Structured reporting of CT polytrauma: a proposal

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Learning objectives

We propose a RIS-integrated CT structured report (SR), to be used for the assessment of severely injured patients (SIP) following polytrauma.

Background

The report is the essential record of the diagnostic service of radiologists.

Free-text reports are often inconsistent in their organization and terminology, which makes them difficult to use for referring physicians.

SR relies on a standardized language, enables radiologists to provide complete and useful reports and promotes adherence to guidelines.

Many clinicians prefer SR over free-text reports because they perceive SR provide improved clarity.

Some radiologists have expressed concern that SR is more time-consuming and may negatively impact workflow and reasoning.

Some older radiologists simply resist change.

These are the main reasons why SR has not gained wide acceptance.

Findings and procedure details

In May 2017, a SR for CT polytrauma examinations was implemented in our department.

It was designed by an emergency radiologist, emergency physician and an intensivist in consensus, to include key features considered necessary for assessing SIP and to plan the medical/surgical approach.

The template was engineered, integrated in our RIS, presented to the emergency imaging staff in September 2017 and its use was highly recommended (not mandatory).

The template is divided into 5 sections: **brain, cervical spine, chest-abdomen, thoracolumbar spine** and **pelvis.**

Each section is structured with headings (technique, findings, collateral findings and conclusions) and subheadings.

Picklists fields, drop down menus, buttons and some free text boxes can be used to describe and measure different possible lesions for each single organ.

At the end of the process, the SR is automatically turned into narrative.

Images for this section:

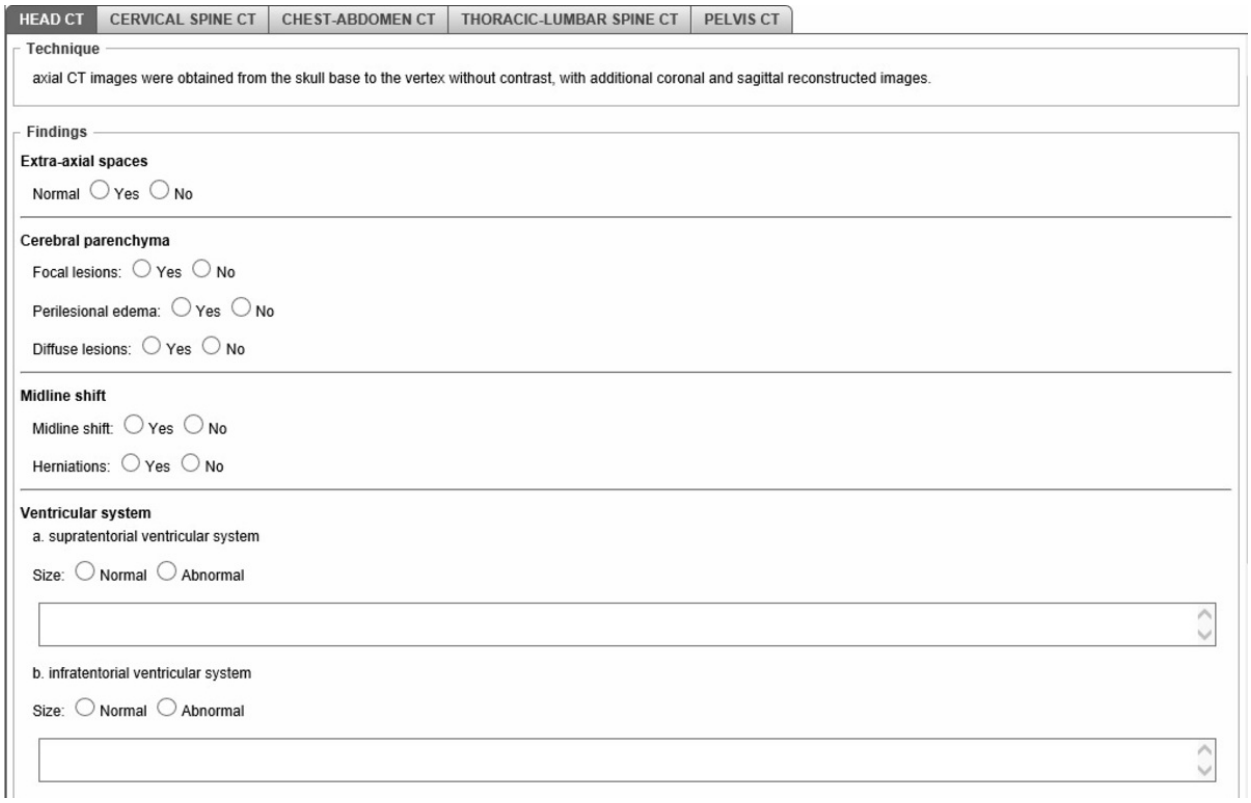

Fig. 1

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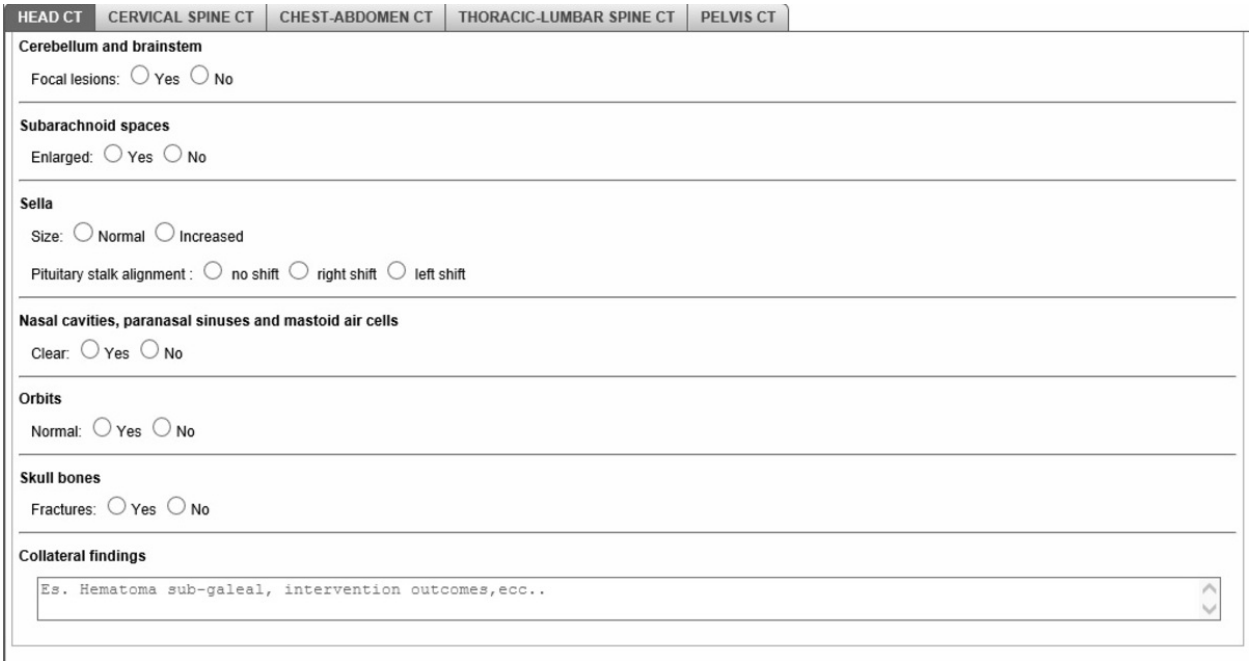

Fig. 2

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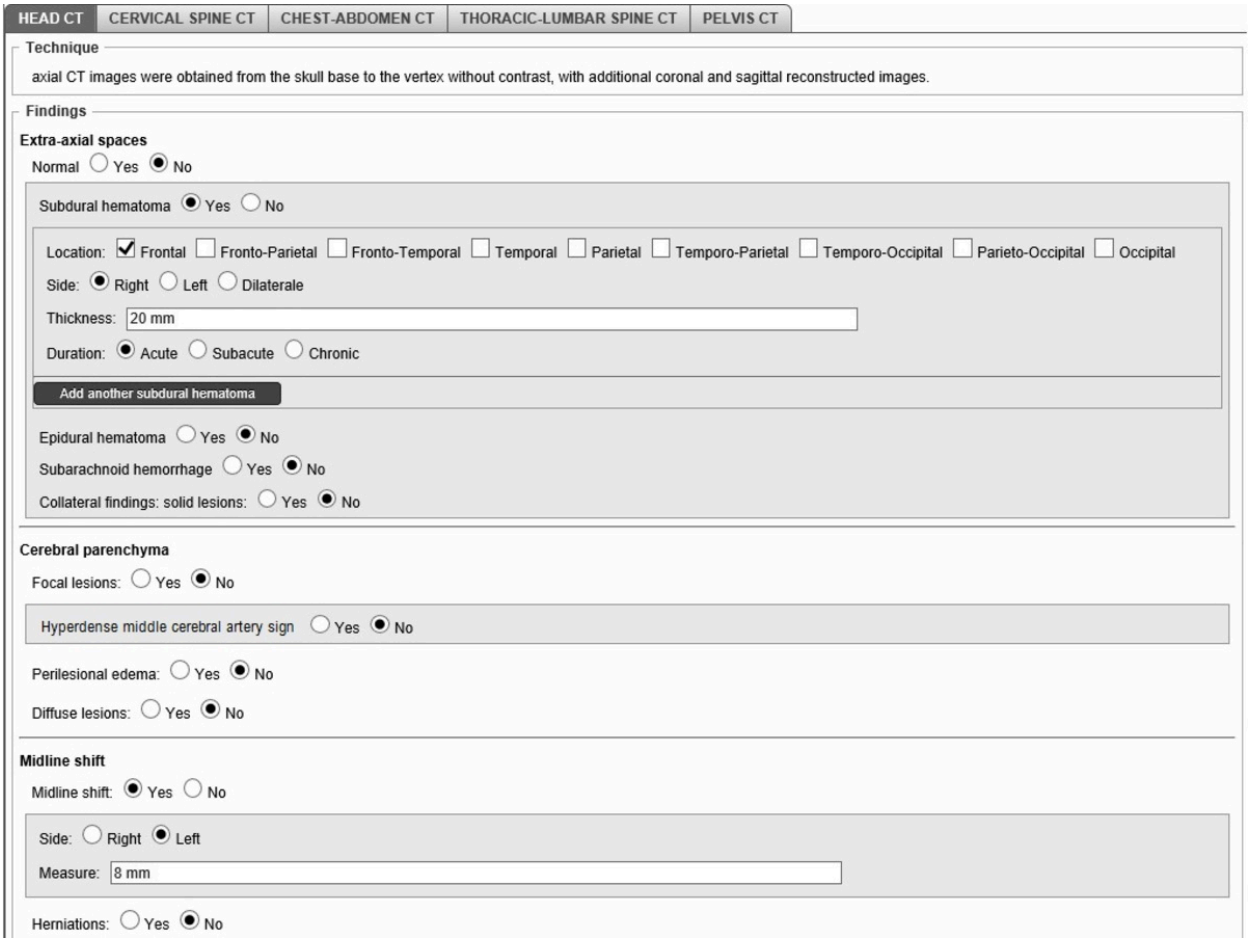

