ESER/BSER ANNUAL SCIENTIFIC MEETING 2017
April 25–26, 2017 | London, UK

Course Programme
Welcome words

Welcome to the first joint European and British Society of Emergency Radiology Meeting, held in the heart of one of the world’s greatest and most cosmopolitan cities, London.

It is going to be an enjoyable and busy conference for everyone, with plenty of active learning opportunities to make new acquaintances, to meet old friends and to deepen our understanding of Emergency Imaging and, where appropriate, interventional procedures. We have a fantastic group of speakers from across the world, who are experts in their field and who most importantly are rated as brilliant teachers.

The scientific presentations are wide ranging and there will be opportunities for those in training to test themselves on basic imaging, while more senior delegates can try out more advanced workshops or interactive lectures. Each session is indicated with a particular training level so that everyone can judge whether it will suit them. These levels also relate to the upcoming European Diploma in Emergency Radiology which will soon be provided by the ESER.

With streams catering for Emergency Physicians, Surgeons, Allied Health Professionals and Medical Students as well as for Radiologists, this is truly going to be a meeting of minds in all senses. Enjoy it and remember to watch out for the social programme too - details on the delegates dinner will be updated via social media so watch the twitter feed and facebook page.

A warm welcome to you all!

Elizabeth Dick
ESER Congress President

Lisa Meacock & Elika Kashef
Co-Congress Presidents

Stefan Wirth
ESER Society President
# Content

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programme</td>
<td>4</td>
</tr>
<tr>
<td>Invited Abstracts</td>
<td>10</td>
</tr>
<tr>
<td>Scientific Oral Abstracts</td>
<td>14</td>
</tr>
<tr>
<td>Poster Abstracts</td>
<td>24</td>
</tr>
<tr>
<td>CME Accreditation</td>
<td>51</td>
</tr>
<tr>
<td>Disclosure Statement</td>
<td>51</td>
</tr>
<tr>
<td>ESER/BSER 2017 Faculty</td>
<td>52</td>
</tr>
<tr>
<td>General Information</td>
<td>53</td>
</tr>
<tr>
<td>Sponsors</td>
<td>60</td>
</tr>
<tr>
<td>Industry Symposium</td>
<td>60</td>
</tr>
<tr>
<td>Time</td>
<td>Session</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>09:15</td>
<td>Welcome &amp; orientation</td>
</tr>
<tr>
<td>09:45</td>
<td>Emergency radiology around the world</td>
</tr>
<tr>
<td>10:00</td>
<td>Shock &amp; bleeding</td>
</tr>
<tr>
<td>10:15</td>
<td>Break</td>
</tr>
<tr>
<td>10:45</td>
<td>11:00</td>
</tr>
<tr>
<td>11:00</td>
<td>A Patient’s Experience</td>
</tr>
<tr>
<td>11:15</td>
<td>11:30</td>
</tr>
<tr>
<td>11:30</td>
<td>11:45</td>
</tr>
<tr>
<td>11:45</td>
<td>12:00</td>
</tr>
<tr>
<td>12:00</td>
<td>12:15</td>
</tr>
<tr>
<td>12:15</td>
<td>12:30</td>
</tr>
<tr>
<td>12:30</td>
<td>12:45</td>
</tr>
<tr>
<td>12:45</td>
<td>13:00</td>
</tr>
<tr>
<td>13:00</td>
<td>13:15</td>
</tr>
<tr>
<td>13:15</td>
<td>13:30</td>
</tr>
<tr>
<td>13:30</td>
<td>13:45</td>
</tr>
<tr>
<td>13:45</td>
<td>14:00</td>
</tr>
<tr>
<td>14:00</td>
<td>14:15</td>
</tr>
<tr>
<td>14:15</td>
<td>14:30</td>
</tr>
<tr>
<td>14:30</td>
<td>14:45</td>
</tr>
<tr>
<td>14:45</td>
<td>15:00</td>
</tr>
<tr>
<td>15:00</td>
<td>15:15</td>
</tr>
<tr>
<td>15:15</td>
<td>15:30</td>
</tr>
<tr>
<td>15:30</td>
<td>15:45</td>
</tr>
<tr>
<td>15:45</td>
<td>16:00</td>
</tr>
<tr>
<td>16:00</td>
<td>16:15</td>
</tr>
<tr>
<td>16:15</td>
<td>16:30</td>
</tr>
<tr>
<td>16:30</td>
<td>16:45</td>
</tr>
<tr>
<td>16:45</td>
<td>17:00</td>
</tr>
<tr>
<td>17:00</td>
<td>17:15</td>
</tr>
</tbody>
</table>
### Programme Overview

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00</td>
<td>Head and neck</td>
</tr>
<tr>
<td>09:15</td>
<td>Upper limb trauma - what not to miss</td>
</tr>
<tr>
<td>09:30</td>
<td>Post op abdomen</td>
</tr>
<tr>
<td>09:45</td>
<td>Acute abdomen</td>
</tr>
<tr>
<td>10:00</td>
<td>Acute MRI abdomen &amp; pelvis</td>
</tr>
<tr>
<td>10:15</td>
<td>Break</td>
</tr>
<tr>
<td>10:30</td>
<td>Lower limb trauma - what not to miss</td>
</tr>
<tr>
<td>10:45</td>
<td>Acute abdomen</td>
</tr>
<tr>
<td>11:00</td>
<td>Acute MRI abdomen &amp; pelvis</td>
</tr>
<tr>
<td>11:15</td>
<td>Break</td>
</tr>
<tr>
<td>11:30</td>
<td>ABCDE pan Europe</td>
</tr>
<tr>
<td>11:45</td>
<td>12:00 BSER General Assembly</td>
</tr>
<tr>
<td>12:15</td>
<td>Break</td>
</tr>
<tr>
<td>12:30</td>
<td>12:45 Scientific session &amp; resident's presentation</td>
</tr>
<tr>
<td>13:00</td>
<td>13:15 War &amp; terror: Reporting from the frontline</td>
</tr>
<tr>
<td>13:30</td>
<td>13:45 Acute MRI brain spine &amp; Acute abdo</td>
</tr>
<tr>
<td>13:45</td>
<td>14:00 Practical MSK sports injuries</td>
</tr>
<tr>
<td>14:15</td>
<td>14:30 Lines and tubes</td>
</tr>
<tr>
<td>14:45</td>
<td>15:00 Preparing for mass terror attacks</td>
</tr>
<tr>
<td>15:15</td>
<td>15:30 Cases of the day - answers and prize giving</td>
</tr>
</tbody>
</table>

**Wednesday, April 26, 2017**
Tuesday, April 25, 2017

09:15-09:30
LR1 Welcome and orientation
E. Dick, London/UK

09:30-10:30
LR1 Emergency radiology around the world (All levels)
Moderators: E. Dick, London/UK; S. Wirth, Munich/DE
A. Agrawal, Delhi/IN
D. Bew, London/UK
D. Varma, Victoria/AU
LR2 Thoracic Session: Case based interactive session –
Acute chest (Level II-III)
Moderators: R. Basilico, Chieti/IT;
J. Curtis, Liverpool/UK
J. Curtis, Liverpool/UK

10:30-11:00 Break

11:00-12:00
LR2 Acute cardiac (Level II-III)
Moderators: R. Basilico, Chieti/IT;
J. Curtis, Liverpool/UK
P. McParland, Portsmouth/UK
WR1 Blunt polytrauma CT (All levels)
L. Meacock, London/UK
M. Scaglione, Castel Volturino/IT
WR2 Penetrating polytrauma CT (All levels)
S. Cross, London/UK
O. Jaffar, London/UK
WR3 On call CT rapid reporting – test yourself (Level I)
G. Antoniades, Hull/UK
D. Dalili, London/UK
WR4 Rapid reporting – test yourself 30 plain film
(Level I)
A. Atinga, London/UK
M. De La Hoz Polo, London/UK
M. Dumba, London/UK
A. Raithatha, London/UK
12:00-12:45
LR1 Emergency CT head (All levels)
Moderators: E. Dick, London/UK; S. Wirth, Munich/DE
N. Khandelwal, Chandigarh/IN

12:45-13:45
WR1 Blunt polytrauma CT (All levels)
L. Meacock, London/UK
M. Scaglione, Castel Volturino/IT
WR2 Penetrating polytrauma CT (All levels)
S. Cross, London/UK
O. Jaffar, London/UK
WR3 On call CT rapid reporting – test yourself (Level I)
G. Antoniades, Hull/UK
D. Dalili, London/UK
WR4 Rapid reporting – test yourself 30 plain film
(Level I)
A. Atinga, London/UK
M. De La Hoz Polo, London/UK
M. Dumba, London/UK
A. Raithatha, London/UK

13:45-14:00 Break

09:15-09:30
LR1 Welcome and orientation
E. Dick, London/UK

11:00-12:00
LR2 Acute cardiac (Level II-III)
Moderators: R. Basilico, Chieti/IT;
J. Curtis, Liverpool/UK
P. McParland, Portsmouth/UK

09:30-10:30
LR1 Emergency radiology around the world (All levels)
Moderators: E. Dick, London/UK; S. Wirth, Munich/DE
A. Agrawal, Delhi/IN
D. Bew, London/UK
D. Varma, Victoria/AU
LR2 Thoracic Session: Case based interactive session –
Acute chest (Level II-III)
Moderators: R. Basilico, Chieti/IT;
J. Curtis, Liverpool/UK
J. Curtis, Liverpool/UK

10:30-11:00 Break

11:00-12:00
LR2 Acute cardiac (Level II-III)
Moderators: R. Basilico, Chieti/IT;
J. Curtis, Liverpool/UK
P. McParland, Portsmouth/UK
WR1 Blunt polytrauma CT (All levels)
L. Meacock, London/UK
M. Scaglione, Castel Volturino/IT
WR2 Penetrating polytrauma CT (All levels)
S. Cross, London/UK
O. Jaffar, London/UK
WR3 On call CT rapid reporting – test yourself (Level I)
G. Antoniades, Hull/UK
D. Dalili, London/UK
WR4 Rapid reporting – test yourself 30 plain film
(Level I)
A. Atinga, London/UK
M. De La Hoz Polo, London/UK
M. Dumba, London/UK
A. Raithatha, London/UK
12:00-12:45
LR1 Emergency CT head (All levels)
Moderators: E. Dick, London/UK; S. Wirth, Munich/DE
N. Khandelwal, Chandigarh/IN

12:45-13:45
WR1 Blunt polytrauma CT (All levels)
L. Meacock, London/UK
M. Scaglione, Castel Volturino/IT
WR2 Penetrating polytrauma CT (All levels)
S. Cross, London/UK
O. Jaffar, London/UK
WR3 On call CT rapid reporting – test yourself (Level I)
G. Antoniades, Hull/UK
D. Dalili, London/UK
WR4 Rapid reporting – test yourself 30 plain film
(Level I)
A. Atinga, London/UK
M. De La Hoz Polo, London/UK
M. Dumba, London/UK
A. Raithatha, London/UK

13:45-14:00 Break
14:00-15:00

LR1  Surgery vs. intervention in visceral bleeding  
     (Level II-III)  
     Moderator: A. Blanco Barrio, Murcia/ES  
     E. Kashef, London/UK  
     M. Khan, London/UK

LR2  Cervical spine trauma CT (All levels)  
     Moderators: R. Greenhalgh, London/UK;  
     D. Varma, Victoria/AU

WR1  Blunt polytrauma CT (All levels)  
     L. Meacock, London/UK  
     M. Scaglione, Castel Volturno/IT

WR2  Penetrating polytrauma CT (All levels)  
     S. Cross, London/UK  
     O. Jaffar, London/UK

WR3  On call CT rapid reporting – test yourself (Level I)  
     G. Antoniades, Hull/UK  
     D. Dalili, London/UK

WR4  Rapid reporting – test yourself 30 plain film  
     (Level I)  
     A. Atinga, London/UK  
     M. De La Hoz Polo, London/UK  
     M. Dumba, London/UK  
     A. Raitatha, London/UK

15:00-16:00

LR1  Trauma w post mortem correlation  
     (Level II-III)  
     Moderator: A. Blanco Barrio, Murcia/ES  
     E. Kashef, London/UK  
     M. Osborn, London/UK

LR2  Spine trauma MR (Level II-III)  
     Moderators: R. Greenhalgh, London/UK;  
     D. Varma, Victoria/AU  
     M. Hopper, Cambridge/UK

WR1  Blunt polytrauma CT (All levels)  
     L. Meacock, London/UK  
     M. Scaglione, Castel Volturno/IT

WR2  Penetrating polytrauma CT (All levels)  
     S. Cross, London/UK  
     O. Jaffar, London/UK

WR3  On call CT rapid reporting – test yourself (Level I)  
     G. Antoniades, Hull/UK  
     D. Dalili, London/UK

WR4  Rapid reporting – test yourself 30 plain film  
     (Level I)  
     A. Atinga, London/UK  
     M. De La Hoz Polo, London/UK  
     M. Dumba, London/UK  
     A. Raitatha, London/UK

16:00-16:30 Break

16:30-17:30

LR1  Trauma on the frontline: Experience in the world’s  
     war and disaster zones (All levels)  
     Moderator: A. Blanco Barrio, Murcia/ES  
     Surg Cdr J. Keogh, UK
Wednesday, April 26, 2017

09:00-10:00
LR1  Head and neck (All levels)
    Moderators: K. Katulska, Poznan/PL;
                G. Antoniades, Hull/UK
                E. Loney, Darlington/UK
LR2  Upper limb trauma – What not to miss (Level I-II)
    Moderators: S. Cross, London/UK;
                M. De La Hoz Polo, London/UK
                D. Elias, London/UK
                A. Shekkeris, London/UK
WR1  Post op abdo (Level II-III)
    P. Healey, Liverpool/UK
WR2  Acute abdo (Level I-II)
    R. Basilico, Chieti/IT
WR3  Acute MRI abdomen & pelvis (Level II-III)
    N. Bharwani, London/UK
    W. Gedroyc, London/UK

09:00-11:30
LR4  Paediatric emergencies (All levels)
    N. Ahmadi, Amsterdam/NL
    A.M. Deganello, London/UK
    C. Landes, Liverpool/UK

10:00-10:30 Break

10:30-11:30
LR1  Head and neck – Supraclavicular anatomy (All levels)
    Moderators: K. Katulska, Poznan/PL;
                G. Antoniades, Hull/UK
                E. Loney, Darlington/UK
LR2  Lower limb trauma – what not to miss (Level I-II)
    Moderators: S. Cross, London/UK;
                M. De La Hoz Polo, London/UK
                D. Elias, London/UK
                A. Shekkeris, London/UK
WR1  Post op abdo (Level II-III)
    P. Healey, Liverpool/UK
WR2  Acute abdo (Level I-II)
    R. Basilico, Chieti/IT
WR3  Acute MRI abdomen & pelvis (Level II-III)
    N. Bharwani, London/UK
    W. Gedroyc, London/UK

11:30-12:15
LR1  ABCDE pan Europe (All levels)
    Moderators: K. Katulska, Poznan/PL;
                G. Antoniades, Hull/UK
                S. Wirth, Munich/DE

12:15-13:15
LR1  BSER General Assembly
    For active BSER members
    12:15-13:15 Break

13:15-14:15
LR1  War & terror: Reporting from the frontline – Iraq & Afghanistan (Level II-III)
    Moderators: M. Scaglione, Castel Volturno/IT;
                N. Ahmadi, Amsterdam/NL
                I. Gibb, Portsmouth/UK
WR1  Acute MRI brain spine (All levels)
    K. Katulska, Poznan/PL
WR2  Acute abdo (Level I-II)
    R. Basilico, Chieti/IT
WR3  Practical MSK sports injuries (Level II-III)
    S. Shamshuddin, Lancaster/UK
    S. Vaidya, London/UK
WR4  Lines and tubes (All levels)
    M. Roddie, London/UK

13:15-15:45
LR2  Scientific session & resident’s presentation (Level I-II)
    Moderators: C. Landes, Liverpool/UK;
                S. Wirth, Munich/DE
    13:15 A meta-analysis of the efficacy of whole-body computed tomography imaging in the management of trauma and injury
    S. Chidambaram, London/UK
    13:25 Value of MDCT in identifying diagnostic findings in blunt bowel and/or mesenteric trauma: Our experience
    M.C. Firetto, Milan/IT
    13:35 Increased risk of vascular injury with isolated occipital condyle fractures following blunt cranio cervical injury: a level 1 trauma centre experience
    T. Campion, London/UK
13:45 Bronchial artery embolization in patients with hemoptysis: 16 years of experience  
F. Morelli, Milan/IT

13:55 Soft Tissue Evidence of Head Injury in Infants and Young Children: Is CT head Examination justified?  
P. Logan, Liverpool/UK

14:05 Correlation between Multi Detector Computed Tomography Findings and Management of Blunt Splenic Injuries in Multi-trauma Patients  
F. Ruschi, Pisa/IT

14:15 When to intervene with the spleen in blunt trauma: 5 year experience in a trauma centre  
J. Zhong, West Yorkshire/UK

14:25 Should CT guided tractography take place in the management of the penetrating abdominal trauma?  
I. Gunes Tatar, Ankara/TR

14:35 Role of dual-phase CT in the assessment of liver and spleen traumatic vascular injuries  
F. Iacobellis, Castel Volturno/IT

14:45 Emergency MDCT Angiography in traumatic arterial injuries of the Extremities  
D. Berritto, Acerra/IT

14:55 Esophageal perforations: CT assesment in emergency  
D. Berritto, Acerra/IT

15:05 Overuse of Head CT Examinations for the Investigation of Minor Head Trauma: Analysis of Contributing Factors  
C. Floridi, Milan/IT

15:15 Discussion

14:45-15:45
LR1 Preparing for mass terror attacks (All levels)  
Moderators: M. Scaglione, Castel Volturno/IT; N. Ahmadi, Amsterdam/NL; E. Dick, London/UK; F. Mück, Munich/DE; K. Nieboer, Brussels/BE

WR1 Acute MRI brain spine (All levels)  
K. Katulska, Poznan/PL

WR2 Acute abdo (Level I-II)  
R. Basilico, Chieti/IT

WR3 Practical MSK sports injuries (Level II-III)  
S. Shamshuddin, Lancaster/UK; S. Vaidya, London/UK

WR4 Lines and tubes (All levels)  
M. Roddie, London/UK

15:45-16:30
LR1 Cases of the day – Answers and prize giving  
Moderators: M. Scaglione, Castel Volturno/IT; N. Ahmadi, Amsterdam/NL; G. Antoniades, Hull/UK; R. Greenhalgh, London/UK

14:15-14:45 Break
Invited Abstracts

Workshop „On call CT rapid reporting - test yourself“

G. Antoniades, Hull/UK

Learning Objectives: Recognise a spectrum of common and less common but life-threatening/important pathologies on acute body cross-sectional imaging. Cases that you could encounter during the on-call work.

Shock and Bleeding

E. Dick, London/UK, A. Blanco Barrio, Murcia/ES

Learning Objectives:
1. Recognise signs of acute shock in traumatic and non-traumatic settings
2. Be able to search for active bleeding
3. Understand how fractures cause haemodynamic compromise even without active bleeding
4. Be able to communicate important features of shock and bleeding to the trauma team

The Patient Experience: Surviving a Polytrauma

A. Drought, London/UK

Profile: Alexandra qualified in radiography from Guy’s Hospital in 1993. She worked as a radiographer at the West Middlesex University Hospital for 2 years, whilst studying for a Postgraduate Diploma in Clinical Ultrasound. Upon qualifying she worked as an ultrasonographer at the Chelsea and Westminster Hospital for 7 years and completed her Master’s degree in Clinical Ultrasound in 2001. Alexandra is currently a Superintendent and Consultant Ultrasonographer in obstetrics and gynaecology at the West Middlesex University Hospital (Chelsea and Westminster NHS Foundation Trust).

Abstract: Alexandra was involved in a road traffic accident in 2014, when she and her boyfriend were hit as cyclists by a car driver who fell asleep at the wheel at 4 pm. They both suffered multiple injuries and were admitted to hospital as ‘polytrauma’ patients. Alexandra will give a brief overview of their injuries, her experiences as a patient, but through the eyes of a healthcare professional and what life was like once she returned home and eventually back to her place of work.

Cardiac CT in the emergency setting

P. McParland, London/UK

Learning Objectives:
1. Give an overview of cardiac CT techniques
2. Recognise the clinically significant findings on cardiac CT
3. Present the evidence for the use of cardiac CT in the emergency setting
4. Explain CT FFR and its possible future use in the emergency setting

Emergency CT Head

N. Khandelwal, Chandigarh/IN

Learning Objectives:
1. Recognise the indications of CT head in emergency settings
2. Identify the types of hemorrhages and associated bony/soft tissue injuries in the setting of acute trauma
3. Understand the parenchymal and vascular features in non-traumatic intracranial hemorrhages with special reference to hemorrhagic and ischemic stroke
4. Detect the parenchymal and meningeal changes associated with acute febrile encephalopathy, status epilepticus and other acute neurological presentations in the ER

**Cervical spine trauma - CT**
D. Varma, Melbourne/AU

**Learning Objectives:**
1. Understand the anatomy of the cervical spine and the cranio-cervical junction
2. Review the evidence behind imaging of cervical spine
3. Grading of cord injuries
4. Review the new evidence regarding blunt cerebrovascular imaging
5. Review the Modified Denver Criteria for BCVI
6. Be able to communicate important features of cervical spine trauma and appropriate utilization of imaging

**Trauma on the frontline-experience in the world’s war and disaster zones**
Surg Cdr J. Keogh, UK

**Learning Objectives:**
1. Understand the injuries sustained from exposure to explosions and from high velocity gunshot wounds.
2. Recognise the importance of effective team-working.
3. Understand how key lessons may be transferred into civilian practice.

**Workshop “Acute Abdomen”**
R. Basilico, Chieti/IT

**Learning Objectives:**
1. To be able to recognize common and unusual findings in acute abdominal disorders
2. To be familiar with the main differential diagnoses in acute abdomen, with reference to the site of pain
3. To be familiar with general signs of disorders causing acute abdomen

**Workshop “Acute abdomen in the female - Where MRI adds value”**
N. Bharwani, W. Gedroyc; London/UK

**Learning Objectives:** Following this interactive, Osirix-based, workshop delegates will be able to:
1. Identify situations where MRI can act as a problem-solving tool in the acute female pelvis e.g. pelvic inflammatory disease, acute abdominal pain in pregnancy with a normal ultrasound examination, complex post-partum patient
2. Counsel and consent pregnant females for MRI investigations
3. Discuss the current recommendations around the use of IV contrast agents in the postpartum period
4. Understand the rationale behind the MRI protocols used in pregnancy
Workshop “Paediatric emergencies”
N. Ahmadi¹, A.M. Deganello², C. Landes³; ¹Amsterdam/NL, ²London/UK, ³Liverpool/UK

The accurate and rapid diagnosis of acute conditions in young children can be very challenging. Due to the small volume of the body, sonography is in most of the pediatric cases the first modality of choice in all parts of the body (with exception of head and spine trauma), but it is not always conclusive and additional tests may be required. CT scan is the best diagnostic tool in evaluation of post traumatic injuries, especially in head and spine trauma, in all ages. It is avoided in the diagnosis of acute abdomen in very young children, not only due to the ionizing radiation, but due to lack of contrast between the abdominal organs the right diagnosis could be almost impossible. MRI is recommended in case of inconclusive diagnosis of appendicitis with sonography, abdominal inflammation and abscess, and acute abdomen in pregnancy.

In the pediatric workshop we will shortly go through some of the common pediatric pathologies and give a couple of examples of less common but life threatening conditions.

ABCDE pan Europe
S. Wirth, Munich/DE

Polytrauma remains a leading cause of death and disability worldwide, especially in the age group below 40 years. As time is particular related to outcome, diagnoses have to be provided clearly within the golden hour and also important interventions or surgical treatment should at least have been begun within this time span. Wide availability, fast and exact diagnosis as well as increased survival have established whole-body CT as the key modality for initial diagnostic polytrauma service. However, the large amount of whole-body CT images requires solutions to ensure efficient and timely interpretation as well as immediate distribution of the report and the images. Trained staff, optimised and standardised processes as well as fundamental knowledge of key injuries that require urgent treatment are indisputable prerequisites. Important, typical image findings of very high acute relevance are: active haemorrhage, non-stable fractures of the spine, sternum and pelvis, pneumothorax, heart, aortic and major vessel injuries, bronchial ruptures, laceration of lung, liver, spleen or kidneys, pancreatic injury with ductal involvement, diaphragmatic or intestinal rupture. Guided by cases we will together learn how to view, report and interpretate in a standardized fashion according to the ABCDE scheme, i.e. (Airway, Breathing, Circulation, Disability, and Environment).

Learning Objectives:
1. To learn polytrauma background information
2. To understand how ABCDE offers scaffolding safety for viewing, reporting and interpretation of emergent trauma cases
3. To learn how to use ABCDE for these kind of cases
4. To apply these knowledge and skills to cases

Post-Mortem Imaging – the evolving role of CT in forensic, military and sudden death imaging
I. Gibb, Portsmouth/UK

Learning Objectives:
1. Understanding the use of imaging, particularly CT, in post-mortem imaging
2. Review of CT PM techniques
3. Understanding use of CT PM in trauma, ballistic and blast deaths with reference to mass casualty terrorist atrocities
4. Recognising some pitfalls and lessons learned in CT PM
5. Understanding the utility and limitations of CT in sudden death
Workshop “Acute MRI brain and spine”
K. Katulska, Poznan/PL

Learning Objectives:
1. To learn which patients are the best candidates for posttraumatic MRI.
2. To be familiar with standard and short MRI examination protocols.
3. To understand the impact of MR findings in brain and spine trauma.
4. To recognize pathology and be familiar in findings in routine exams of brain and spine trauma.

Mass casualty incidents (MCI) – prepare yourself
Killing spree Munich 2016
F. Mueck, Munich/DE

Although Mass casualty incidents (MCI) are still rare events, the threat of terrorism is further increasing. Therefore radiologists as members of the emergency room team have to be prepared. This lecture focusses on case reports from the killing spree of Munich 2016 as examples for gunshot wounds. Furthermore this will include a brief overview about additional MCI service challenges problems like mass panic, insufficient local public transportation and lacks of safety. A special focus is given to immediate post mortem imaging.

Learning Objectives:
1. To understand MCI background in Europe
2. To learn interpretation of typical gunshot wounds
3. To learn key MCI side challenges
4. To develop the attitude to prepare your institution for MCI events

Preparing for mass terror attacks
The Brussels bombings March 22, 2016
K. Nieboer, Brussels/BE

The morning of March 22, 2016, three coordinated suicide bombings occurred in Belgium: two at Brussels Airport in Zaventem and one at Maalbeek metro station in central Brussels. Thirty-two civilians and three perpetrators were killed, and 324 people were injured (65 T1, 68 T2, 115 T3 and 76 without field triage). Patients were evacuated to 27 different hospitals, secondary evacuation was organized to 24 other hospitals all over Belgium. During this session, we will review the organization of the UZ Brussel radiology department in case of a mass casualty. Representative cases will be discussed.

Invited Abstracts appear as submitted and have not been checked for correctness and completeness. Subject to changes, printing and typesetting errors.
A meta-analysis of the efficacy of whole-body computed tomography imaging in the management of trauma and injury

S. Chidambaram, E.L. Goh, M.A. Khan; London/UK

Purpose: Traumatic injury is the third leading cause of death overall. To optimize the outcomes in these patients, hospitals employ whole-body computed tomography (WBCT) imaging due to the high diagnostic yield and potential to identify missed injuries. However, this delays time-critical interventions. Currently, there is an absence of any high-level evidence to support or refute either view. We present a meta-analysis of the available literature to elucidate the efficacy of WBCT in improving the outcomes of trauma, specifically the mortality rate.

Methods and Materials: A systematic review of studies comparing WBCT and selective CT imaging in secondary survey was conducted, using MEDLINE, EMBASE, the Cochrane Review and Scopus databases. The articles were evaluated for intervention using WBCT to reduce mortality rate, followed by subgroup analysis for other secondary measures, using Review Manager 5.3 software.

Results: Eleven studies of 32,207 patients were included. There were lower overall (OR=0.79; 95% CI 0.74,0.83, p<0.05) and 24-hour mortality rates (OR=0.72, 95% CI 0.66,0.79, p<0.05) in the WBCT cohort. Additionally, patients in the WBCT arm spent less time in the emergency room (MD=-14.81; 95% CI -17.02, -12.60, p<0.00001) and needing ventilation (MD=-2.01; 95% CI -2.41, -1.62, p<0.05) despite a higher baseline injury severity score.

Conclusion: The analysis shows that WBCT results better outcomes, including a lower overall and 24-hour mortality rate. Further work is required to make definitive clinical recommendations for a tailored algorithm in managing trauma patients.
Value of MDCT in identifying diagnostic findings in blunt bowel and/or mesenteric trauma: our experience

M.C. Firetto, A.A. Lemos, T. Canini, P. Biondetti; Milan/IT

**Purpose:** To compare CT findings to surgical findings in CT diagnosis of bowel/mesenteric blunt traumatic lesions in our series of patients

**Methods and Materials:** From January 2010 to March 2015, 324 consecutive multi-system trauma patients with ISS > 16, who underwent whole body MDCT, were retrospectively evaluated. Reference standards were surgical findings, clinical follow-up and discharge diagnosis

**Results:** 14/324 patients had bowel and/or mesenteric injuries, mentioned in the radiology report (all male, mean age 39.6, range 18-70y old). 9/14 patients had laparotomy after CT. 5/14 patients did not have laparotomy: in this group of patients, CT findings were: extra-luminal air (n=2), intramural air (n=1), bowel wall thickening (n=2), abnormal bowel wall enhancement (n=1), mesenteric infiltration/stranding (n=2), intra/retroperitoneal free fluid (n=1). No bowel discontinuity, extra-luminal contrast extravasation or active bleeding were observed. 3 patients had concomitant solid organ injuries. In the group of 9 patients who underwent laparotomy, CT findings were as follows: bowel discontinuity (n=3), extra-luminal air (n=4), bowel wall thickening (n=4), abnormal bowel wall enhancement (n=3), mesenteric infiltration/stranding (n=4), active bleeding (n=4), free fluid (n=9). No extraluminal contrast extravasation and intramural air were observed. 4 patients had concomitant solid organ injuries

**Conclusion:** Active bleeding and bowel discontinuity are surgically proven predictors of unsuccessful conservative management, in agreement with literature. Free fluid is an indicator of possible underlying bowel/mesenteric injury, in agreement with literature. The significance of intramural air is controversial.
Increased risk of vascular injury with isolated occipital condyle fractures following blunt craniocervical injury: A level 1 trauma centre experience

T. Campion, J. Siddiqui, A. Adams; London/UK

Purpose: Occipital condyle fractures in the context of blunt craniocervical injury often indicate a high-energy trauma and as such may carry a risk of associated vascular injury; however, institutional protocols vary as to whether CT angiography (CTA) is indicated if these fractures are identified in isolation. We performed a retrospective audit to determine the incidence of vascular injury in such cases.

Methods and Materials: A RIS search was performed to identify patients with occipital condyle fractures from December 2014 - January 2017. Patients with fractures secondary to blunt trauma were included. The type of occipital condyle fracture, any associated craniocervical injuries on CT head or cervical spine (which would be indications for CTA), whether CTA was recommended and/or performed, and subsequent management were recorded.

Results: 72 patients with occipital condyle fractures were identified, of whom 24 had no other indication for CTA. These included 1 patient with a type 1 fracture, 8 patients with a type 2 fracture and 15 patients with type 3 fractures. CTA was performed in 9/24 (38%). Vascular injury was identified in 4/24 (17%). Of note, vascular injury was only identified in patients with type 3 (avulsion) occipital condyle fractures (4/15, 27%).

Conclusion: Although in a relatively small sample, our results suggest that there may be an association between isolated type 3 occipital condyle fractures and vascular injury, and as such CTA may be of value in this patient cohort. Larger series are required to fully elucidate the role of CTA in occipital condyle fractures.
Bronchial artery embolization in patients with hemoptysis: 16 years of experience

F. Morelli, F. Pesapane, E. Fumarola, A. Sacrini, G. Cornalba, G. Carrafiello; Milan/IT

Purpose: To evaluate feasibility, safety, efficacy of bronchial artery embolization (BAE) in our single-center experience.

Methods and Materials: From 2001 to 2016, 90 patients (59 males, 31 females; median age: 59 years), with moderate-severe hemoptysis underwent BAE (28 due to bronchiectasis, 41 due to other known causes, 21 with unknown causes). Artery features and embolization agents were reported. Efficacy was evaluated at 24 and 48 hours after BAE and again after 1 month. All complications were recorded.

