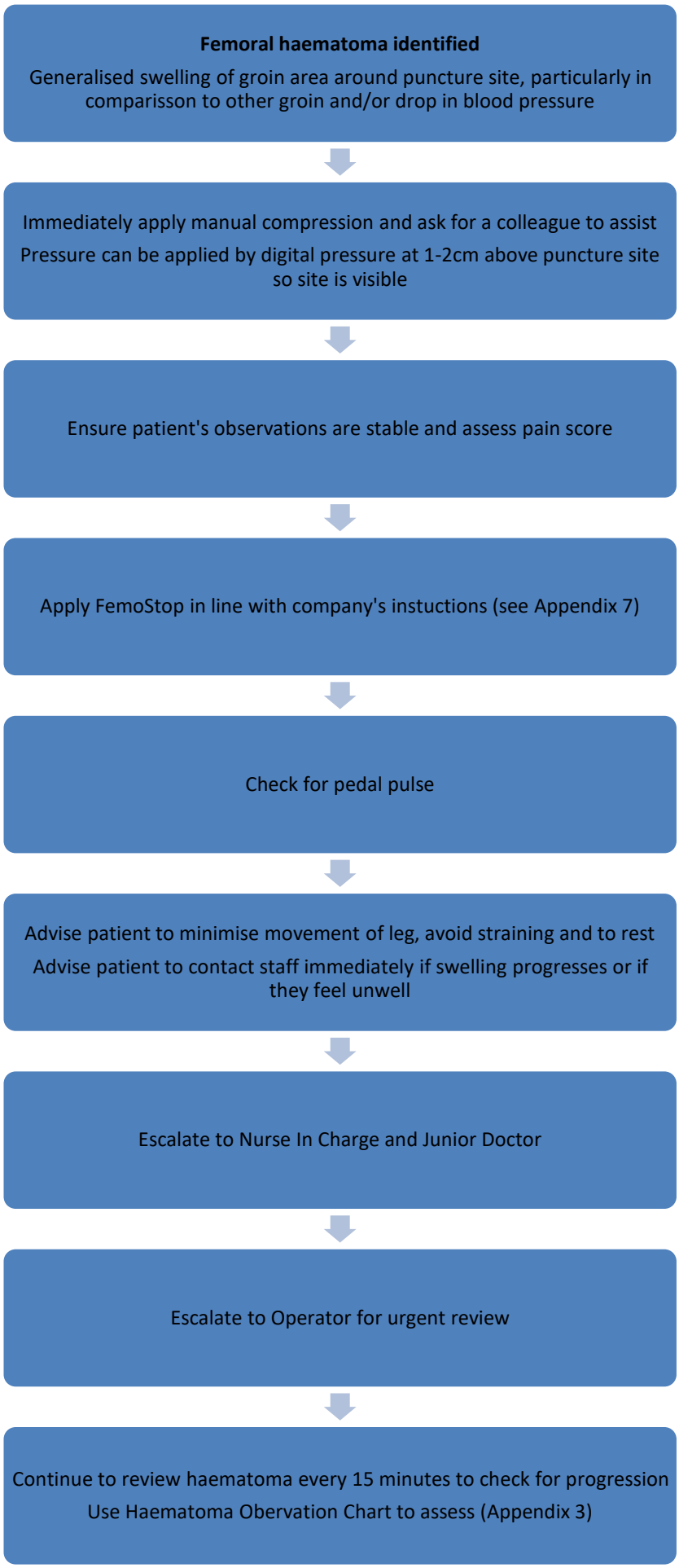
(small)



Wrist / Forearm Haematoma (large)