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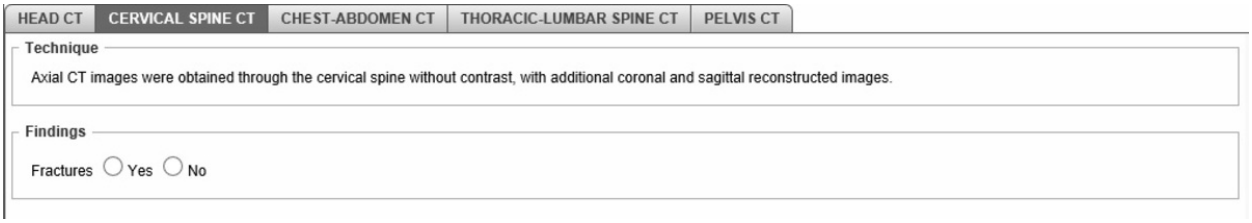

Fig. 4

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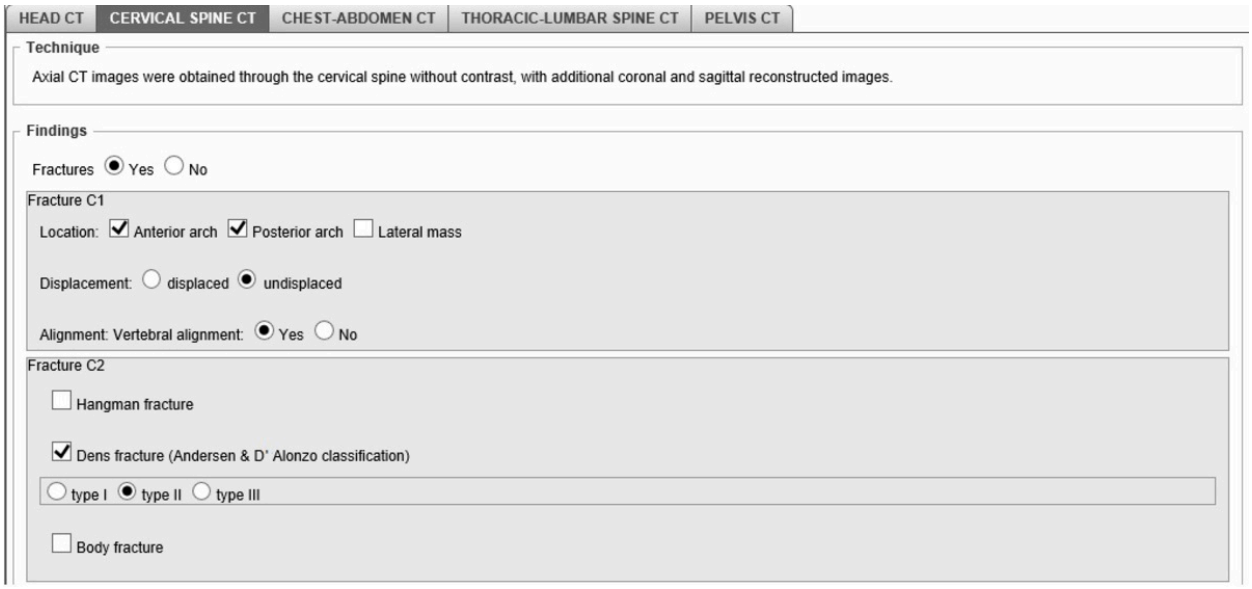

