

Frequency and spectrum of interventional procedures in acute trauma patients after multidetector-row computed tomography (MDCT) of the chest and/or abdomen

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Purpose

The purpose of our study was to evaluate the frequency and spectrum of interventional procedures in acute trauma patients after multidetector-row computed tomography (MDCT) of the chest and/or abdomen in the emergency room of a large Level 1 trauma center during a 4 year period.

Methods and Materials

A retrospective search of the center's inpatient database from 12/2008 until 09/2012 was performed for the following criteria: MDCT of chest and/or abdomen and an interventional procedure within 7 days thereafter. MDCT is effective in detecting active arterial traumatic and nontraumatic bleeding and dedicated protocols have been described more than 10 years ago (1,2).

All MDCT studies were performed in the arterial and venous phase on a Siemens Sensation Open 40 row- MDCT (Siemens Medical Solutions, Erlangen, Germany) with the following parameters 100 kV, mAs 170, Matrix 512 x 512; collimation 24 x 1.2mm. 120 ml contrast agent (350mg/ml) was injected with time-dependent flow using the Optibolus software. Axial and coronal and oblique MPRs (3 mm) and MIPs were obtained using a soft tissue algorithm (400/40 HU).

Results

The total number of chest MDCT's in the emergency room after acute trauma was 395.

In 19 patients (4.8%), interventional radiological procedures were performed. In seven patients (37%), branches of the iliac or renal artery were selectively embolized. In ten patients (53%), an endovascular thoracic stentgraft was applied due to type-B-dissection or traumatic transection of the thoracic aorta. Fig.1. and 2 show contrast enhanced axial and coronal MPRs of a traumatic aortic transection and pseudoaneurysm after an MVA in a 30 year old male. The patient was successfully treated with endovascular aortic repair with a thoracic stentgraft (MedtronicValiant). Completion angiography demonstrates regular position of the stentgraft (Fig.3), (3).

In Fig.4 axial contrast enhanced MDCT shows active bleeding after pelvic ring fracture and distortion of the symphysis in a 54 year old male after blunt trauma. This patient was hemodynamically unstable and DSA (Fig.5) confirms arterial bleeding. Endovascular treatment with superselective coiling (IDC, BostonScientific) of branches of the internal iliac artery stopped the bleeding (Fig.6), (4,5).

Images for this section:

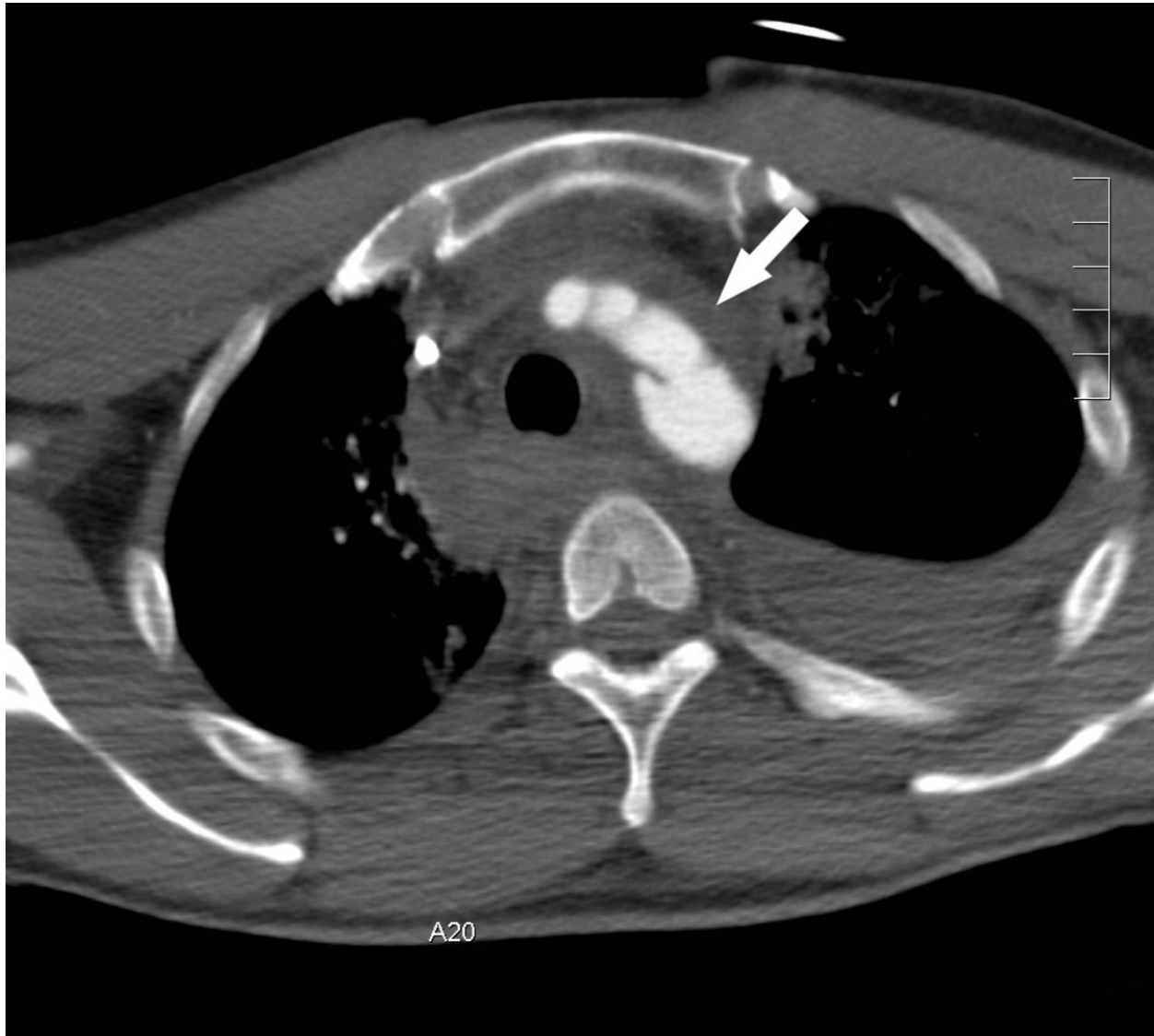


Fig. 1: Axial MPR of a contrast enhanced MDCT of a traumatic aortic transection and pseudoaneurysm

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Fig. 2: Coronal MPR of a contrast enhanced MDCT of a traumatic aortic transection and pseudoaneurysm

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Fig. 3: Regular position of thoracic stentgraft demonstrated with completion angiography

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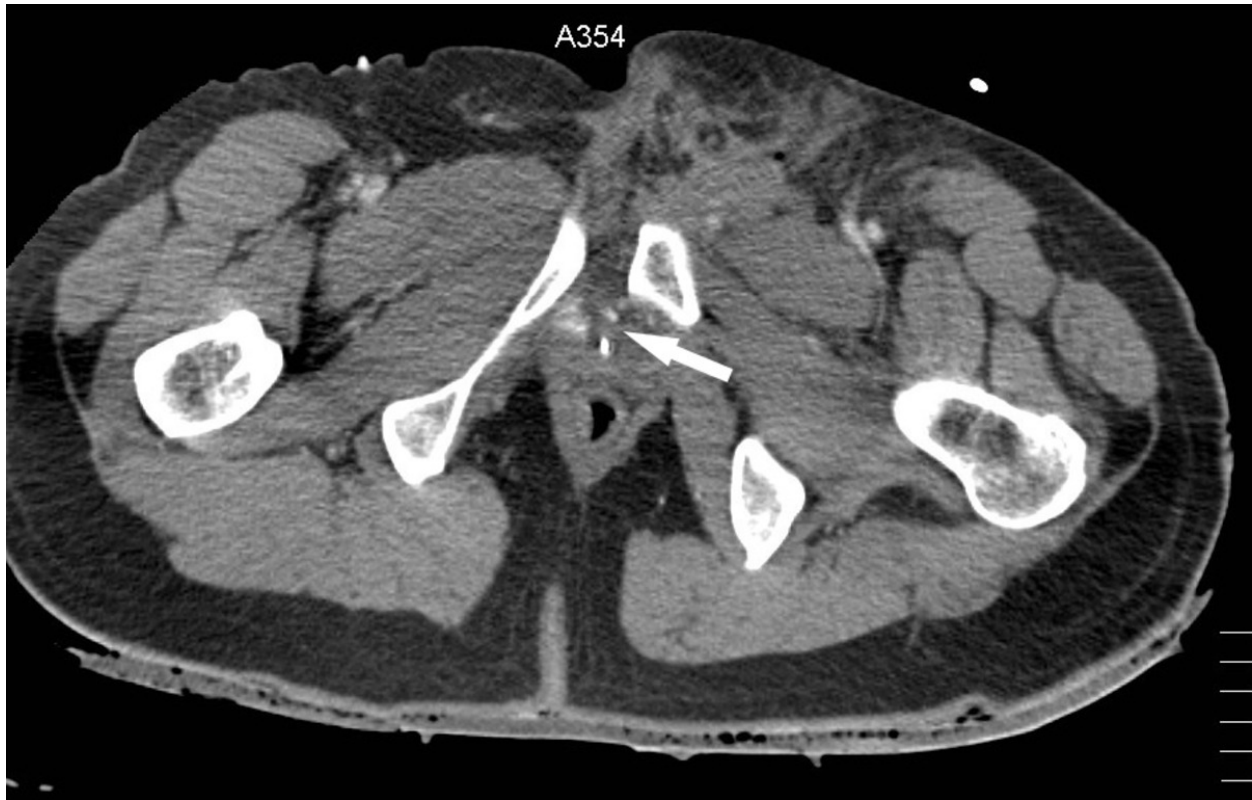