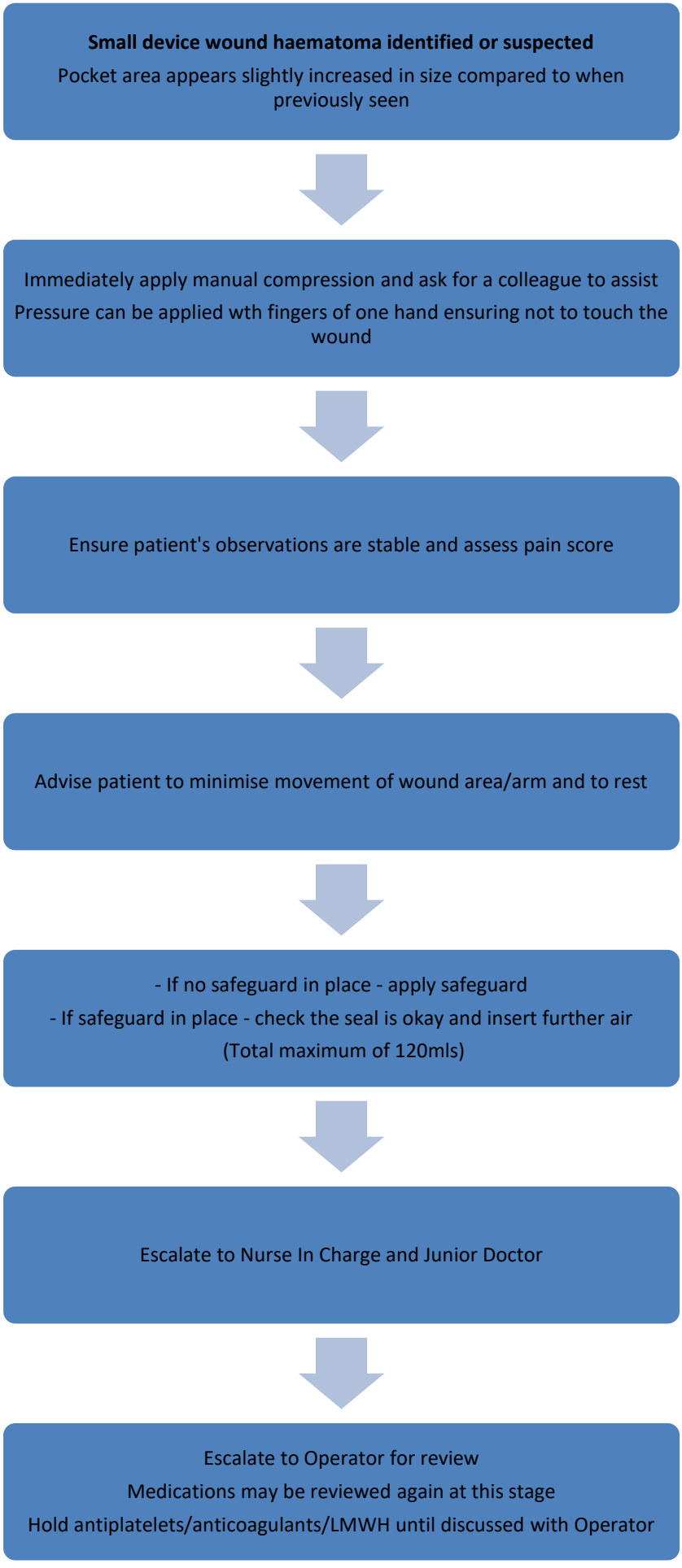


Femoral Haematoma



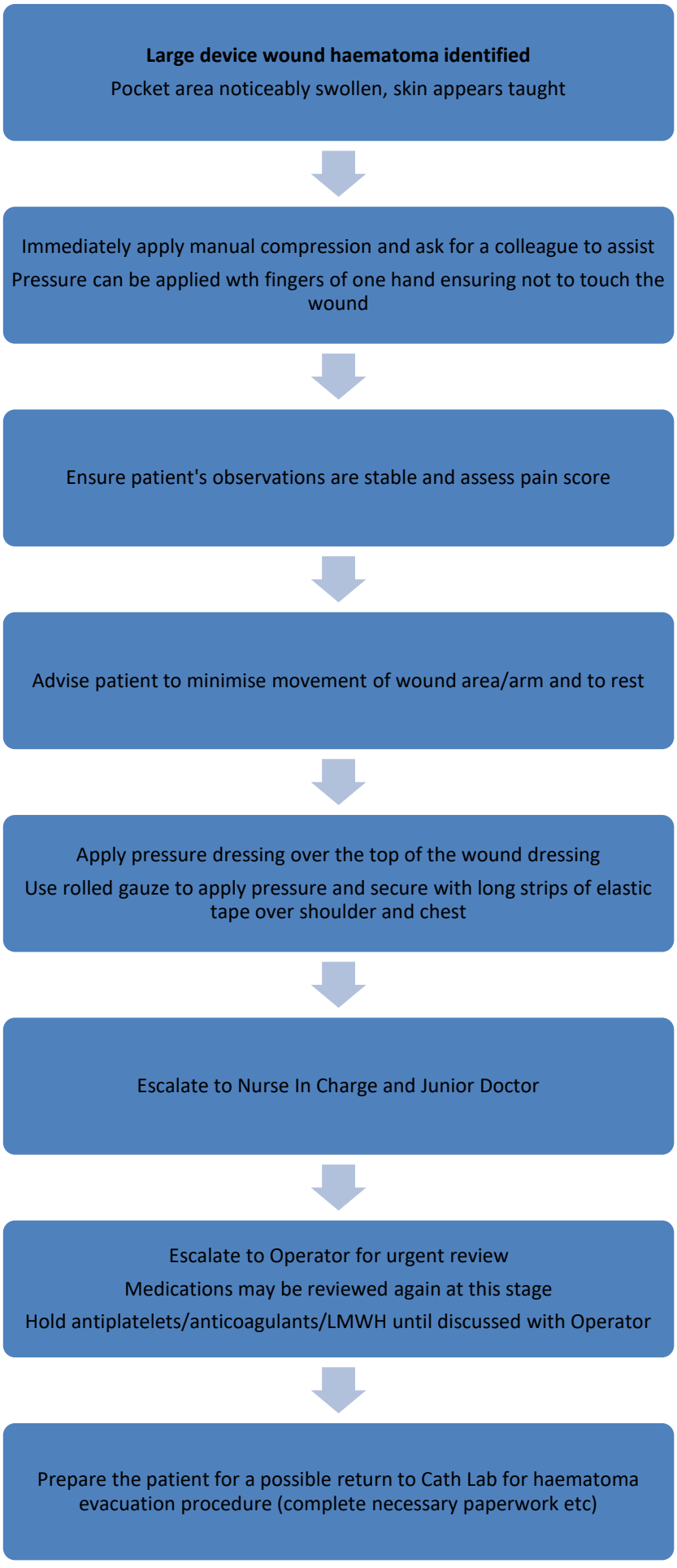
Device Wound Haematoma

(small)



Device Wound Haematoma

(large)



3. Monitoring compliance and effectiveness

Information Category	Detail of process and methodology for monitoring compliance
Element to be monitored	Haematoma audit. Completion of haematoma observation chart audit.
Lead	Dr Sen Devadathan (Cardiologist). Isabella Burridge (Specialist Staff Nurse).
Tool	Haematoma audit. Completion of Haematoma Observation Chart (CHA4841).
Frequency	Annual audits required with annual reporting.
Reporting arrangements	Reporting will be to Cardiology management, Cardiology ward/unit leaders, Cardiologists. The important factor will be whether the standardisation of the advice and availability eases the impact on Operators or whether they are still regularly required to be involved in management of haematoma which should initially be performed by ward teams. This can be fed back via email or, if required, a meeting. The lead or committee is expected to read and interrogate the report to identify deficiencies in the system and act upon them.
Acting on recommendations and Lead(s)	Action planning for recommendations to be completed by Cardiology ward/unit leaders and Cardiologists. Required actions will be identified and completed in a specified timeframe.
Change in practice and lessons to be shared	The implementation of any changes required will be tailored to the recommendation raised. The timeframe will therefore vary. However, through working together with the links in the Learning and Development team change is both possible to be implemented from a managerial angle and also that of a clinical position. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant stakeholders, via email and at relevant meetings.

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the Equality Diversity And Inclusion Policy or the Equality and Diversity website.

4.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.

