Group arrangements:
Salford Royal NHS Foundation Trust (SRFT)
Pennine Acute Hospitals NHS Trust (PAT)

NHS
Northern Care Alliance
NHS Group

Policy for Cervical Spine Imaging Following Trauma in Adults

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Additional author(s)	Input received from all relevant stakeholders including the Emergency Department, Radiology Consultant Body and Anaesthetics Department
Division/ Department::	Division of Diagnostics and Pharmacy, Directorate of Radiology and Neurophysiology
Applies to:	North Manchester Care Organisation Bury & Rochdale Care Organisation Oldham Care Organisation
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Document Summary Sheet

Policy for Cervical Spine Imaging Following Trauma in Adults

CPDI122 V4

- This policy provides a framework for the appropriate imaging, and documentation of that imaging, in patients who may have sustained traumatic injury to the cervical spine.
- This policy is a consensus based on the best available evidence.
- The cornerstones of the decision making process include the nature of the mechanism of injury of the trauma, the clinical risk stratification and the ability of the patient to co-operate with history taking and examination including active lateral neck rotation >45 degrees.
- Until radiographic confirmation of the absence of cervical spine injury, all patients should be advised and treated as “worst-case-scenario” based on the clinical risk assessment undertaken by the referring clinician. If spinal precautions are in place, these should continue.
- Referring clinicians and radiologists must ensure that their findings are accurately documented.

1. What is this policy about?

1.1 Radiology departments receive significant numbers of requests for radiological imaging of patients who may have sustained injury to the cervical spine. This policy provides a framework for the appropriate imaging, and documentation of that imaging, in patients who may have sustained traumatic injury to the cervical spine.

If you have any concerns about the content of this document please contact the author or advise the Document Control Administrator.

2. Where will this policy be used?

2.1 This policy applies to all referrers for cervical spine imaging following trauma working within Pennine Acute Hospital NHS Trust. Referrers should ensure clear clinical information is provided to allow timely justification for radiation exposure.

This policy applies to all Radiographers working within Pennine Acute Hospital NHS Trust. Radiographers should ensure images are acquired in a timely fashion.

This policy applies to all Consultant Radiologists working within Pennine Acute Hospital NHS Trust. Consultant Radiologists should ensure imaging reports are produced in a timely fashion.

2.2 Applies to adult patients only.

3. Why is this document important?

3.1 Referring clinicians, radiographers and radiologists must balance the risk of disability from a missed cervical spine injury against the risks of radiation exposure and the limited resources available. Adherence to this policy helps all relevant staff groups to ensure consistent best practice is implemented.

3.2 Spinal injury assessment: assessment and imaging, and early management for spinal Injury, National Institute for health and Clinical Excellence (NICE) Feb 2016.

4. What is new in this version?

4.1

- 3.1.2 Added inability to issue verified report
- 3.2 Amended with simplification of previous risk stratification groups
- 3.2.1.4 Additional cornerstone of whether the patient is a High Risk Patient
- 3.2.2.2. Amended to include Motorised recreational vehicle accident, Significant bicycle injury and horse riding accident under High risk mechanism of injury
- 3.2.3. Amended to move >65 years of age, rigid vertebral disease to new 3.2.4 High Risk Patient category. Midline pain and tenderness removed. Amended altered mental state to GCS<13 and added intubated and ventilated

- Removed lateral flexion and extension views, trauma oblique views and CT of relevant abnormal areas
- Amended to remove the part about delaying CT C-spine report
- 3.2.3.4.5 amended to 3.2.10 to include current electronic mechanisms for image transfer to another trust
- 3.2.11 new further advanced imaging section
- This document has a simpler pathway to follow which is best shown graphically in Appendix 2
- Appendix 3 to 5 removed.

5. Policy

5.1 Documentation

5.1.1 Referring clinicians and radiologists must ensure that their findings are accurately documented. Because of the high risk of litigation as a result of missed cervical spine injuries it is vital that the following are recorded contemporaneously in the hospital notes:

5.1.1.1 The mechanism of injury any clinical findings & the reason for referral.

5.1.1.2 The radiological findings.

5.1.1.3 The proposed treatment plan.

5.1.2 If the radiologist is unable to issue a verified report on the Radiology Information System (RIS) or physically unable to write in the patient's hospital notes (remote reporting); then a verbal report may be dictated over the telephone to a member of the referring team. The report should be "read-back", confirmed with a second member of staff, and recorded in the notes.

5.2 Clinical Risk Stratification and Imaging

5.2.1 Until radiographic confirmation of the absence of cervical spine injury, all patients should be advised and treated as "worst-case-scenario" based on the clinical risk assessment undertaken by the referring clinician.