Fig. 5

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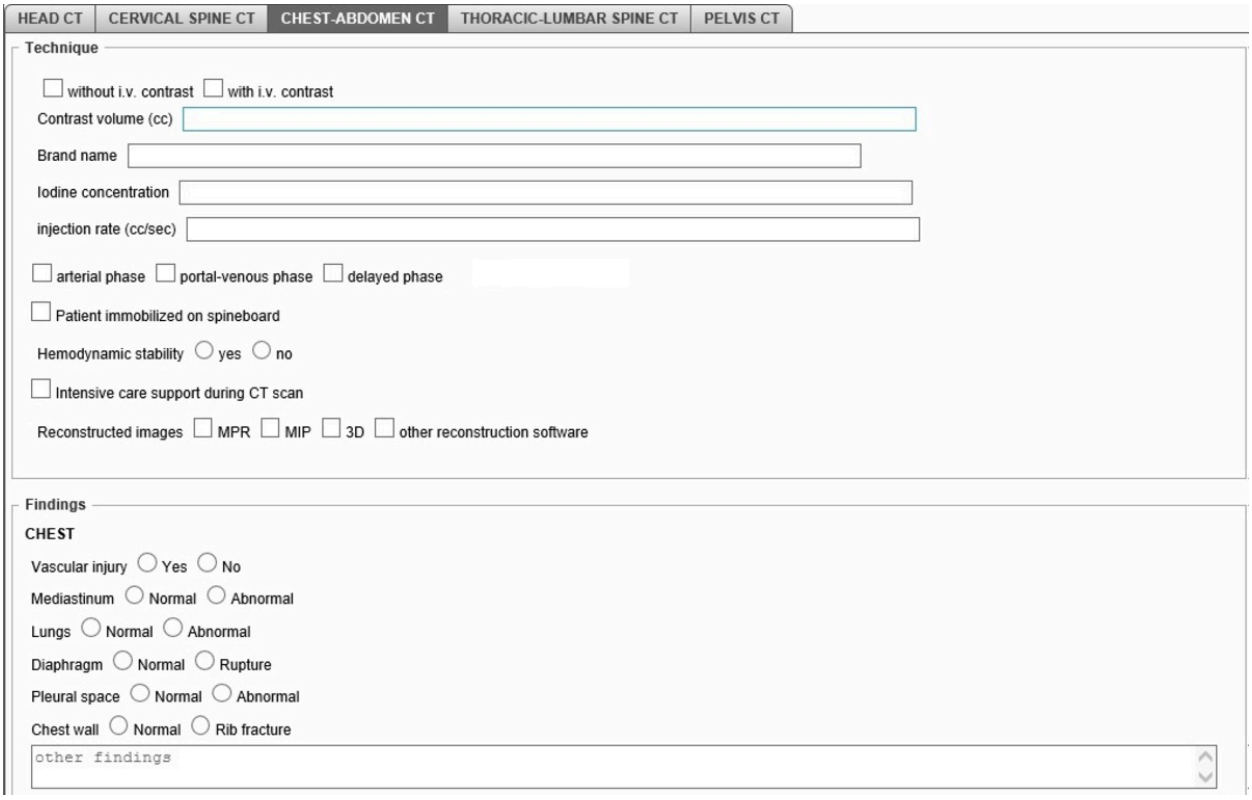

Fig. 6

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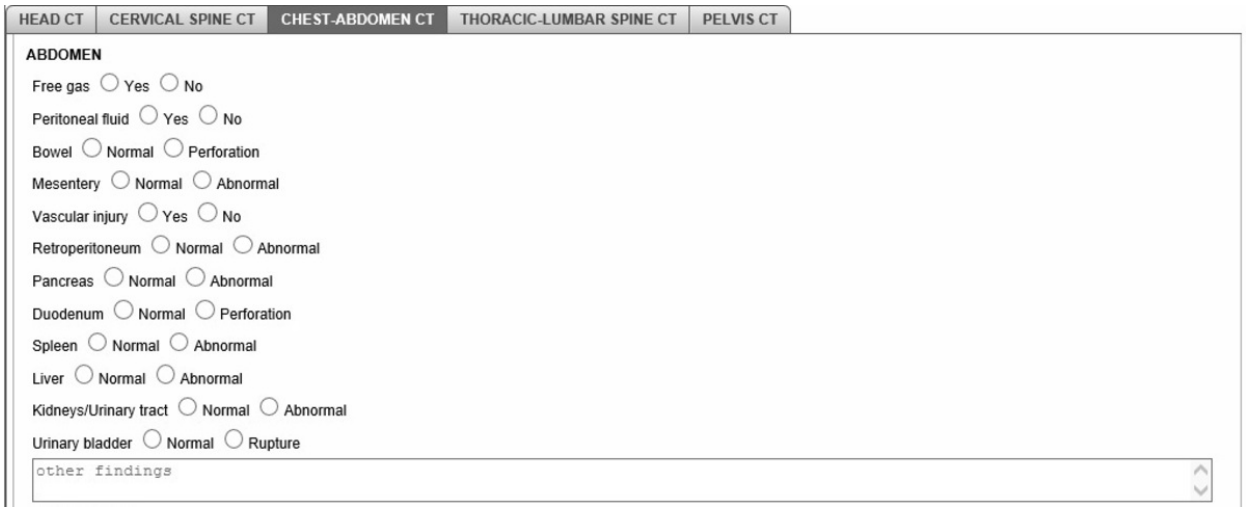

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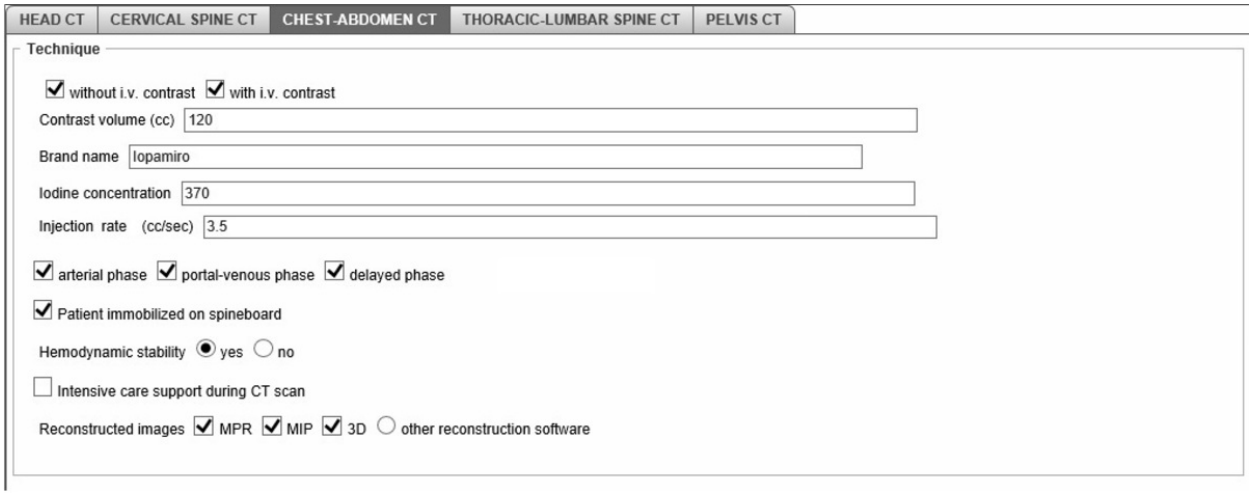

