

Radiological issues in spinal immobilization

Submission date 16/07/2015	Recruitment status No longer recruiting	<input type="checkbox"/> Prospectively registered
		<input type="checkbox"/> Protocol
Registration date 18/08/2015	Overall study status Completed	<input type="checkbox"/> Statistical analysis plan
		<input type="checkbox"/> Results
Last Edited 04/08/2015	Condition category Musculoskeletal Diseases	<input type="checkbox"/> Individual participant data
		<input type="checkbox"/> Record updated in last year

Plain English summary of protocol

Background and study aims

Patients who have been in an accident and are suspected of spinal injury are routinely treated with devices for spinal immobilization in order to stabilise the spinal column after injury and therefore prevent injury to the spinal cord. These devices are usually left in place while the patient is in the Emergency Room for assessment, including taking x-rays or making CT scans. However, the presence of these devices may hamper judgement of these images since they can produce artefacts (e.g. lines). Also, the presence of the devices may increase the amount of radiation the patient is exposed to. CT scanners and x-ray machines automatically adjust the radiation dose for imaging to get consistent image quality, and increase the dose when there is more matter (be it patient or device) to beam through. With this study we judge patient CT scans to assess image quality, and we measure radiation exposure using a phantom. We want to know which device therefore produces the best image quality and the least radiation exposure

Who can participate?

Adults (aged at least 18) who had a CT scan of their head while on a device for spinal immobilization in 2011.

What does the study involve?

Patients' CT scans are assessed retrospectively for the presence and extent of artifacts caused by the spinal immobilization device used. Phantom CT scans and x-rays are assessed prospectively for radiation exposure in relation to the spinal immobilization device being used.

What are the possible benefits and risks of participating?

There are no benefits or risks to participants.

Where is the study run from?

Maastricht University Medical Center (Netherlands)

When is the study starting and how long is it expected to run for?

August 2013 to December 2014

Who is funding the study?

Maastricht University Medical Center (Netherlands)

Who is the main contact?
Miss Baukje Hemmes

Contact information

Type(s)
Scientific

Contact name
Miss Baukje Hemmes

Contact details
Bogaartsborg 3
Maastricht
Netherlands
6228AK

Additional identifiers

Protocol serial number
METC 13-4-113

Study information

Scientific Title
Radiation exposure and objective and subjective image quality in spinal immobilization: a comparison of patient data and phantom data

Study objectives
Devices for spinal immobilization decrease image quality and increase radiation exposure

Ethics approval required
Old ethics approval format

Ethics approval(s)
METC MUMC (Medical Ethics Committee of the Maastricht University Medical Center), 19/12 /2013, ref: METC 13-4-113

Study design
1. Retrospective evaluation of CT scans of patients
2. Prospective evaluation of CT scans and x-rays of a phantom
3. Single center study

Primary study design
Observational

Study type(s)
Other

Health condition(s) or problem(s) studied

Radiation exposure and radiological image quality

Interventions

1. Patients CT scans are assessed retrospectively for the presence and extent of artifacts in relation to spinal immobilization device used.
2. Phantom CT scans and x-rays are assessed prospectively for radiation exposure in relation to spinal immobilization device used.

Intervention Type

Device

Primary outcome(s)

1. Artifacts are scored independently by two trained judges, based on presence and impact of any disturbance of the image, which can be related back to the spinal immobilization device
2. Radiation exposure is measured using an ionisation chamber and electrometer
3. Noise is measured in SD of the CT values (in Hounsfield Units) of the pixels within 16 circular regions of interest covering 51% of the phantom using ImageJ

Key secondary outcome(s)

Overall assessment of the question which device for spinal immobilization performs best from a radiological point of view, with recommendations for clinical use.

Completion date

01/06/2015

Eligibility**Key inclusion criteria**

Patients who underwent CT of the head in 2011 while on a device for spinal immobilization, aged 18 or older

Participant type(s)

Mixed

Healthy volunteers allowed

No

Age group

Adult

Lower age limit

18 years

Sex

All

Key exclusion criteria

Patients are excluded when the type of device(s) used are unknown

Date of first enrolment

01/01/2014

Date of final enrolment

01/03/2014

Locations

Countries of recruitment

Netherlands

Study participating centre

Maastricht University Medical Center

Maastricht

Netherlands

6202AZ

Sponsor information

Organisation

Maastricht University Medical Center

ROR

<https://ror.org/02d9ce178>

Funder(s)

Funder type

Hospital/treatment centre

Funder Name

Maastricht University Medical Center (Netherlands)

Results and Publications

Individual participant data (IPD) sharing plan**IPD sharing plan summary**

Stored in repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes