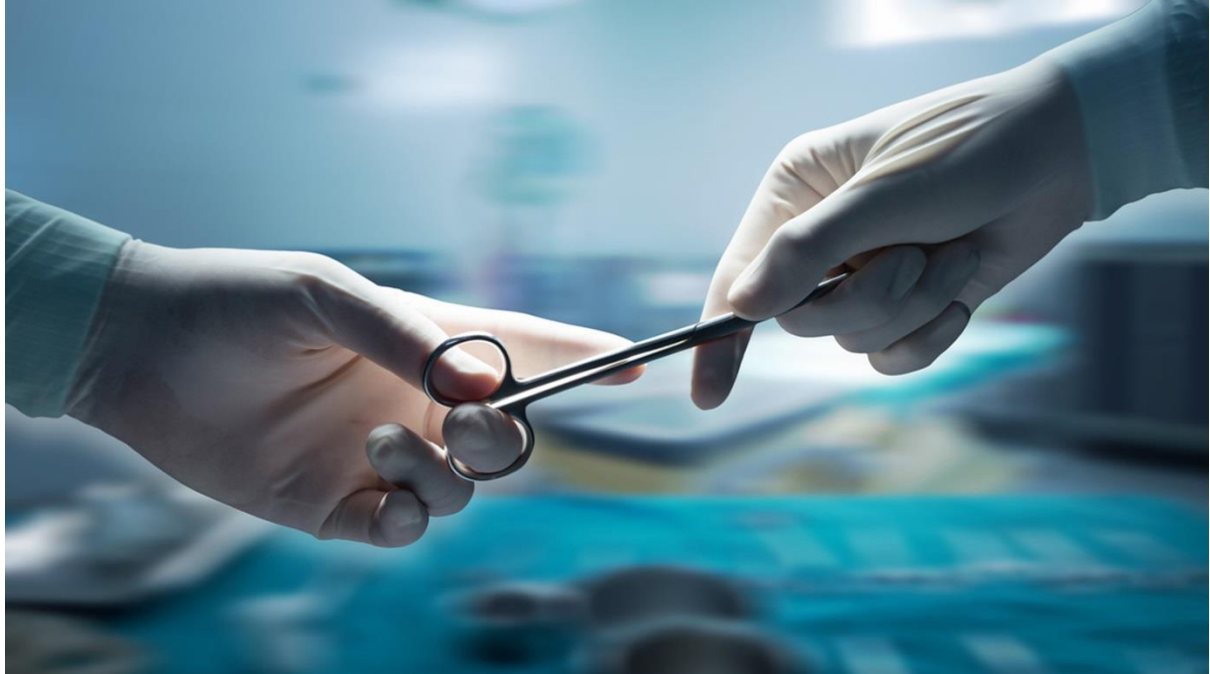


West Midlands Regional Spine Network



Consensus guidance and standard for:

- 1. Recognition and initial management of emergency vascular injury as a complication of spine surgery**
- 2. Provision of emergency vascular cover for spine surgery services**

December 2018

Category	Operational Delivery Network policy document West Midlands Regional Spine Network (WMRSN)
Purpose	To provide a standard for recognising vascular injury as a complication of spine surgery and providing emergency vascular for spine surgery services in the West Midlands Region
Version	1.0
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Supporting documents	Regulation 28 report on action to prevent future deaths
Responsible working group	WMRSN Board
Sign off	WMRSN board
Related networks	Vascular networks
Distribution	All WMRSN hospital COO and medical director - including private providers All WMRSN STP / CCG Chairs / Planned care leads All WMRSN spine surgeons Betsi Cadwaladr health board
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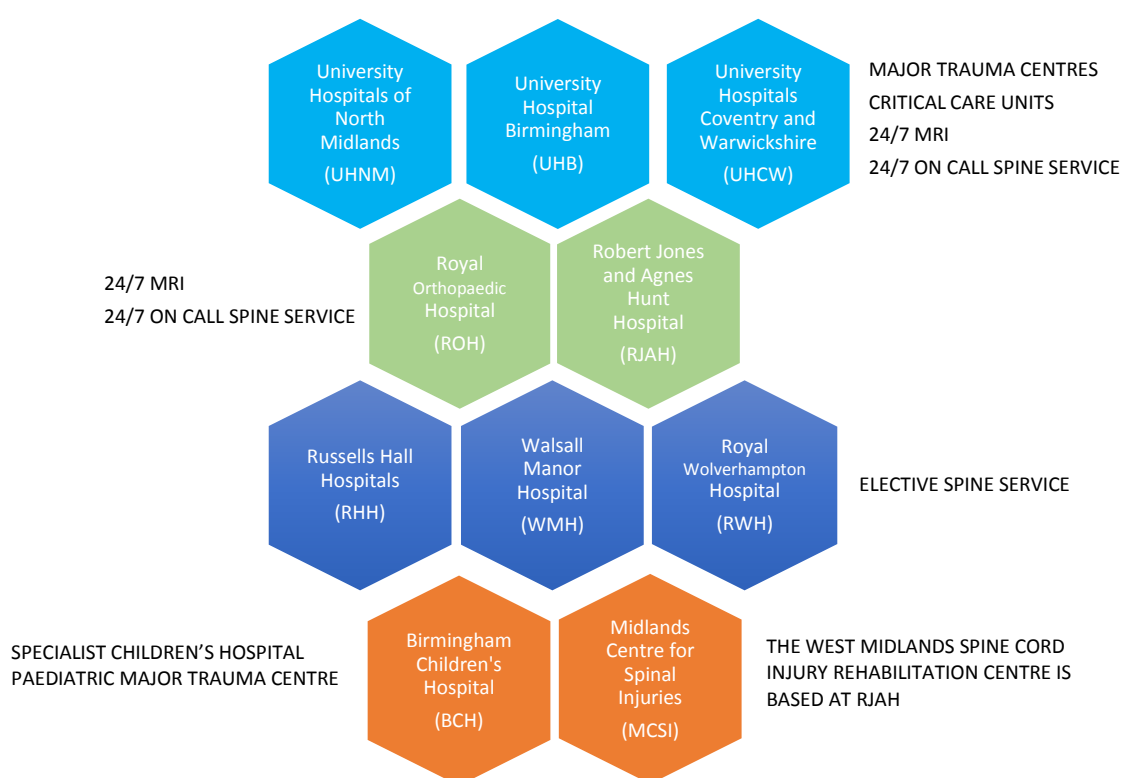
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INTRODUCTION

The West Midlands Regional Spine Network (WM RSN) includes 3 major trauma centres, 2 specialist orthopaedic hospitals, 3 neuroscience centres and 3 spine partner hospitals. There is also a specialist children’s hospital which provides elective and emergency spine care. There is a regional specialist spinal cord injury rehabilitation centre. Spine cord injury rehabilitation also takes place at the neurorehabilitation centres associated with the major trauma centres.

UHNM, UHB, UHCW, ROH and RJAH are known as spine hubs as they provide 24 hours spine on call cover. RWH, Walsall Manor and RHH are spine partners as they provide a spine service but without 24 hours on call cover.

WM RSN SPINE SURGICAL SERVICE OUTLINE



All hospitals accept adult patients for outpatient and inpatient management.

BCH, UHNM, ROH and RJAH accept 16 – 18 year olds for outpatient and inpatient management. BCH and UHNM accept <16 year olds for outpatient and inpatient management. RJAH manages patients <14 years old as inpatients through Alder Hey Hospital, Liverpool.

In addition to the above hospitals are the triage services, pain management and rehabilitation services. Private provider hospitals carrying out spine surgery are also part of the RSN.

TYPES OF ELECTIVE SPINE SURGERY BY HOSPITAL

Hospital	Degenerative lumbar	Degenerative cervical	Adult deformity	Paediatric disorders	MSCC	Intradural pathology
UHNM	✓	✓	✓	✓	✓	✓
UHB	✓	✓	✓		✓	✓
UHCW	✓	✓	✓		✓	✓
ROH	✓	✓	✓	✓*	✓	✓
RJAH	✓	✓	✓	✓*	✓	
RHH	✓					
WMH	✓					
RWH	✓	✓				
BCH				✓		

*16 – 18 year old on site; for ROH < 16 y are managed at BCH; RJAH < 14 y at Alder Hey

PRIVATE PROVIDERS OF ELECTIVE SPINE SURGERY

BMI Meriden Hospital
 BMI South Cheshire
 BMI Priory

Nuffield North Staffordshire
 Nuffield Shrewsbury
 Nuffield Warwickshire
 Nuffield Wolverhampton