Appendix 1. Governance Information

Information Category	Detailed Information
Document Title:	Haematoma Management Clinical Guideline V1.0
This document replaces (exact title of previous version):	New Document
Date Issued/Approved:	February 2025
Date Valid From:	June 2025
Date Valid To:	June 2028
Directorate/Department responsible (author/owner):	Isabella Burridge, Cardiac Cath Lab Specialist Nurse. Dr Sen Devadathan, Consultant Cardiologist.
Contact details:	01872 252227
Brief summary of contents:	This guideline provides information on the management of radial artery, femoral artery and pacemaker site haematomas following a procedure in the Cardiac Catheter Lab. This applies to those patients being cared for in hospital, both elective and inpatients.
Suggested Keywords:	Cardiology, Cath Lab, Haematoma, Pacemaker, Radial, Femoral, TR Band, Femostop, Safeguard, Angiogram, Device.
Target Audience:	**RCHT:** Yes **CFT:** No **CIOS ICB:** No
Executive Director responsible for Policy:	Chief Medical Officer
Approval route for consultation and ratification:	Cardiology Governance Meeting
Manager confirming approval processes:	Paul Evangelista
Name of Governance Lead confirming consultation and ratification:	Racheal Pearce
Links to key external standards:	None required

Information Category	Detailed Information
Related Documents:	Haematoma Observation Chart (CHA4841).
Training Need Identified?	Yes. Locally in Cardiology Gary Slater our Learning and Development link is aware.
Publication Location (refer to Policy on Policies – Approvals and Ratification):	Internet and Intranet
Document Library Folder/Sub Folder:	Clinical / Cardiology

Version Control Table

Date	Version Number	Summary of Changes	Changes Made by
January 2025	V1.0	Initial development	Isabella Burridge, Cardiac Cath Lab Specialist Nurse

All or part of this document can be released under the Freedom of Information Act 2000.

All Policies, Strategies and Operating Procedures, including Business Plans, are to be kept for the lifetime of the organisation plus 6 years.

This document is only valid on the day of printing.

Controlled Document.

This document has been created following the Royal Cornwall Hospitals NHS Trust The Policy on Policies (Development and Management of Knowledge Procedural and Web Documents Policy). It should not be altered in any way without the express permission of the author or their Line Manager.

Appendix 2. Equality Impact Assessment

Section 1: Equality Impact Assessment (EIA) Form

The EIA process allows the Trust to identify where a policy or service may have a negative impact on an individual or particular group of people.

For guidance please refer to the Equality Impact Assessment Policy (available from the document library) or contact the Equality, Diversity, and Inclusion Team rcht.inclusion@nhs.net

Information Category	Detailed Information
Name of the strategy/policy/proposal/service function to be assessed:	Haematoma Management Clinical Guideline V1.0
Directorate and service area:	Specialist Medicine, Cardiology
Is this a new or existing Policy?	New
Name of individual completing EIA (Should be completed by an individual with a good understanding of the Service/Policy):	Isabella Burridge, Cardiac Cath Lab Specialist Nurse
Contact details:	01872 252227

Information Category	Detailed Information
1. Policy Aim - Who is the Policy aimed at? (The Policy is the Strategy, Policy, Proposal or Service Change to be assessed)	Healthcare professionals working in Cardiology, caring for patients post Cardiac Cath Lab procedure on cardiac wards.
2. Policy Objectives	To provide clinicians with guidance on the management of radial artery, femoral artery and device site haematomas following a procedure in the Cardiac Catheter Lab.
3. Policy Intended Outcomes	To formalise and standardise the management of haematomas in line with national and international guidance and best practice. Therefore, increasing patient safety and experience alongside simplifying clinical input.
4. How will you measure each outcome?	Audits of haematomas and use of haematoma observation chart (CHA4841).
5. Who is intended to benefit from the policy?	Patients.

Information Category	Detailed Information
6a. Who did you consult with? (Please select Yes or No for each category)	• Workforce: Yes • Patients/visitors: No • Local groups/system partners: No • External organisations: No • Other: No
6b. Please list the individuals/groups who have been consulted about this policy.	**Please record specific names of individuals/groups:** Cardiology Consultant Team. Cardiology Ward Teams.
6c. What was the outcome of the consultation?	Guideline approved.
6d. Have you used any of the following to assist your assessment?	**National or local statistics, audits, activity reports, process maps, complaints, staff, or patient surveys:** No

7. The Impact

Following consultation with key groups, has a negative impact been identified for any protected characteristic? Please note that a rationale is required for each one.