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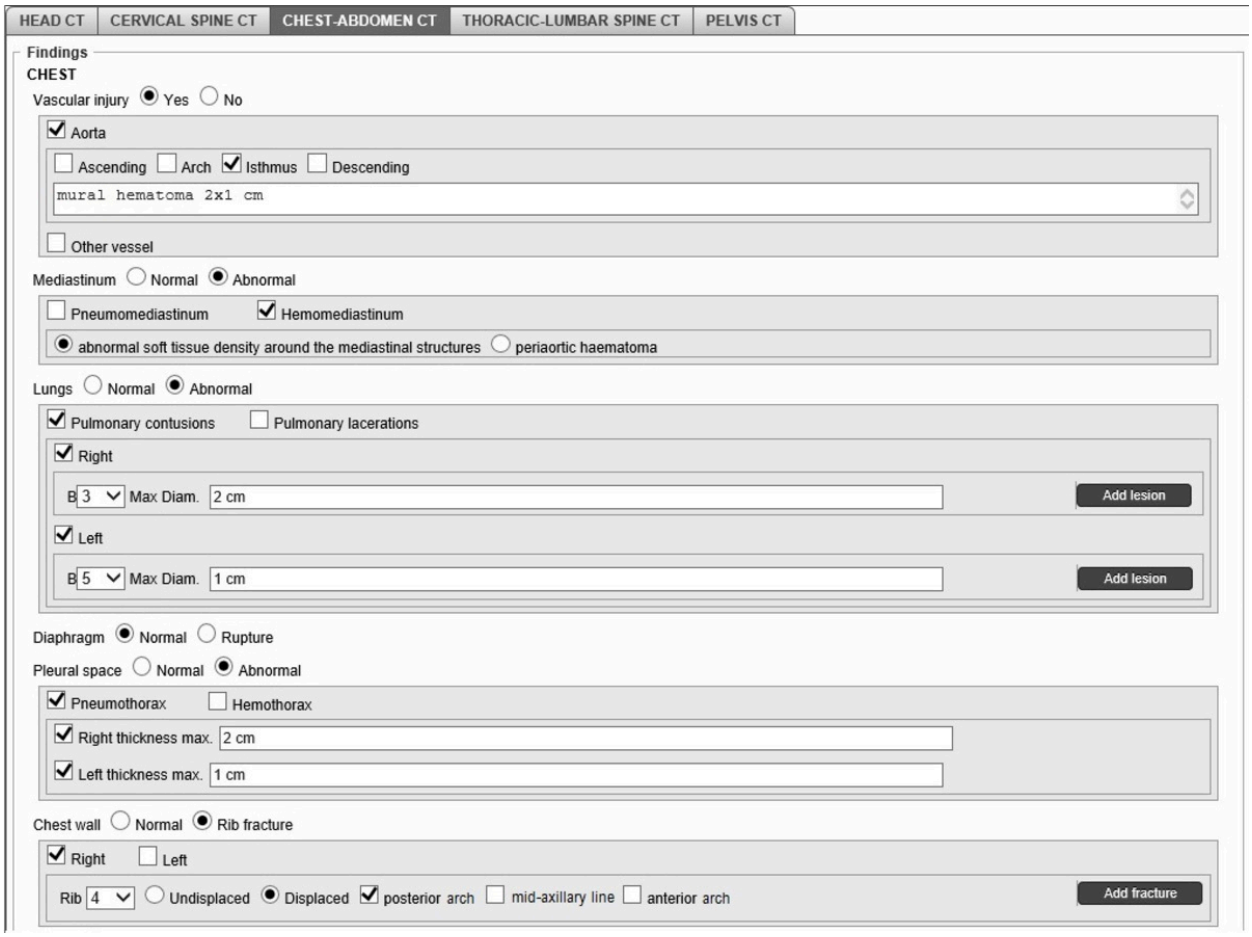