Ramsay Rowley Hall
 Ramsay West Midlands Hospital

Spire Little Aston
 Spire Parkway
 Spire Little Aston
 Spire Droitwich

Executive Summary

- The aim of this document is to communicate the need for compliance with the regulation 28 report on the need to recognise and act on vascular injury as a complication of spine surgery.
- The regulation 28 report also requires the provision of emergency vascular services for spine surgical services in NHS and private providers of spine surgery in the West Midlands Regional Spine Network.
- Vascular injury is a rare but serious complication of all spine surgery including posterior lumbar spine surgery.
- There should be a low threshold for looking for this complication in the event of unexplained tachycardia or hypotension, breach of the anterior annulus in posterior lumbar surgery.
- It should also be recognised when there is an obvious haemorrhage or direct vascular injury in other approaches to the spine.
- There should be emergency vascular equipment available in any theatre suite carrying out spine surgery.
- There should be a clear education programme for all personnel involved in spine surgery.
- There should be a standard operating policy (SOP) to be implemented in the case of a vascular complication occurring.
- There should be a service level agreement with the nearest vascular surgical service allowing emergency transfer of a patient with a vascular complication AND consideration for allowing an on call vascular surgeon to attend and operate in the primary hospital if the patient is not fit for transfer.

Who does this policy affect?

Patient group

This policy affects all patients undergoing spine surgery. All spine surgical procedures (including posterior lumbar procedures) carry a small but serious risk of vascular injury which can be rapidly life threatening. For lumbar spine surgery the reported incidence varies from 0.03% to 4% depending on approach.

Clinical staff

Spine surgeons and surgical team, theatre and recovery personnel, anaesthetic teams, vascular surgical services, emergency services.

Managerial staff

Responsible theatre managers, directorate managers, divisional managers, associate directors and Chief Operating Officer for each Trust in the WM RSN (spinal hub, spinal partner and private provider hospitals) must be aware of this policy and be involved in acting on this policy.

What is the policy trying to achieve?

In 2017, Anne Mary Christine Pember, Senior Coroner for the coroner area of Northampton published a regulation 28 report relating to the death of DM following a L4/5 unilateral discectomy. The death was due to an unrecognised iliac artery injury.

The regulation 28 report is a call for action to prevent further deaths. HM Coroner asked for action to be taken to make patients and personnel aware of vascular injury as a potentially fatal complication of elective spine surgery. HM Coroner felt that action should be taken to prevent future deaths.

The Royal Colleges, BASS and SBNS felt that a programme of education would aid recognition and access to vascular emergency services should help prevent future deaths.

Recognising an inadvertent vascular injury

Inadvertent vascular injury can result from:

1. Anterior approaches to the spine where vascular structures are being manipulated for access to the spine (e.g. ALIF, ACDF).
2. Use of high speed or sharp instruments to decompress a segment (e.g. vertebral artery injury in ACDF).
3. Implants into the spine (e.g. vertebral artery injury in posterior cervical instrumentation, thoracic pedicle screws).
4. Removing disc material via a posterior approach in the lumbar spine (e.g. discectomy, interbody cage).

Vascular injury can cause:

1. Immediate haemorrhage (potentially life threatening).
2. Late haemorrhage due to a contained injury (potentially life threatening).
3. Pseudoaneurysm and its consequences.
4. End organ ischaemia or infarct.

Major potentially life threatening haemorrhage can be defined as bleeding which leads to a heart rate more than 110 beats/min and/or systolic blood pressure less than 90 mmHg. Hospitals must have locally agreed triggers (British Committee for Standards in Haematology).

Vascular injury can be recognised if the following happen:

1. Obvious direct injury to a vessel with obvious haemorrhage.
2. Breach of planes / structures normally protecting vessels (e.g. anterior annulus).
3. Unexplained sudden hypotension or tachycardia in theatre, recovery or the ward.
4. Pseudoaneurysm pain or pressure symptoms.
5. Ischaemic or infarct consequences.

Spine surgeon responsibilities

Recognising risk

1. Preoperative planning should include an evaluation of the individual risk of vascular injury depending on procedure, approach and individual anatomy.
2. Carrying out and interpreting preoperative imaging to identify risk (e.g. CT angiography).
3. Alerting a vascular surgeon if a high risk procedure is planned.
4. Ensuring that a SOP is in place and that all personnel are aware of the SOP in the event of a vascular event.
5. Informing patients about the risk of vascular injury (in addition to other complications) during the consent process Risk will vary with approach and procedure. The patient should be made aware that in the event of a vascular injury, the consequences could be life threatening or life changing. The life changing risks could be loss of limb or end organ infarct such as a stroke.

