

6. Shulman LN, Hitt RA, Ferry JA. Case records of the Massachusetts General Hospital. *New Eng J of Med*; 2008.
7. Eren, S. Karaman, A. Okar, A. The superior vena cava syndrome caused by malignant disease. Imaging with multi detector row CT. *EJR*. 2006;(53):93-103.
8. Cohen R, Mena D, Carbajal-Mendoza R, Matos N, Karki N. *Int J Angiol*. Spring 2008;17(1):43-46. [www.ncbi.nlm.nih.gov/pmc/articles/pmc2728369](http://www.ncbi.nlm.nih.gov/pmc/articles/pmc2728369)
9. Kapur S, Paik E. Where there is blood, there is a way: unusual collateral vessels in superior and inferior vena cava obstruction. *Radiographics*. January 2010:67-78.
10. Kandpal H, Sharma R, Gamangatti S, Srivastava D, Vashisht S. Imaging of inferior vena cava: a road less travelled. *Radiographics*. May 2008:669-689.

## peer reviewed CASE REPORT

# Case report: An open book fracture of the pubic symphysis demonstrated by multi-slice computed tomography (MSCT)

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### Abstract

This case report describes an open book fracture of the pubic symphysis with an accompanying large pelvic haematoma, diagnosed in a young male following a motorcycle accident. His clinical history, radiological findings as well as treatment are discussed.

### Keywords

Haematoma, embolisation, active haemorrhage.

### Case report

A young male involved in a motorcycle accident was admitted to a private hospital for trauma management. He had no medical history of note. He required ventilation, inotropic support and blood transfusions. He was then referred for a full body scan.

A CT scan of his brain, cervical spine, chest, abdomen and pelvis was performed. The chest, abdomen and pelvis protocol allowed for his chest to be scanned in an arterial phase utilizing bolus tracking and the abdomen and pelvis in the venous phase. The slice thickness for the primary data was acquired using 5mm slice widths and the secondary data were reconstructed at 1.25mm. Due to patient movement the acquired images were suboptimal but the scan revealed that there were no definite liver or pancreatic parenchymal injuries with both kidneys enhancing uniformly.

The CT findings (Figures 1-4) demonstrated an un-displaced base of skull fracture of the left temporal bone and left middle cranial fossa; a subarachnoid haemorrhage with blood in the gyri and sulci was present. There was excessive fluid in the nasal cavity and oropharynx. No cervical spine injuries were noted and there was normal alignment of the vertebrae. The 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> ribs were frac-

tured with extensive air space opacification in the upper lobes of the chest. An apical pneumothorax was present on the right side.

An open book fracture was seen at the pubic symphysis (Figure 1 and 4). Active haemorrhage was present in the right adnexal area with a large haematoma displacing the bladder in a superolateral direction (Figure 2 and 3). Some haemorrhage was noted in the mesenteric root. Oedema in the anterior abdominal wall was also identified (Figure 3).

The patient underwent bilateral iliac artery embolisation where occlusion of the medial sacral branches was achieved. He then had a voiding cystourethrograde (VCU) procedure to demonstrate his micturating abilities. An anterior plate was surgically inserted to stabilize the open book fracture.

### Discussion

An open book fracture of the pubis symphysis can be described as an anterior force that causes a disruption of the pubic symphysis<sup>[1]</sup>. Separation of the pubic symphysis greater than 1cm is considered abnormal. The force causes each hemi pelvis to externally rotate<sup>[1]</sup>. Fixation of the open book fracture depends on the stability of the patient and displacement of the fracture. Internal fixation with anterior plat-

ing and screws is often performed when there is an open book fracture however the patient should be haemodynamically stable<sup>[2]</sup>.

Pelvic fractures can lead to death. However, the fractures are not the primary cause as related injuries can cause further complications<sup>[3]</sup>. Pelvic trauma has a high mortality rate and with the use of multi slice computed tomography (MSCT), fractures, vascular and organ injuries can be identified with ease. Compared to plain-film radiography MSCT has a higher sensitivity to detect abnormalities. Pelvic fractures are often accompanied by haemorrhaging. With open book fractures the sacroiliac joint is supported by posterior ligaments and opens like a hinge. Open book fractures require the highest number of blood transfusions. Pelvic fractures lead to extensive bleeding; the retroperitoneum is capable of holding 4 litres of blood<sup>[4]</sup>.

Embolisation of arterial haemorrhaging caused by pelvic fractures is advisable even in unstable patients as death and organ failure can be avoided<sup>[3]</sup>. Transcatheter arterial embolisation (TAE) in relation to haemorrhage control and reduced transfusions has proven successful in 85%-100% of the patients it is performed on<sup>[5]</sup> and should be performed as soon as possible to prevent morbidity or mortality<sup>[6]</sup>.

MSCT has proven useful in unstable and uncooperative patients with blunt abdominal trauma<sup>[9]</sup>. Despite several movement artifacts on this patient's CT images a diagnosis was possible. A full body scan is preferable in unresponsive patients. MSCT

is fast and allows movement artifacts to be avoided in stable patients. MSCT has the ability to scan large areas with a narrow slice thickness and perform multiphase contrast examinations. Optimal scanning parameters must be applied to avoid high

radiation doses<sup>[7]</sup>.

Pelvic trauma is common and can be graded by using classifications according to the mechanism of the trauma and if there is a fracture present. MSCT can identify the location and extent of the bleeding



Figure 1: Anteroposterior (AP) scout projection, showing the open book fracture of the right pubic symphysis (arrow).



Figure 3: A coronal view of the abdomen depicting the large haematoma (black arrow) displacing the bladder (white arrow). Movement artifacts are noticed (see lateral ribs).



Figure 2: An axial projection of the abdomen showing contrast extravasations of contrast media (top white arrow with black outline). Also note the haematoma on the right side of the pelvis (white arrow) displacing the bladder to the left (black arrow).



Figure 4: Three dimensional (3D) volume rendered image indicating the location of the open book fracture on the right side of the pubic symphysis (black and white arrows).

and provide soft tissue and bone detail in a single scan. Post-processing techniques, such as 3D volume rendered imaging, provide detail regarding the extent of the fracture and aid the surgeons. Sagittal and coronal post processing of the axial imaging provides data in different planes<sup>[6-8]</sup>.

The use of biphasic scanning makes distinguishing between arterial and venous haemorrhaging possible; embolization of affected vessels should then be performed. This therapeutic method provides

occlusion of the blood vessel to stop active haemorrhaging<sup>[5]</sup>.

Extravasated contrast media can be distinguished from clotted blood by measuring the CT attenuation. Clotted blood has a CT attenuation range between 40 and 70 HU with an average of 51 HU<sup>[9]</sup>. Active haemorrhaging on MSCT has a higher attenuation. With the use of MSCT the location of the contrast material extravasations should closely correspond with the site of bleeding making interventional radiogra-

phy more successful<sup>[10]</sup>.

## Conclusion

MSCT is a useful tool to diagnose pelvic trauma with the use of contrast media. The 3D multiplanar reconstructions provide vascular and bony detail<sup>[3]</sup>. MSCT has made diagnosis and further management of patients more successful. Embolisation of the affected vessels must be treated as a priority to surgical repair the fracture site<sup>[9]</sup>.

## References

1. Chen JK, Johnson PT, Fishman EK; 2007. Pseudoaneurysm of the pudendal arteries complicating cystoprostatectomy: diagnosis with MDCT angiography. *AMJ*, 2007, Vol. 189: W292-W294.
2. Geeraerts T, Chhor V, Cheisson G, Martin L, Bessounds B, Ozanne A; 2007. Clinical review: Initial management of blunt pelvic trauma patients with haemodynamic instability. *American Association of Critical-Care Nurses*, 2007, Vol. 11,(1):1-9.
3. Frakes MA, Evans T. Major pelvic fractures. *American Association of Critical-Care Nurses*, 2008, Vol. 24 (2):18-30.
4. Watura R, Taylor J; 2004. Multislice CT in imaging of trauma of the spine, pelvis and complex foot injuries, *BJR*, 2004, Vol 77:S46-S63.
5. Yoon W, Kim J, Jeong Y, Seo J, Park J, Kang H. Pelvic arterial hemorrhage in patients with pelvic fractures: detection with contrast-enhanced CT, *RadioGraphics*, 2004, Vol. 24:1591-1606.
6. Furlan A, Fakhran S, Federle MP; 2009. Spontaneous Abdominal Hemorrhage: Causes, CT Findings, and Clinical Implications, *American Journal of Roentgenology*, Vol. 193, pp. 1077-1087.
7. Kertesz JL, Anderson SW, Murakami A, Pieroni S, Rhea JT, Soto JA; 2009. Detection of Vascular Injuries in Patients with Blunt Pelvic Trauma by Using 64-Channel Multidetector CT, *RadioGraphics*, Vol. 29, pp. 151-164.
8. Pinto A, Niola R, Tortora G, Ponticello G, Russo G, Di Nuzzo L, Gagliardi N; 2010. Role of multidetector-row CT in assessing the source of arterial haemorrhage in patients with pelvic vascular trauma: Comparison with angiography, *American Society of Emergency Radiology*, Vol. 115, pp. 649-667.
9. Hammond CJ, Barron DA, Spencer J; 2008. Extensive perineal soft tissue disruption with 'open-book' pelvic fracture, *American Society of Emergency Radiology*, Vol. 15, pp. 277-280.
10. Mauritz W, Weninger P. Multislice computed tomography in blunt abdominal trauma. *Trauma*, 2007, Vol. 9(3):195-212.

## peer reviewed CASE REPORT

### Case report: Testicular germ cell tumour in a young male

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#### Abstract

This case report covers a patient with a metastatic non-seminomatous testicular germ cell tumour which manifested after trauma to the testicle. Radiology findings, epidemiology of the disease and patient management are discussed.

#### Keywords

Orchidectomy, retroperitoneal lymph node dissection, tumour markers, nodal mass.

#### Case report

A young male patient in his early twenties presented with a swollen left testicle at an academic state hospital. He reported that he had knocked his testicles a few months earlier and that his left testicle started swelling and became painful. He was subsequently diagnosed with non-seminomatous testicular germ cell tumour. A computed tomography (CT) scan one month

later revealed an abdominal mass which was an indication of metastases. He was placed on four cycles of bleomycin, etoposide and cisplatin (BEP) chemotherapy following an orchidectomy. He was booked for retroperitoneal lymph node dissection (RPLND) two weeks later. After completion of the chemotherapy treatment he was referred for a follow up CT scan. This demonstrated a massive retro-

peritoneal nodal mass with rim enhancement and a central low density (Figure 1). The mass elevated the aorta anteriorly. The inferior vena cava (IVC) was markedly compressed and displaced anteriorly. The mass extended from the level of the right external iliac vessels superiorly and laterally to the porta-hepatis. There was a large right sided component compressing and displacing the right kidney laterally (Fig-