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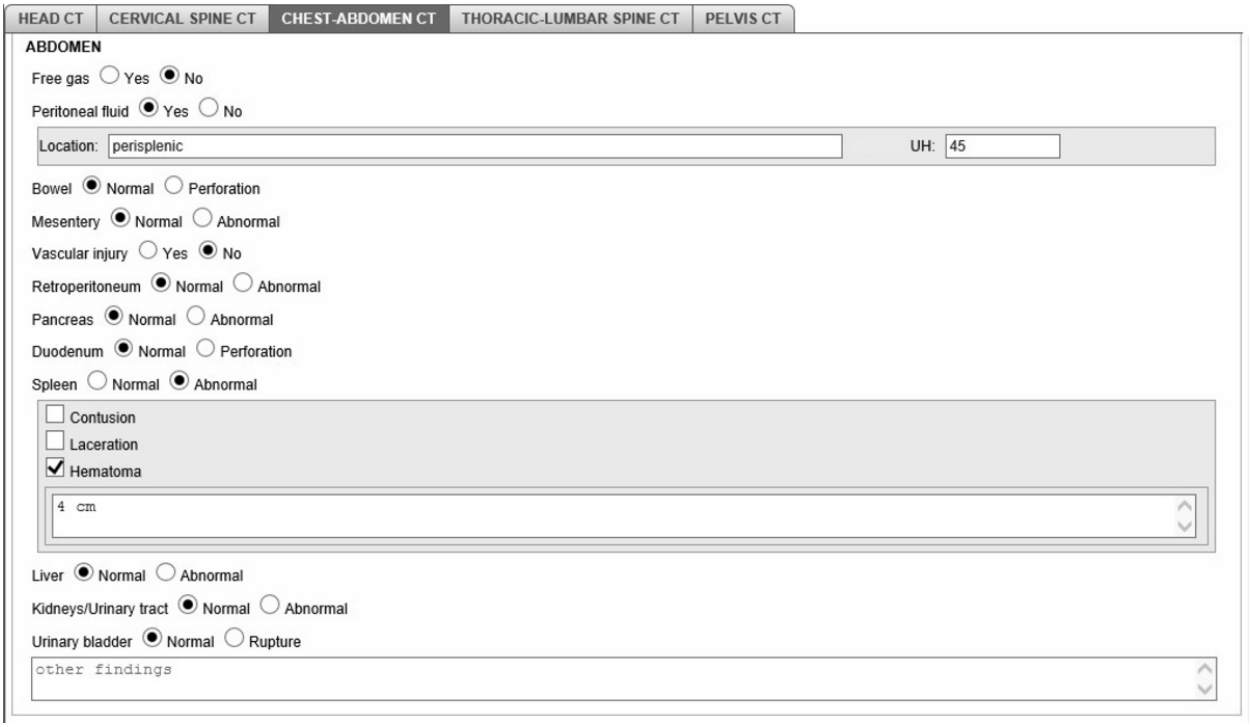
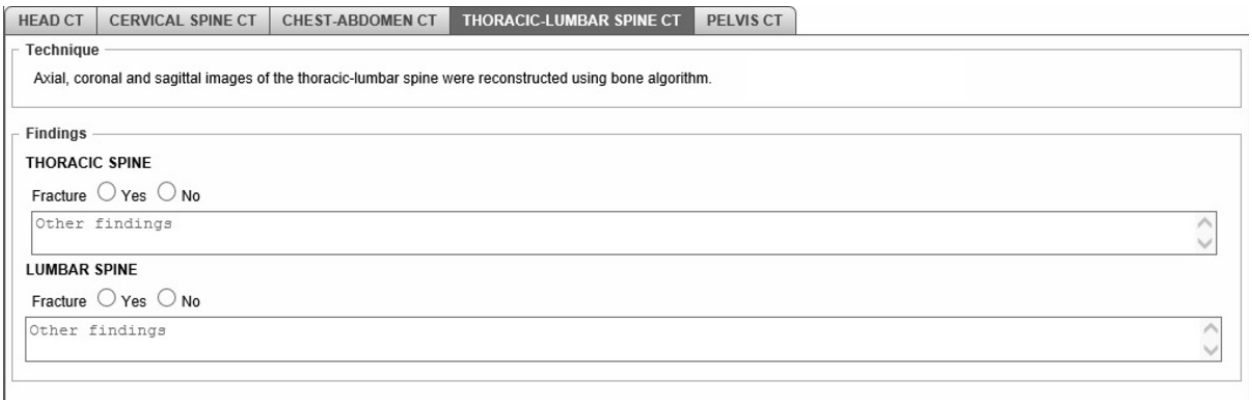