Where a negative impact is identified without rationale, the key groups will need to be consulted again.

Protected Characteristic	(Yes or No)	Rationale
Age	No	
Sex (male or female)	No	
Gender reassignment (Transgender, non-binary, gender fluid etc.)	No	
Race	No	
Disability (e.g. physical or cognitive impairment, mental health, long term conditions etc.)	No	
Religion or belief	No	
Marriage and civil partnership	No	

Protected Characteristic	(Yes or No)	Rationale
Pregnancy and maternity	No	
Sexual orientation (e.g. gay, straight, bisexual, lesbian etc.)	No	

A robust rationale must be in place for all protected characteristics. If a negative impact has been identified, please complete section 2. If no negative impact has been identified and if this is not a major service change, you can end the assessment here.

I am confident that section 2 of this EIA does not need completing as there are no highlighted risks of negative impact occurring because of this policy.

Name of person confirming result of initial impact assessment: Isabella Burridge, Cardiac Cath Lab Specialist Nurse.

If a negative impact has been identified above OR this is a major service change, you will need to complete section 2 of the EIA form available here:
Section 2. Full Equality Analysis

Appendix 3. Haematoma Observation Chart (CHA4841)

NHS Number: .....
Name: .....
Address: .....
Affix patient label
.....
Date of Birth: .....
CR Number: .....

NHS
Royal Cornwall Hospitals
NHS Trust

Cath Lab Haematoma Observation Chart

Date: Ward: Operator:

Haematoma Site: Closure Device:

Haematoma Site:		Date / Time												
Pain	0	None/Mild												
	1	Moderate												
	2	Severe												
Colour	0	Normal												
	1	Pale												
	2	Cyanotic												
Temperature	0	Warm												
	1	Cool												
	2	Cold												
Capillary Refill	0	Brisk <3 Seconds												
	1	Slow >3 Seconds												
	2	None												
Sensation	0	Good/Present												
	1	Tingling												
	2	Numb												
Active Movement*	0	Good												
	1	Poor												
	2	None												
Passive Movement Pain**	0	None												
	1	Moderate												
	2	Severe												
Pulse / SpO2 Waveform	0	Strong												
	1	Weak												
	2	Absent												
		Signature												

The following observations should be recorded after identification of haematoma every:
15 minutes for 1 hour
30 minutes for 1 hour
1 hour for 12 hours
Escalate to the operator/COW immediately if deterioration is recorded in 2 parameters or if any score of 2 is recorded.

*Active Movement – Patient moves their own limb/digits
**Passive Movement – Clinician moves patient's limb/digits

Suggested movement for the above – flex of wrist/ankle and wiggling of fingers/toes

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CHA4841 V1 Printed 01/2024 Review due 2027

PROOF

Appendix 4. Haematoma Observation Chart Guide Sheet

Haematoma Observation Chart Guide Sheet

Radial haematomas often present as a defined lump above the puncture site as it is a relatively superficial artery.

Ulna haematomas are harder to notice as they are characterised by a general firming of the skin around the puncture site, this is because the ulna artery is deeper than the radial and therefore bleeding into the surrounding tissues occurs which can lead to a delay to recognition.

Forearm haematomas can occur due to progression of the one of the above or they can occur on their own therefore when assessing an arm after angiogram is it important to look at the whole area of elbow to fingertips.

Femoral haematomas can present as a noticeable lump above the arterial puncture site but can also form into the surrounding tissues of the groin, pelvis, lower abdomen or leg. This means that the extent of a femoral haematoma is sometimes hidden.

Pacing haematomas usually encompass the pocket area, where the device is positioned. They are unlikely to cause as many problems as those mentioned above as pacing procedures are performed using the venous system however still require monitoring.

If not recognised and managed quickly and effectively haematomas can lead to significant bruising, pain, restricted blood flow, nerve damage, blood transfusion, further surgery, infection, prolonged hospitalisation, compartment syndrome, loss of limb.

Following identification of a haematoma it is important that any anticoagulants, Tirofiban or Heparin infusion are reviewed as they may need to be held to avoid excessive bleeding.