Results: Bleeding was bilateral in 9 patients, unilateral in 81 cases (57 right, 24 left). 71 patients (78.9%) had bleeding from orthotopic bronchial arteries, 19 patients (21.1%) had bleeding from ectopic bronchial arteries or from non-bronchial systemic arteries. Diagnostic angiography showed hypertrophy of the bleeding artery in 54 cases; in the other cases anomalous shunts (16 times), scattered hypervascularization (16 times) and arterial blushing (13 times) were observed. Polyvinyl alcohol (PVA) embolization alone was performed in 81 patients. Coil embolization alone was performed in only 1 patient. Both PVA and coils were released in 8 patients. Hemoptysis resolution was observed in 75 patients (83.3%) after 24 hours and in 87 patients (96.7%) after 48 hours. No further treatments were necessary for the 3 patients non-responsive to BAE within 48 hours. No major complications were observed, in particular no medullary ischemia/other neurological complications. 13 patients (14.4%) developed temporary chest pain and 4 patients (4.4%) temporary dysphagia. Hemoptysis relapse was observed in 19 patients (21.1%) after 1 month.

Conclusion: BAE is a feasible, safe, effective procedure to treat patients with moderate-severe hemoptysis.

Fig.1: MIP reconstruction in CT coronal image (A) and angiographic imaging of hypertrophic right bronchial artery (B).
Soft Tissue Evidence of Head Injury in Infants and Young Children: Is CT head Examination justified?

S. Zaman, P. Logan, S. Harave, C. Landes; Liverpool/UK

**Purpose:** The NICE head injury guidelines 2014 continue to recommend CT head examination for children under 1 year of age who present with a bruise, swelling or laceration of more than 5cm following head injury. The purpose of this study was to determine whether this is justified. Further aims were to determine whether there was any justification for performing CT head examination for children with soft tissue injuries measuring less than 5cm, or for children over 1 year with evidence of soft tissue injury but without any other concerning feature.

**Methods and Materials:** Children under 3 years of age presenting with soft tissue evidence of head injury between May 2011 and Oct 2014 and who subsequently underwent head CT were retrospectively identified from radiology requests. The CT scans and clinical notes were used to identify those with skull fracture or intracranial haemorrhage and to determine whether the child was subsequently admitted or discharged from Accident and Emergency.

**Results:** 85 CT head examinations met the criteria for inclusion. Of these, 45 examinations demonstrated skull fractures and 4 examinations identified intracranial haemorrhage. 38 requests included soft tissue evidence of head injury as the sole reason indicated for CT head examination. Of these, 22 examinations demonstrated skull fractures and 1 examination identified intracranial haemorrhage.

**Conclusion:** Soft tissue evidence of head injury as the sole reason for CT head examination appears to be justified in our patient population.
Correlation between multi detector computed tomography findings and management of blunt splenic injuries in multytrauma patients

F. Ruschi, M. Tonerini; Pisa/IT

**Purpose:** To correlate in terms of sensitivity, specificity, positive/negative predictive values and diagnostic accuracy the Multi Detector Computed Tomography (MDCT) findings, ranked according to the Baltimore Grading System, with the management of blunt splenic injuries in multytrauma patients.

**Methods and Materials:** 36 trauma patients were admitted to the Emergency Department and underwent a contrast-enhanced MDCT (using a 64 slices CT) with diagnosis of blunt splenic injury (study group). MDCT results were collected retrospectively and then ranked according to the Baltimore Grading System criteria.

**Results:** The MDCT findings were categorized as true positive, true negative, false positive or false negative to determine the sensitivity, specificity, positive and negative predictive value and accuracy of MDCT in suggesting the management of patients. The MDCT findings had an overall sensitivity of 92.30%, specificity of 91.30%, positive predictive value of 85.71%, negative predictive value of 95.45% and diagnostic accuracy of 91.66%. Of all the hemodynamically stable patients at admission to the Emergency Radiology (33 of 36 patients), 30 patients (91%) had a successful nonoperative management (NOM). Only in 3 patients (9%) NOM failed, leading to splenectomy, because of respectively post-embolization splenic abscess, post-embolization splenic rupture, and inability to catheterize the splenic artery.

**Conclusion:** the Baltimore Grading System of Blunt Splenic Injuries shows high sensitivity, specificity, negative predictive value and diagnostic accuracy in predicting the management of patients. In agreement with the literature data, our experience confirms that NOM of blunt splenic injuries is the standard of care in patients who are hemodynamically stable at admission to the Emergency Radiology.

When to intervene with the spleen in blunt trauma: 5 year experience in a trauma centre

J. Zhong, J. Lenton, S. Mcpherson, J.V. Patel, D.J.A. Scott, K. Flood; West Yorkshire/UK

**Purpose:** Management decisions for traumatic splenic injuries remain variable. This study evaluates the morbidity and mortality of splenic injury according to treatment (surgery, splenic artery embolization (SAE) and non-operative management (NOM)) and aims to define optimal selection criteria for appropriate management.

**Methods and Materials:** Retrospective study at a Level I trauma centre (2010-2015). Patients with splenic trauma were identified from the National Trauma Audit and Research Network (TARN) and the hospital coding department. Management and morbidity were recorded. Cross-sectional imaging was reviewed by 4 IR Consultants to assess inter-observer variability in management decision based on imaging findings and haemodynamic status.

**Results:** Total of 112 patients (81 male:31 female). 10%(11) had surgical splenectomy, 20%(22) had SAE and 70%(79) had NOM. SAE group: 23%(5) patients had proximal embolisation for splenic laceration and haemodynamic instability. 77%(17) had distal embolization (for active bleeding). 1 patient had delayed splenectomy for haemodynamic instability post embolization and 3 failed NOM and required SAE; no other complications observed. All proximal SAE patients were commenced on prophylactic pneumococcal vaccination.

108(96%) patients had cross-sectional imaging at presentation. Regarding CT signs, the 4 vascular consultants were in most agreement on the presence of active bleeding (89%), Fleiss’ Kappa 0.696. For method of treatment, inter-observer agreement was 84% (range 83-93%) and Fleiss’ Kappa was 0.614.
**Conclusion:** In the presence of splenic laceration and active bleeding on initial cross sectional imaging, SAE was preferred over surgical and NOM. Selective SAE is favoured and has good outcomes, with low complication rate. Conservative management has a high success rate for low-grade injury.

![Figure 1: MIP reconstruction in CT coronal image (A) and angiographic imaging of hypertrophic right bronchial artery (B).](image1)

![Figure 2: Contrast enhanced CT showing contrast extravasation within the spleen at the site of splenic laceration indicating active bleeding.](image2)

![Figure 3: Catheter angiogram of splenic artery following blunt trauma showing a ‘Seurat’ spleen with multiple small punctate regions of intra-parenchymal contrast extravasation indicating active bleeding.](image3)

![Figure 4: Catheter angiogram of splenic artery showing selective embolization of the injured lower pole of the spleen (pseudoaneurysms and extravasation of contrast seen on the left image).](image4)
Should CT guided tractography take place in the guideline of the management of the penetrating abdominal trauma?