Fig. 10



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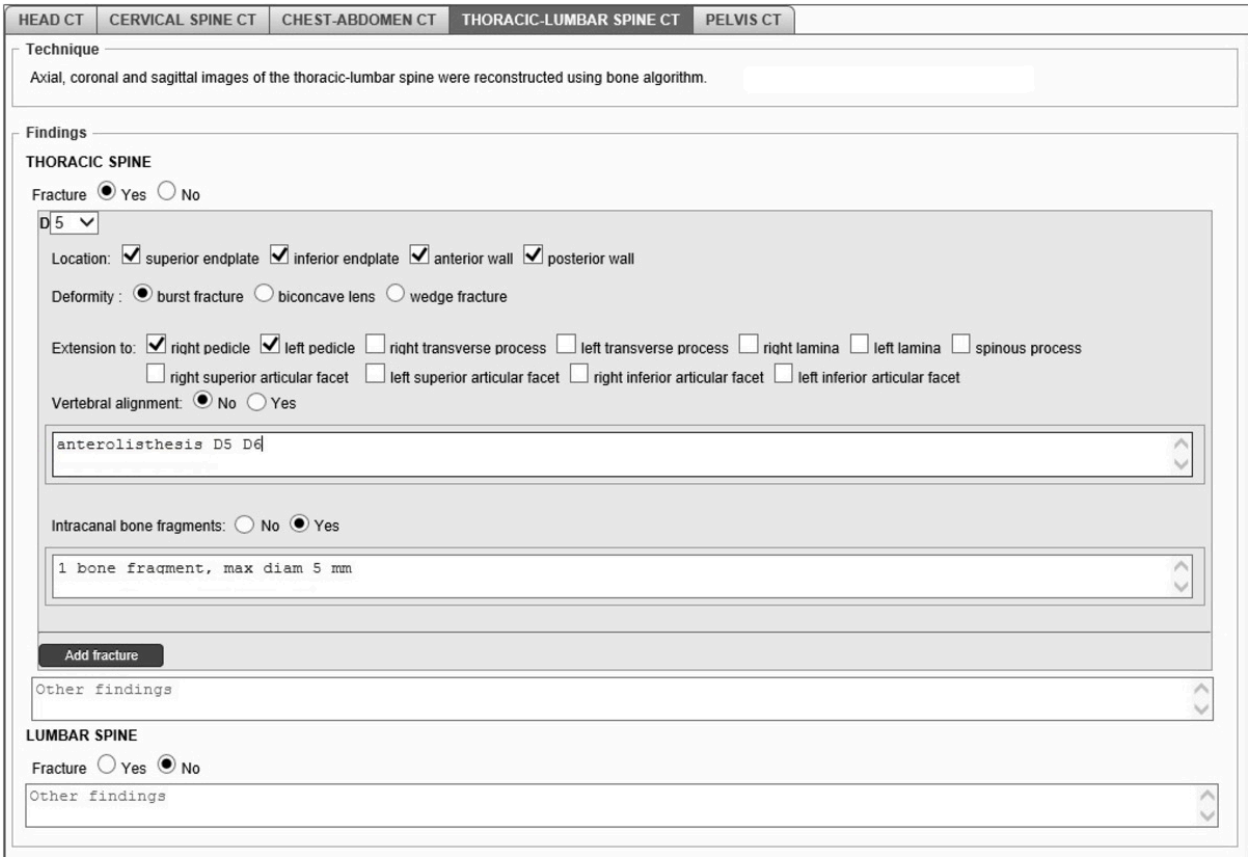


Fig. 12

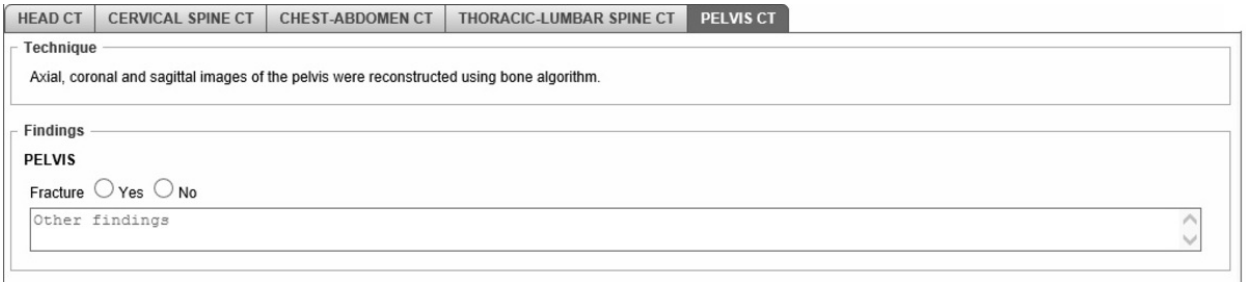
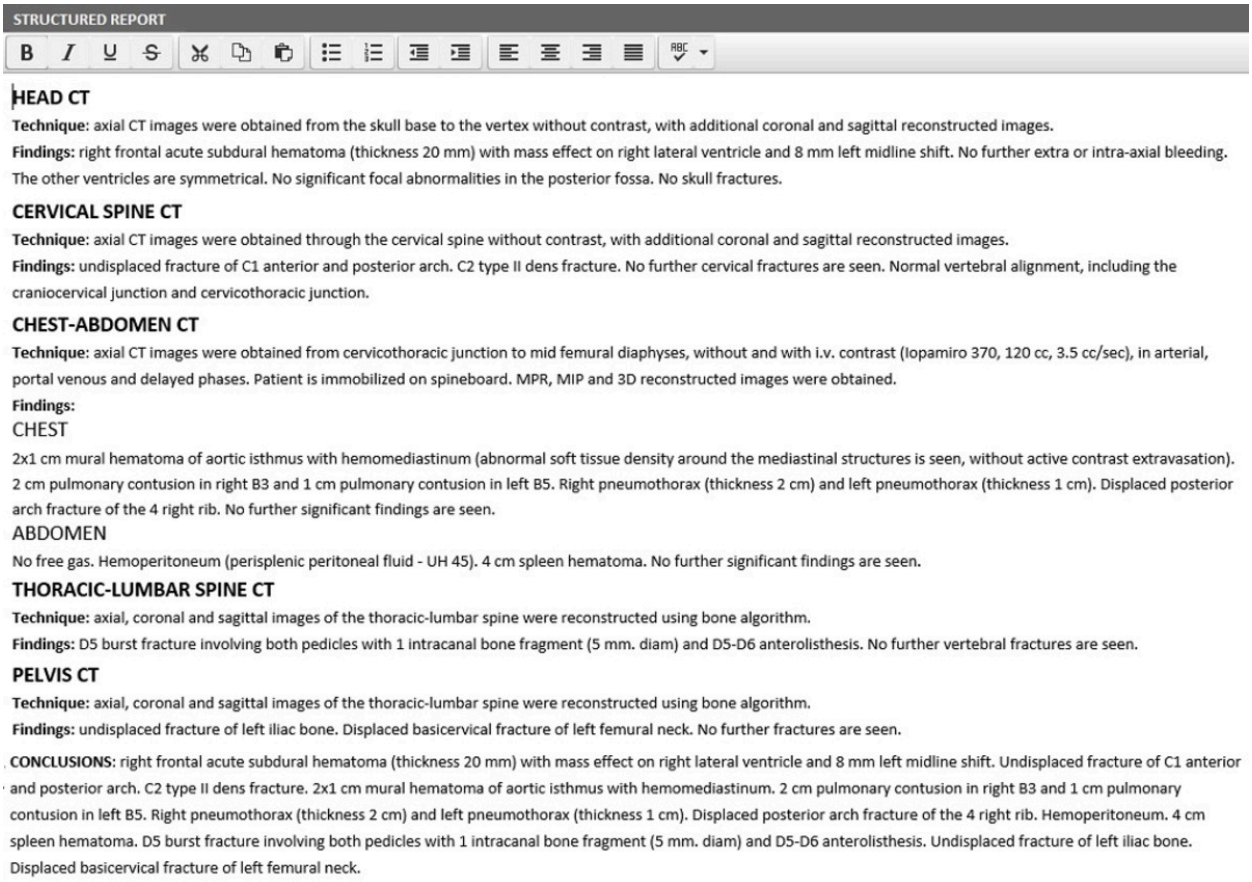