1

Haematoma Observation Chart Guide Sheet

Pain

Wrist (Radial/Ulna/Forearm)

+ Mild discomfort or ache at the wrist where the TR band is placed is to be expected, as these are applied tightly

- Pain in the forearm or hand is not expected and could be a sign of a haematoma compressing blood flow or nerves

Groin (Femoral)

+ Mild discomfort or ache at the groin puncture site can be expected

- Pain around the groin, pelvis, lower abdomen or leg could be a sign of an advancing haematoma

Chest (Pacing)

+ Mild discomfort particularly on moving the shoulder can be expected

- Pain around the wound could indicate that pressure building due to bleeding

- Pain or ache across the chest could also be a sign on pneumothorax

Colour

Wrist (Radial/Ulna/Forearm)

+ Pale hands are not uncommon following a trip to the Cath Lab as the room is air conditioned

- If the hand where the TR band is placed is a significantly different colour to the other free hand then this could indicate restricted blood flow

Groin (Femoral)

+ Pale feet are not uncommon following a trip to the Cath Lab as the room is air conditioned

- If the foot on the side of the puncture is a different colour to the other foot then this could indicate restricted blood flow

Chest (Pacing)

+ Light bruising to the site of the wound is usual however this is unlikely to present immediately and will develop over a few days

- If there is significant bruising which is increasing this could mean progression of haematoma

Haematoma Observation Chart Guide Sheet

Temperature

Wrist (Radial/Ulna/Forearm)

+ Cool hands are not uncommon following a trip to the Cath Lab as the room is air conditioned

- If the hand where the TR band is placed is a significantly different temperature to the other free hand then this could indicate restricted blood flow

Groin (Femoral)

+ Cool feet are not uncommon following a trip to the Cath Lab as the room is air conditioned

- If the foot on the side of the puncture is a different temperature to the other foot then this could indicate restricted blood flow

Chest (Pacing)

No alteration in temperature around the site or arm is expected following a pacing procedure

Capillary Refill

Wrist (Radial/Ulna/Forearm)

+ Capillary refill can be checked by pressing on a finger on the hand with the TR band. This can be slow due to the above factors but this would expect to improve once the patient is back on the ward

- If the capillary refill remains slow or does not happen this indicates reduced blood flow to the hand.

Groin (Femoral)

+ Capillary refill can be checked by pressing on a toes on the foot on the side of the puncture. This can be slow due to the above factors but this would expect to improve once the patient is back on the ward

- If the capillary refill remains slow or does not happen this indicates reduced blood flow to the hand.

Chest (Pacing)

No alteration to capillary refill is expected after a pacing procedure, if you chose to assess this please be careful where you are pressing to avoid additional pain to the patient

3

Haematoma Observation Chart Guide Sheet

Sensation

Wrist (Radial/Ulna/Forearm)

+ Tingling and numbness in the thumb is often seen following a radial procedure due to the local anaesthetic. This wears off after a couple of hours

- If the tingling/numbness is reported in more than just the thumb this could mean the nerves are compressed

Groin (Femoral)

+ Tingling and numbness can very occasionally be positional and therefore temporary

- If the tingling or numbness is persistent this could mean that nerves are compressed

Chest (Pacing)

+ Numbness around the shoulder and puncture site is to be expected due to the local anaesthetic, this should wear off after a couple of hours.

- No altered sensation to wound or arm is expected after a pacing procedure

Active Movement (a patient moves their own limb/digits)

Wrist (Radial/Ulna/Forearm)

+ Flexing the wrist may be slightly more difficult due to the TR band however this and the wiggling of fingers should still be possible

- If the patient cannot independently perform the flex and wiggle movements then this is likely caused by the haematoma

Groin (Femoral)

+ The patient should be advised not to move at the hip as their leg should be kept straight but instead the movement should be assessed in the ankle and toes

- If the patient is unable to move their foot and wiggle their toes then this could mean that the nerves are compromised

Chest (Pacing)

+ A patient should be able to move their arm freely (be mindful to inform them to not raise their arm above their head)

- If movement is difficult this may be due to haematoma

Haematoma Observation Chart Guide Sheet

Passive Movement Pain (clinician moves a patient's limb/digits)