M. Akkoca, S. Balas, K.B. Yilmaz, I. Gunes Tatar, M. Akinci, S. Tokgoz, S. Tamam, H. Karabacak; Ankara/TR

**Purpose:** In spite of the numerous research published focusing on the penetrating abdominal trauma and the presence of the trauma guidelines, the surgical approach to the penetrating abdominal trauma patients is still under debate. Computed tomography guided tractography (CTT) is an imaging modality in which water soluble iodinated contrast medium is administered via Foley catheter to the site of injury in the CT unit. The aim of this study was to find out the diagnostic accuracy of the CTT.

**Methods and Materials:** Penetrating abdominal trauma patients who admitted to the emergency department and underwent CTT were retrospectively evaluated taking into account the reports of ultrasonography (US), contrast enhanced abdominal CT, CTT, surgery and clinical results.

**Results:** A total of 101 patients, 12 women (11.9%) and 89 men (88.1%) were evaluated. US procedures showed 0.474 sensitivity, 0.929 specificity and 0.667 accuracy. CT procedures demonstrated 0.549 sensitivity, 0.933 specificity and 0.663 accuracy. CTT revealed 0.928 sensitivity, 0.906 specificity, 0.921 accuracy, 0.955 positive predictive value and 0.855 negative predictive value. In 24 patients (23.8%) whom CTT indicated passage through the peritoneum, paranchymal organ injury was not present. There was not any procedure related morbidities.

**Conclusion:** CTT is a safe imaging modality for the evaluation of the hemodynamically stabile patients. It is superior to demonstrate whether peritoneum is intact compared to the other imaging modalities, therefore should take place in the guidelines. It is beneficial to correlate the results with other imaging modalities to diagnose the parenchymal injuries and to determine the treatment approach.

Role of dual-phase CT in the assessment of liver and spleen traumatic vascular injuries

F. Iacobellis1, A.M. Lerardi2, I. Iadevito1, S. Giovine3, R. Grassi4, M. Scaglione1; 1Castel Volturno/IT, 2Varese/IT, 3Aversa/IT, 4Naples/IT

**Purpose:** To explore the role of dual-phase CT in the assessment of traumatic vascular injuries of liver and spleen, comparing the prevalence of parenchymal contusion, contained vascular injuries or active bleeding between arterial and portal venous phase.

**Methods and Materials:** Dual-phase CT examinations of 71 patients diagnosed with vascular injuries of liver and spleen, performed between January 2012 and December 2016 were retrospectively reviewed. For each examination, arterial and portal venous phase were compared in the identification of active bleeding, pseudo-aneurisms (PSA) and arteriovenous fistulas (AVF).

**Results:** Of 71 patients, 49 (69%) had active bleeding, 34 of them (69.4%) from spleen injury and 15 (30.6%) from hepatic injury, and 22 (31%) had contained vascular injuries, 15 of them of the spleen (68.2%) and 7 (31.8%) of the liver. In 15/49 patients with active bleeding (30.6%), the arterial phase was crucial to correctly identify the arterial origin of the bleeding. In 13/22 of patients with contained vascular injuries (59%), the detection of vascular injury was possible only in the arterial phase.

**Conclusion:** Dual-phase CT examinations increases the possibility, in the arterial phase, to detect contained arterial injuries, whereas the venous phase is essential to identify the venous vascular injuries, to differentiate contained vascular injuries from active bleeding and to evaluate the entity of the bleeding. Dual-phase protocol is recommended allowing an accurate identification and characterization of traumatic vascular injuries and an adequate distinction between the injuries that may be conservatively treated and those requiring interventional treatment or vascular surgery.
Emergency MDCT Angiography in traumatic arterial injuries of the Extremities
C. Liguori, G. Russo, T. Cinque, S. Daniele, N. Gagliardi, C. Acampora, L. Romano; Naples/IT
Presenter: D. Berritto, Acerra/IT

**Purpose:** To retrospectively assess the accuracy of MDCT angiography as the initial diagnostic technique to depict arterial injury in patients with extremity trauma.

**Methods and Materials:** Over 40 months, 95 patients (16-87 yy) with clinically suspected arterial injury after extremity trauma underwent 64/128 MDCT angiography and 80 ultimately underwent surgery or interventional radiology treatment. 67 pts had blunt injuries, and 28 had penetrating injuries. Each detected arterial lesion was then characterized as a spasm, stenosis, occlusion, pseudoaneurysm or rupture. 2 CT experienced radiologists performed separately images evaluation. The standard of reference was surgery (54 pts) or angiography (26 pts); clinical and radiologic follow-up was used in 15 pts. Image quality, lesion depiction, and artefacts were assessed.

**Results:** 72 traumatic arterial lesions were confirmed. MDCT showed sensitivity and specificity 95% and 87%, respectively, in vascular lesion depiction. Image quality and lesion depiction on MDCT angiograms were considered good and artefacts were considered mild with substantial interobserver agreement.

**Conclusion:** MDCT angiography provides significant and reproducible technique for detection and characterization of arterial injuries to the extremities with high image quality and vascular delineation.

Esophageal perforations: CT assessment in emergency
C. Liguori, A. Pinto, G.L. Ponticiello, C. Stavolo, S. Nicotra, L. Romano; Naples/IT
Presenter: D. Berritto, Acerra/IT

**Purpose:** To investigate how accurately MDCT can diagnose the level of upper GI tract perforation especially assessing site and entity of esophageal leakages.

**Methods and Materials:** MDCT studies in 60 patients with surgically confirmed esophageal perforation were retrospectively evaluated. Examinations were performed using 64 and 128 MDCT; submillimetre axial images and multiplanar reconstruction (MPR) images were generated for all patients. Intravenous contrast enhancement was performed in all patients and in 35 oral contrast was also administered. Two experienced radiologists reviewed the images for direct findings (free air, ruptured esophageal wall, oral contrast leak) and indirect findings (inflammatory changes, fluid collection, focal thickening of the GI tract wall) and attempted to identify the perforation site in each patient.

**Results:** Free air was seen in more than 95% of the patients with perforation at sites; rupture of the esophageal wall was directly visualized in 32%; oral contrast leakage was appreciated in 90%. Indirect signs: wall thickening and peri-esophageal inflammatory changes were present in 95% of cases, fluid collections in 87%. The perforation site was correctly diagnosed in 90% of the patients when the radiologists referred to both direct and indirect findings.