5.2.2 The cornerstones of the decision making process are:

5.2.2.1 The nature of the mechanism of injury of the trauma and the division into High and Low risks of injury.

5.2.2.2 The ability of the patient to co-operate with history taking and examination for significant physical signs.

5.2.2.3 The ability of the patient to laterally rotate >45 degrees.

5.2.2.4 Whether the patient is a High Risk Patient

5.2.3 Mechanism of injury:

5.2.3.1 Mechanism of injury – "**low risk**"; including:

- Simple rear-end RTC < 30 MPH impact

- No roll-over
- Not ejected from a vehicle
- Not pushed into oncoming traffic
- Ambulatory since injury

5.2.3.2 Mechanism of injury – "**high risk**"; including:

- High velocity RTC >30 miles per hour
- Shunted into oncoming traffic
- Fall > 1 metre (5 stairs)
- Roll-over / ejection from vehicle
- Direct axial loading (e.g. diving accident)
- Motorised recreational vehicle accident
- Significant bicycle collision
- Horse riding accident

5.2.4 Significant clinical signs

- Obvious cervical pain/deformity
- Paraesthesia/neurological deficit
- Multiple long bone fractures
- Thoracic / lumbar fractures
- Known significant traumatic head injury i.e. CT head indicated
- GCS <13
- Intubated and Ventilated

5.2.5 High Risk Patient

- >65 years of age
- Known rigid vertebral disease
- Significant degenerative cervical spine disease

5.2.6 **Group one risk: Alert patient (GCS 15) with ANY low risk mechanism criteria,**

delayed onset neck pain, midline tenderness AND able to laterally rotate >45°

- Requires no imaging.

5.2.6.1 Please note that patients who do not fulfil Group one criteria should have appropriate cervical spine stabilisation measures in place until the cervical spine has been definitively "cleared" and documented.

5.2.7 **Group two risk: Alert patient who does not fulfil Group one criteria and has NO significant clinical signs**

- AP & lateral cervical spine radiographs C1-C7/T1 (arms pulled down)
- Odontoid peg ("open mouth") view
- Swimmers' view (if C7/T1 junction not visualised in the lateral projection)

OR

- Cervical CT scan CT Skull base -T1 with reconstruction algorithm
    - If Inadequate /suspicious/ abnormal X-ray cervical spine
    - Strong clinical suspicion of injury despite normal X-ray
    - May be more appropriate for High risk patient or difficult body habitus eg. “no neck”

5.2.7.1 Please note that alert patients, whose mechanism of injury is classified as a “high risk” but who display no significant clinical signs may be re-classed as group two

5.2.8 **Group three risk: Patient who does not fulfil Group one criteria AND has ANY of the significant clinical signs**

- Cervical CT scan CT Skull base -T1 with reconstruction algorithm

5.2.9 **Group four risk: Patient who has does not fulfil Group 3 risk BUT has ANY High risk mechanism and is a High risk patient**

- Cervical CT scan CT Skull base -T1 with reconstruction algorithm

5.2.9.1 Please note, patients who are intoxicated or have painful injuries causing attention distraction should have appropriate cervical spine stabilisation measures in place; and be closely observed for developing neurological signs until they are able to co-operate with history, examination and radiological investigation.

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5.2.10 **Group five risk - The hanged patient**

The detail of mechanism of injury “strangulation or a “drop” and the level of consciousness / co-operation will guide the clinicians regarding the correct risk stratification, and requirements for imaging.

5.2.11 If the patient requires transportation to another Trust’s, the electronic data from the imaging of the brain and cervical spine should, whenever possible, be transferred using the current electronic mechanism (Image Exchange Portal, North West Portal and Virtual Private Networks). If this mechanism is unavailable, the patient’s data should be written to CD and transferred with the patient for easy viewing by the importing hospital’s radiologists.

5.2.12 **Further advanced Imaging**

5.2.12.1 Further advanced imaging can be carried out following discussion by the referrer with the local spinal surgery team.

5.2.12.2 It should be noted that any patients requiring anaesthetic or critical care support cannot have MR imaging locally as we do not have MR safe life support equipment.

5.2.12.3 MR imaging is indicated if there are neurological signs and symptoms referable to the cervical spine.

5.2.12.4 Be aware that MR imaging may add important information about ligamentous and disc injuries suggested by X-ray, CT or clinical findings.

5.2.12.5 If there is suspicion of vascular injury (for example, vertebral malalignment, a fracture involving the foramina transversaria or lateral processes, or a posterior circulation syndrome), CT or MR angiography of the neck vessels may be performed to evaluate for this.

5.2.12.6 It should be noted that MR, MR angiography and CT angiography are only available during normal working hours. If required out of hours, the patient will require Consultant to Consultant referral to the local spinal surgery centre.

5.3 Audit

5.3.1 This policy will be audited annually by the consultant radiologists or identified individuals from the radiology team.