Wrist (Radial/Ulna/Forearm)

+ A clinician should be able to move the patient's wrist and pull/push the patient's fingers towards their head slightly without this causing pain

- If pain occurs during a clinician manoeuvring a patient's digits this would indicate nerve compression

Groin (Femoral)

+ A clinician should be able to move the patient's ankle and pull/push the patient's foot and toes towards their head slightly without this causing pain

- If pain occurs during a clinician manoeuvring a patient's digits/ankle this would indicate nerve compression

Chest (Pacing)

+ A clinician should be able to move a patient arm freely (be mindful to not raise their arm above their head)

- If movement is difficult this may be due to haematoma

- Some pain is expected however this should not be excessive

Pulse / SpO2 Waveform

Wrist (Radial/Ulna/Forearm)

+ A pulse should be able to be felt in the wrist or hand where the TR band is placed

If the radial artery has been used for the procedure then you can check the ulna pulse in the wrist on the hand side of the TR band OR the hand radial pulse in the groove between thumb and forefinger may be able to be felt

If the ulna artery has been used for the procedure then you can check the radial pulse in the wrist on the hand side of the TR band OR the hand radial pulse in the groove between thumb and forefinger may be able to be felt

+ A clear strong neat waveform should be able to be seen on an obs machine SpO2 trace when the probe is attached to the hand with the TR band. The SpO2 reading should be similar to the reading when the probe is on the other hand

- If no pulse is palpable and the SpO2 waveform and reading is poor then this would indicate reduced blood flow to the hand

5

Haematoma Observation Chart Guide Sheet

Groin (Femoral)

+ A pedal pulse in the foot should be able to be found whether this is on top of the foot or behind the ankles. A doppler may be required to assist in locating the pulse.

- If a pulse cannot be found in the foot or ankle then this indicates reduced blood flow

Chest (Pacing)

No difficulty in palpating a pulse, gaining an SpO2 reading or trace is to be expected

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Appendix 5. Safeguard Application Instructions

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SAFEGUARD FOCUS™
COMPRESSION DEVICE



The SAFEGUARD FOCUS™ dressing provides compression over closed surgical sites (to and including pacemaker and ICD pockets) in the immediate post-operative period.

DIRECTIONS FOR USE

PREPARATION:

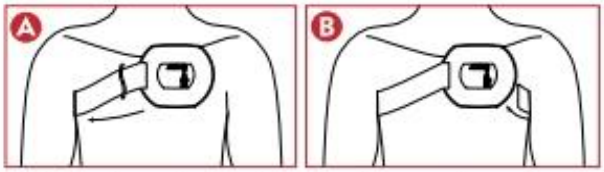
After closure of surgical site ensure surrounding skin is clean and dry.

PLACEMENT: ADHESIVE TYPE

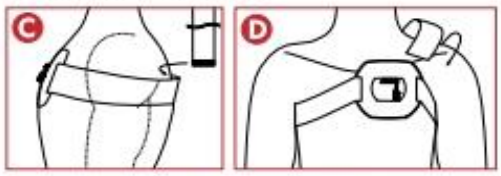
1. Remove backing material from adhesive.
2. Align balloon with desired location of compression.
3. Apply adhesive to surrounding skin.

PLACEMENT: ADHESIVE-FREE TYPE

1. Attach printed end of strap to the side of balloon border (Drawing A).
2. Wrap long printed strap around chest of patient under each arm (Drawing B).



3. Align balloon with desired location of compression and pull strap tight and attach on opposite side.
4. Attach short strap to the underside of the long strap on the patient's back (Drawing C).



5. Bring short strap over shoulder and attach to top of balloon border ensuring balloon is maintained over desired compression area (Drawing D).
6. Trim excess strap material.

APPLYING COMPRESSION

1. Engage syringe with valve by inserting and a half twist.
2. Inflate balloon with up to 60ml of air or cooling solution observing compression of site.
3. Disconnect syringe.
4. If desired, annotate inflation time and volume on device (On balloon border for adhesive device, on strap for adhesive-free device).