Recognising the injury

For early / potentially life threatening vascular injuries:

1. Obvious direct injury to a vessel with obvious haemorrhage.
2. Breach of planes / structures normally protecting vessels (e.g. anterior annulus).
3. Unexplained sudden hypotension or tachycardia in theatre, recovery or the ward.
4. Ischaemic or infarct consequences.

For late presenting vascular injuries:

1. Pseudoaneurysm pain or pressure symptoms.
2. Ischaemic or infarct consequences.

If the surgeon is concerned that there has been a life threatening vascular injury they should alert the anaesthetic and theatre team and vigilance should be high.

If a major haemorrhage becomes obvious the agreed SOP should be triggered.

Institutional responsibilities

1. The hospital that the spinal surgery is performed in should be able to facilitate any preoperative planning required to recognise and reduce risk.
2. There must be a major haemorrhage protocol in place.
3. There must be a repeated education programme for all personnel that includes recognising and treating inadvertent vascular injury as a component.
4. The hospital and theatres should be equipped to handle an inadvertent life threatening vascular injury:
 - a. A major haemorrhage protocol in place and initiated
 - b. A SOP for inadvertent vascular injury in place and initiated
 - c. Rapid transfusion devices
 - d. Processing urgent blood requests including group and save / cross matching
 - e. Provide immediate cross matched, type specific and universal (Group O) blood for transfusion (initial 4 – 6 units may be required and repeat)
 - f. Provide blood products to counteract coagulation abnormalities (FFP, cryoprecipitate, platelets)
 - g. Tranexamic acid as a 1g bolus
 - h. Vascular access and vascular control instruments
 - i. The ability to consider on table angiography if possible
 - j. The ability to transfer patients emergently to a vascular service
 - k. The ability to allow a vascular surgeon to attend the theatres if the patient is not haemodynamically stable and carry out life-saving procedures
 - l. Emergency access to an on-site or off-site interventional radiology suite for angiography or endovascular procedures (under guidance of the vascular surgeon)
5. An SLA will need to be place with the nearest vascular surgical service / network to facilitate these actions.

Template standard operating procedure for inadvertent vascular Injury in spinal surgery resulting in haemodynamic instability.

PREOPERATIVE

Recognise and evaluate level of risk
Carry out appropriate investigations
Inform patient during consent process
Alert Vascular service / anaesthetist and theatre teams if high risk

RECOGNISING AN INJURY

1. Obvious direct injury to a vessel with obvious haemorrhage.
2. Breach of planes / structures normally protecting vessels (e.g. anterior annulus).
3. Unexplained sudden hypotension or tachycardia in theatre, recovery or the ward.
4. Ischaemia or infarct consequences.



SUSPICION ALERT

If there is suspicion of injury make sure all personnel are aware:

1. Anaesthetist and ODA (both should remain in theatre)
2. Surgeon and assistant
3. Scrub nurse and circulating personnel
4. Porter



SUSPICION CONFIRMED

1. Initiate major haemorrhage protocol and ask for additional staff
2. Alert designated vascular surgeon that there is a vascular injury with haemodynamic consequences
3. Theatre staff to prepare vascular trays
4. Alert radiographer that on table angiography may be required
5. Alert interventional radiology suite that patient may require emergency intervention
6. Consider tranexamic acid 1g bolus
7. Spinal surgeon to pause procedure / stabilise spine rapidly if necessary
8. Pack any accessible bleeding site with haemostatic substance e.g. Floseal and surgical swabs (appropriate size)
9. Leave site undisturbed until vascular surgeon arrives
10. If patient stabilises notify vascular surgeon and follow advice
11. If no vascular service on site and patient stable for transfer
 - a. Prepare for emergency transfer with appropriate monitoring and blue light ambulance
 - b. Off- site vascular team prepared to receive and operate as a vascular emergency
 - c. Anaesthetist to accompany transfer and handover to vascular team
12. If no vascular service on site and patient not stable for transfer
 - a. Continue major haemorrhage protocol and resuscitation
 - b. Vascular surgeon to attend site as emergency (SLA must have agreement and provision for this)
 - c. Initial vascular control to be achieved as emergency
 - d. Prepare for emergency transfer with appropriate monitoring and blue light ambulance
 - e. Off-site vascular team prepared to receive and operate for definitive vascular procedure
 - f. Anaesthetist to accompany transfer and handover to vascular team

Contributors

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