Fig. 13

Fig. 14


STRUCTURED REPORT

HEAD CT

Technique: axial CT images were obtained from the skull base to the vertex without contrast, with additional coronal and sagittal reconstructed images.

Findings: right frontal acute subdural hematoma (thickness 20 mm) with mass effect on right lateral ventricle and 8 mm left midline shift. No further extra or intra-axial bleeding. The other ventricles are symmetrical. No significant focal abnormalities in the posterior fossa. No skull fractures.

CERVICAL SPINE CT

Technique: axial CT images were obtained through the cervical spine without contrast, with additional coronal and sagittal reconstructed images.

Findings: undisplaced fracture of C1 anterior and posterior arch. C2 type II dens fracture. No further cervical fractures are seen. Normal vertebral alignment, including the craniocervical junction and cervicothoracic junction.

CHEST-ABDOMEN CT

Technique: axial CT images were obtained from cervicothoracic junction to mid femural diaphyses, without and with i.v. contrast (Iopamiro 370, 120 cc, 3.5 cc/sec), in arterial, portal venous and delayed phases. Patient is immobilized on spineboard. MPR, MIP and 3D reconstructed images were obtained.

Findings:

CHEST

2x1 cm mural hematoma of aortic isthmus with hemomediastinum (abnormal soft tissue density around the mediastinal structures is seen, without active contrast extravasation). 2 cm pulmonary contusion in right B3 and 1 cm pulmonary contusion in left B5. Right pneumothorax (thickness 2 cm) and left pneumothorax (thickness 1 cm). Displaced posterior arch fracture of the 4 right rib. No further significant findings are seen.

ABDOMEN

No free gas. Hemoperitoneum (perisplenic peritoneal fluid - UH 45). 4 cm spleen hematoma. No further significant findings are seen.

THORACIC-LUMBAR SPINE CT

Technique: axial, coronal and sagittal images of the thoracic-lumbar spine were reconstructed using bone algorithm.

Findings: D5 burst fracture involving both pedicles with 1 intracanal bone fragment (5 mm. diam) and D5-D6 anterolisthesis. No further vertebral fractures are seen.

PELVIS CT

Technique: axial, coronal and sagittal images of the thoracic-lumbar spine were reconstructed using bone algorithm.

Findings: undisplaced fracture of left iliac bone. Displaced basicervical fracture of left femural neck. No further fractures are seen.

CONCLUSIONS: right frontal acute subdural hematoma (thickness 20 mm) with mass effect on right lateral ventricle and 8 mm left midline shift. Undisplaced fracture of C1 anterior and posterior arch. C2 type II dens fracture. 2x1 cm mural hematoma of aortic isthmus with hemomediastinum. 2 cm pulmonary contusion in right B3 and 1 cm pulmonary contusion in left B5. Right pneumothorax (thickness 2 cm) and left pneumothorax (thickness 1 cm). Displaced posterior arch fracture of the 4 right rib. Hemoperitoneum. 4 cm spleen hematoma. D5 burst fracture involving both pedicles with 1 intracanal bone fragment (5 mm. diam) and D5-D6 anterolisthesis. Undisplaced fracture of left iliac bone. Displaced basicervical fracture of left femural neck.

Fig. 15

Conclusion

The crucial role of diagnostic assessment of SIP and the lack of SR templates for CT polytrauma on most influential radiology sites, led us to contribute our template.

In the first 4 months since its introduction, the SR has been used for reporting ~ 50% of CT polytrauma exams performed in our department.

The first impressions from the radiologists who have used it are encouraging: they have found it easy to adopt and they especially appreciated its user-friendly graphic interface.

Some colleagues didn't even try to apply it, because they felt uncomfortable and had little confidence with advanced informatics tools.

Emergency physicians and intensivists have expressed their approval for SR, because it uses a standardized language and provides clear and complete information.

Further evaluation will be needed to complete assessment.

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