Fig. 4: Axial MPR of contrast enhanced MDCT with active contrast extravasation just behind the symphysis after pelvic ring fracture

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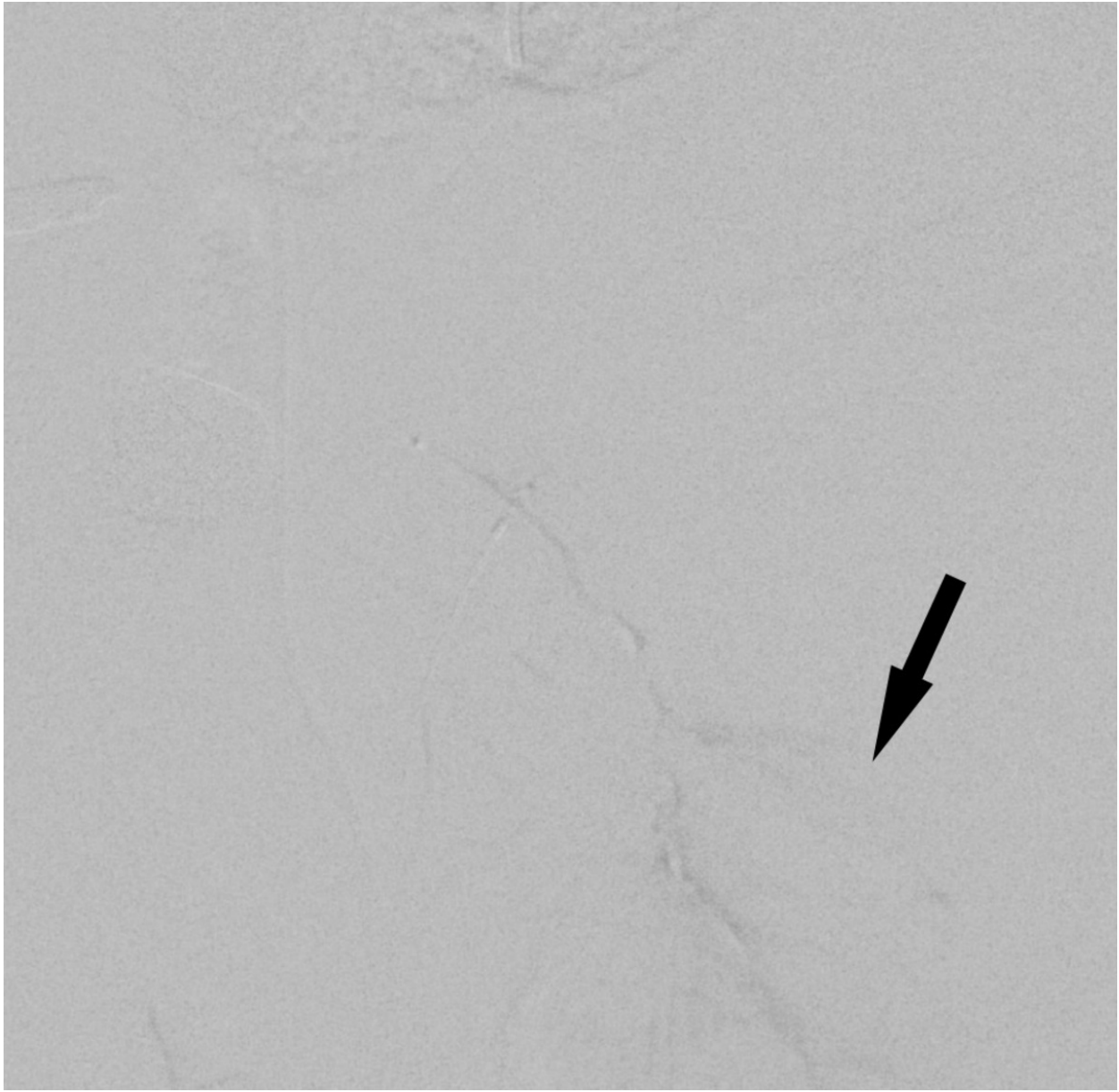


Fig. 5: DSA confirms arterial bleeding of branches of the intern iliac artery

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Fig. 6: DSA with coils in branches of the internal ilical artery and successful termination of bleeding

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Conclusion

In up to 4.8% of acute trauma patients, emergency interventional radiological procedures were performed in our department with the majority being stentgrafts of the thoracic aorta. The second most common endovascular procedure was embolization of the internal iliacal artery for pelvic haemorrhage (6,7) followed by embolization of branches of the renal artery (8). Interventional procedures are an important tool in the management of the actively bleeding trauma patient and in selected cases can obviate the need for emergent major surgical procedures.

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