5.3.2 The audit will seek to ascertain awareness amongst radiology staff and those clinicians who refer acute trauma patients for cervical spine imaging.

5.3.3 The audit will also undertake a search of clinical incident reporting data and complaints to identify clinical incidents involving cervical spine injuries which may have occurred as a result of a failure of the policy itself or a failure of compliance with the existing policy.

6. Roles and responsibilities

6.1 All Referrers to Radiology (particularly Emergency Department): Responsible for following the policy and ensuring appropriate referrals.

6.2 Consultant Radiologists and Radiology Specialist Registrars: Responsible for vetting and accepting radiology referrals, reporting on resultant images in a timely manner.

6.3 Radiographers: Responsible for imaging the patient and ensuring the resultant images are available for radiology reporting in a timely manner.

7. Monitoring document effectiveness

7.1 Key standards:

1. Appropriate selection and referral of patient
2. Patient safety
3. Report must be issued according to policy

- **Method(s):**
  1. Exam must be discussed and agreed between clinician and radiologist or radiographer.

Exam must be discussed and agreed between clinician and radiologist or radiographer.
Imaging will not be performed without prior agreement.

2. Patients meet the criteria as identified within this policy.
   Imaging will not be performed unless these criteria are met.
3. Report must be issued according to policy.
   Consultant radiologist must discuss with referring clinician.

- **Team responsible for monitoring:** Consultant radiologists and radiographers.
- **Frequency of monitoring:** Continually, upon referral.
- **Process for reviewing results and ensuring improvements in performance:** Compliance will be shared with the teams involved and reported through monthly Radiology Directorate Quality Governance meetings.

8. Abbreviations and definitions

A&E	Accident & Emergency
ASIA	American Spinal Injury Assessment
AP	Anterior-Posterior
C1/C7/T1	Cervical/thoracic vertebrae
CD	Compact Disk
CT	Computerised Tomography
ED	Emergency Department
GCS	Glasgow Coma Scale, measurement of patient consciousness
ICU	Intensive Care Unit
MR	Magnetic Resonance
NICE	National Institute for Health & Care Excellence
PEFR	Peak Expiratory Flow Rate
RIS	Radiology Information System
RTC	Road traffic collision

9. References and Supporting Documents

9.1 References

• The practice management guidelines for identifying cervical spine injuries following trauma" (Eastern Association for the Surgery of Trauma (EAST) in 1998 and modified in 2000.)

• "The Canadian C-Spine Rule study for alert and stable trauma patients" JAMA. 2001 Oct 17;286(15):1841-8

• "The Canadian C-spine rule versus the NEXUS low-risk criteria in patients with trauma" N Engl J Med. 2003 Dec 25;349(26):2510-8

• "The evaluation for spinal injuries among unconscious victims of blunt poly trauma: a management guideline for intensive care" (Intensive Care Society 2005) www.ics.ac.uk/

• "Trauma – who cares?" National Confidential Enquiry into Patient Outcome and Death (NCEPOD) 2007 http://www.ncepod.org.uk/2007b.htm

• "Head Injury: triage, assessment, investigation and early management of head injury in infants, children and adults" National Institute for health and clinical Excellence (NICE)" Sept 2007) http://www.nice.nhs.uk/nicemedia/pdf/CG56guidance.pdf

• American College of Radiology ACR appropriateness criteria (origin 1999, reviewed 2009). http://www.acr.org/secondarymainmenucategories/quality_safety/app_criteria/pdf/expertpanelonmusculoskeletalimaging/suspectedcervicalspinetraumadoc22.aspx

• Guidelines for the management of Acute Cervical Spine and Spinal Cord Injuries. American association of Neurological Surgeons. http://static.spineuniverse.com/pdf/traumaguide/finished1116.pdf

• Cervical Spine: Management of alert, adult patients with potential cervical spine injury in the Emergency Department, Royal College of Emergency Medicine (RCEM) Nov 2010

• "Systematic review of flexion/extension radiography of the cervical spine in trauma patients" European Journal of Radiology, June 2013, vol./is. 82/6(974-981)

• Cervical spine collar clearance in the obtunded adult blunt trauma patient: A systematic review and practice management guideline from the Eastern Association for the Surgery of Trauma (EAST) Journal of Trauma and Acute Care Surgery, February 2015, vol./is. 78/2(430-441), 2163-0755;2163-0763

• Spinal injury assessment: assessment and imaging, and early management for spinal injury ,National Institute for health and clinical Excellence (NICE) Feb 2016

9.2 Related SRFT/PAT documents

- Policy for the Transfer of PACS images (DPGDI022)
- Incident Reporting & Investigation Policy including the Serious Incident Framework (EDQ008)
- Complaints Handling Policy (EDG004)
- Information Governance Policy (EDI001)

10. Document Control Information

It is the author's responsibility to ensure that all sections below are completed in relation to this version of the document prior to submission for upload.