POST CARE INSTRUCTIONS

1. Observe compression site and assess site per hospital or physician protocol.
2. Continue to observe site and change volume per hospital or physician protocol.

NOTE: Balloon maximum volume is 60 mL of cooling solution or 120 mL of air.

3. Deflate the balloon per hospital or physician protocol with syringe. Cooling solution removed from the balloon can be disposed of normally—No special MSDS requirements.

NOTE: If the SafeGuard Focus syringe is not available during air removal, the cap on the tubing line may be removed by twisting and a standard luer syringe can be attached.

REMOVAL

1. Fully deflate the balloon with syringe and carefully remove adhesive from skin or detach hook and loop bands.
2. Once adhesive is removed from skin do not attempt to place back on patient. If compression is still needed after removal a new device should be used.
3. Dispose of SafeGuard FOCUS according to hospital protocol.

For information, please visit **www.merit.com** or contact your local Merit sales representative.

SAFEGUARD FOCUS Cool™
COMPRESSION DEVICE

By adding saline to a pre-loaded syringe, the SafeGuard Focus Cool applies cooling directly to the application site while delivering compression.

To order SafeGuard Focus™ call 1-800-356-3748

Catalog Number	Description
SGF1A	Contoured adhesive dressing
SGF1AC	Contoured adhesive dressing with cooling

Packaged 5 units per box

Catalog Number	Description
SGF1V	Adhesive-free flexible strap
SGF1VC	Adhesive-free flexible strap with cooling

Packaged 5 units per box

Before using, refer to Instructions for Use for indications, contraindications, warnings, precautions, and directions for use.

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406753001_002 ID 051922

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Appendix 6. TR Band Application Instructions

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TR Band®

Radial Compression Device

REMOVAL GUIDELINES*

Heparin 50 units/kg or less—band remains in place 60 minutes. Heparin (or comparable agent) greater than 50 units/kg —band remains in place for 120 minutes.

1. Place oxygen saturation probe on thumb or index finger of access site hand to confirm patent hemostasis.
2. Remove 3-5mL every 10-15 minutes.

   NOTE: As an alternative, to accelerate the removal of the TR BAND Compression Device, the operator can slowly deflate the TR BAND Compression Device in one step.
3. If bleeding occurs during removal, insert enough air to restore hemostasis; confirm patent hemostasis. Wait 15-30 minutes, repeat step 2.
4. Once air has been completely removed from band, confirm bleeding has stopped. Unfasten the adjustable band while stabilizing access site with gentle pressure. Remove band by lifting slowly toward palm of hand.
5. Apply sterile dressing.



* NOTE: Guidelines are based on compilation of best practices. TR BAND Compression Device removal protocols should be consistent with needs of the provider(s) and patient. Air injection volume and compression time may differ according to the patient's condition, anticoagulation, and the size of the puncture site. Check the puncture site frequently and adjust accordingly.

RX ONLY. Refer to the product labels and package insert for complete warnings, precautions, potential complications, and instructions for use.

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TERUMO INTERVENTIONAL SYSTEMS

Appendix 7. FemoStop Application Instructions

1. Position belt in line with puncture site(s), equal on both sides.
2. Attach dome. Peel back lid, keeping the dome sterile.
3. Center dome over arterial puncture (superior and medial to skin incision). Keep sheath hubs clear of dome rim.
4. Attach belt to arch and fit snug. Ensure arch is level and square across the groin area. Adjust by pulling on appropriate corner of belt to make arch perpendicular to femoral compression site.
5. Attach manometer and tubing
6. Inflate dome to 20-30 mmHg; then remove venous sheath* (if applicable).
7. Further inflate to 60-80 mmHg and remove arterial sheath (if applicable). Then quickly increase pressure in dome to be +10-20 mmHg greater than systolic BP or higher as necessary to maintain initial hemostasis.
8. After 3 minutes maximum; lower to a maintenance pressure until limb profusion is restored to baseline and hemostasis is maintained. Check pedal pulse periodically to confirm whether flow remains in vessel. After appropriate duration as defined by hospital guidelines; lower by 10-20 mmHg every few minutes until you reach zero. Leave in place at low pressure if appropriate. Remove carefully.
   Dress wound. Discard device.