Remove instructions once completed.

Nominated Lead author:	Name Dr Herbert Imalingat	Role Consultant Radiologist	
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Lead Author's Manager:	Name Dr Carolyn Allen	Role: Consultant Radiologist and Radiology Clinical Director.	
Applies to:	Oldham CO	North Manchester CO	Bury & Rochdale CO
Document developed in consultation with :	Input received from all relevant stakeholders including the Emergency Department, Radiology Consultant Body and Anaesthetics Department		
Keywords/ phrases:	Cervical spine, Neck Trauma, Neck Injury, C-spine x-ray , CT C-spine		
Communication plan:	The policy will be uploaded on to the Trust's Intranet Document Management System and disseminated to radiology staff via the Radiology Bulletin, and radiology site and staff meetings. The policy will be forwarded to the Lead Clinicians for the Emergency Departments (ED) across PAHNT for dissemination to the ED clinicians.		
Document review arrangements:	This document will be reviewed by the author, or a nominated person, at least once every three years or earlier should a change in legislation, best practice or other change in circumstance dictate.		
Approval:	Division of Diagnostics and Pharmacy Quality Governance Committee		
	Approval date: 24/09/2018		
How approved:	Formal Committee decision		

11. Equality Impact Assessment (EqIA) screening tool

Legislation requires that our documents consider the potential to affect groups differently, and eliminate or minimise this where possible. This process helps to reduce health inequalities by identifying where steps can be taken to ensure the same access, experience and outcomes are achieved across all groups of people. This may require you to do things differently for some groups to reduce any potential differences.

1a) Have you undertaken any consultation/ involvement with service users, staff or other groups in relation to this document? If yes, specify what.	Yes: Consultation with Emergency Department staff.
1b) Have any amendments been made as a result? If yes, specify what.	No changes.

2) Does this policy have the potential to affect any of the groups listed below differently? This may be linked to access, how the process/procedure is experienced, and/or intended outcomes. Prompts for consideration are provided, but are not an exhaustive list.

Protected Group	Yes	No	Unsure
Age *(e.g. are specific age groups excluded? Would the same process affect age groups in different ways?)*		X	
Sex *(e.g. is gender neutral language used in the way the policy or information leaflet is written?)*		X	
Race *(e.g. any specific needs identified for certain groups such as dress, diet, individual care needs? Are interpretation and translation services required and do staff know how to book these?)*		X	
Religion & Belief *(e.g. Jehovah Witness stance on blood transfusions; dietary needs that may conflict with medication offered.)*		X	
Sexual orientation *(e.g. is inclusive language used? Are there different access/prevalence rates?)*		X	
Pregnancy & Maternity *(e.g. are procedures suitable for pregnant and/or breastfeeding women?)*	X		
Marital status/civil partnership *(e.g. would there be any difference because the individual is/is not married/in a civil partnership?)*		X	
Gender Reassignment *(e.g. are there particular tests related to gender? Is confidentiality of the patient or staff member maintained?)*		X	
Human Rights *(e.g. does it uphold the principles of Fairness, Respect, Equality, Dignity and Autonomy?)*		X	
Carers *(e.g. is sufficient notice built in so can take time off work to attend appointment?)*		X	
Socio/economic *(e.g. would there be any requirement or expectation that may not be able to be met by those on low or limited income, such as costs incurred?)*		X	
Disability *(e.g. are information/questionnaires/consent forms available in different formats upon request? Are waiting areas suitable?) Includes hearing and/or visual impairments, physical disability, neurodevelopmental impairments e.g. autism, mental health conditions, and long term conditions e.g. cancer.*		X	

Are there any adjustments that need to be made to ensure that people with disabilities have the same access to and outcomes from the service or employment activities as those without disabilities? *(e.g. allow extra time for appointments, allow advocates to be present in the room, having access to visual aids, removing requirement to wait in unsuitable environments, etc.)*		**X**	

3) Where you have identified that there are potential differences, what steps have you taken to mitigate these?

Pregnancy and radiation risk need to be considered, although clinical decision may overrule pregnancy status. Suitable radiation protection can be applied as necessary.

4) Where you have identified adjustments would need to be made for those with disabilities, what action has been taken?

All radiology staff and referrers aware of radiation/pregnancy risks.

Will this policy require a full impact assessment? No

(*a full impact assessment will be required if you are unsure of the potential to affect a group differently, or if you believe there is a potential for it to affect a group differently and do not know how to mitigate against this - Please contact the Inclusion and Equality team for advice on* equality@pat.nhs.uk)

Author:: Herbert Imalingat
Date: 24/09/2018

Sign off from Equality Champion: Joanne Stephenson
Date: 24/09/ 2018

12. Appendices

Appendix 1 – Flow chart for cervical spine imaging in adults following blunt trauma