**Conclusion:** MDCT is a robust technique for esophageal perforation identification. Intravenous contrast and oral contrast administration are key factors for a confident diagnosis.
Overuse of Head CT Examinations for the Investigation of Minor Head Trauma: Analysis of Contributing Factors

C. Floridi, M. Cellina, M. Orsi, G. Clesceri, V. Di Candido, G. Oliva; Milan/IT

Purpose: The aim of this study was to estimate the amount of CT studies performed in an emergency department that are not indicated by Canadian CT Head Rule (CCHR) guidelines and to analyze factors that contribute to unnecessary examinations.

Methods and Materials: A total of 915 brain CT examinations performed for minor head injuries were retrospectively analyzed. Medical records were assessed for the following parameters: demographics, cause of head trauma, and referring physician’s seniority and specialty. For each CT scan, it was determined whether the CT referral met the CCHR criteria. The CT interpretations of patients under 65 years of age were evaluated to assess the sensitivity and negative predictive value of the CCHR criteria.

Results: A total of 104 examinations (11.3%) were not indicated according to the CCHR, but in patients younger than 65 years, 103 of 279 examinations (36.9%) were not indicated. Neurologists conducted more unwarranted CT studies, whereas surgeons tended to order fewer studies. There was no statistically significant difference between the seniority of the referring physician and over-referral. A hit on the head by an object were associated with a higher rate of nonindicated CT examinations. The CCHR had sensitivity and negative predictive value of 100% for either brain hemorrhage or fractures.

Conclusion: Overuse of CT examinations for minor head injuries was demonstrated, especially in young patients, with an excess of 36.9%. Contributing factors are referring physician specialty and injury mechanism. Analysis of overuse causes can be implemented for education programs and for computerized referring protocols.
**Poster Abstracts**

### T2 relaxation time measurement of the lumbar spine at 3T MRI with different protocols

**L. Xiao, M.K. Yuen, O.C. Li, P.K. Tsang, W.Y. Wong, J. Leung; Tuen Mun/HK**

**Purpose:** Several factors can affect T2 relaxation time quantification. Therefore, T2 values are protocol dependent. The purpose of this study was: (1) to evaluate the consistency of T2 relaxation time quantification in the spine tissues, including disc, bone using different sequences at 3T including SE, TSE, and GRASE acquisition; (2) to evaluate the MultiTransmit technology effect on T2 relaxation time quantification.

**Methods and Materials:** T2 relaxation times were first measured on quality assessment Eurospin II test objects with the traditional spin echo (SE), fast spin echo with different echo train length, gradient and spin echo (GRASE) sequences with single-slice on Philips Achieva 3.0T TX. Disc T2 relaxation times were then measured in 15 volunteers. In addition, the B1 effect on T2 quantification was assessed by switching on or off the multi-transmitter of the MR scanner. The differences between these T2 measurements were statistically analysed using student’s t test.

**Results:** The T2 relaxation time for the in vivo tissues (Fig1) or phantom (Fig2) was different for the different sequences. SE gives lowest T2 relaxation times and FSE with 32 echoes gives the highest values. With multitransmitter (MT) adaptive option, the T2 relaxation times decrease for all sequences except for the SE protocol. There is significant difference between different protocols (p<0.05) and also the same protocol between MT on and MT off.

**Conclusion:** The quantitation of T2 of spine tissues varies as different protocols are used. It is more appropriate to compare the trends of relaxation times rather than the actual relaxation times when performing studies for comparison.

---

**The ABCs: Airway, Breathing, CT scan?**

**RESUS training in the Radiology Department at a London Major Trauma Centre**

**A.J. Jameel, E. Minas, K. Ordidge, R. Thomas; London/UK**

**Introduction:** Cardiopulmonary resuscitation (CPR) is an integral part of modern healthcare provision. In the UK, national bodies such as the RESUS council set guidelines to ensure all healthcare providers have life support training. First responders can have a significant impact on the outcomes of patients in both peri and cardiac arrests.

In our busy trauma and tertiary centre many unstable patients undergo CT examinations. The ability of the radiology staff to respond to patient deterioration and perform CPR until the specialist teams arrive can make a significant difference to patient outcomes. This study aims to ascertain level of training and the confidence of our staff in resuscitation.

**Methods and Materials:** Retrospective analysis of the ability and confidence of all staff in the radiology department (radiographers, nurses, health care assistants, radiologists) was performed using both quantitative and qualitative data collated from questionnaires between August and September 2014.
Results: A total of 82 staff completed the questionnaire, approximately 75% of the department. Although the level of training varied across the staff groups, overall 44 were in-date and 38 (46.3%) out-of-date with their RESUS training. 47 (57.3%) felt confident to maintain the airway and give CPR. Only 11 (13.4%) were confident using the AED defibrillator; however 58% wanted Immediate Life Support training to use the defibrillator.

Conclusion: This study identified a lack of up-to-date training and confidence in resuscitation within our department. It generated much discussion and a desire for change - the second cycle will be performed in March 2017.

Gastric Perforation after insertion of gastric balloon for management of morbid obesity

R. Aggarwal, C. Markakis, C. Tsironis, S. Purkayastha; London/UK

Background: Insertion of an intragastric balloon has been shown to successfully induce modest short-term weight loss in morbidly obese patients either as a standalone procedure or when used as a bridge to the definitive bariatric procedure, potentially resulting in safer outcomes. It is a safe procedure frequently associated with minor symptoms such as nausea and vomiting, however, serious complications, such as balloon migration and perforation, have been described and can result in significant morbidity and even mortality. The appropriate treatment can be conservative, endoscopic or surgical and experience in management of bariatric surgical complications is essential for favourable outcomes.

Methods and Materials: We present two cases of female patient’s presenting with generalized peritonitis 2 days after insertion of an intragastric balloon. Both CT scan’s showed sub-diaphragmatic free air and fluid. The patient’s were transferred to theatre for urgent laparoscopic management.

Results: Laparoscopy revealed four-quadrant peritonitis and a large part of the gastric fundus was necrotic with a perforation at the superolateral aspect. The intragastric balloon was removed and a fundectomy was performed removing non-viable tissue. This resulted in a staple line extending from the middle of the greater curvature to a point very close to the gastrooesophageal junction.

Conclusion: The intragastric balloon is a useful tool in the management of bariatric patients. Serious complications are rare, but perforation in particular can be devastating. A high index of suspicion for perforation in patients exhibiting significant abdominal pain after insertion of an intragastric balloon is paramount for successful management with early imaging vital.

Adequate contrast enhancement of CT pulmonary angiograms

H. Ashraf, A. Andi, London/UK

Background: Suboptimal enhancement of CT pulmonary angiograms (CTPA) leads to non-diagnostic studies and therefore unnecessary exposure to contrast and radiation.

Aim: To assess the adequacy of contrast enhancement in CTPA’s to ensure the contrast enhancement is sufficient for diagnosis.

Audit standards:
1. A level of 200 Hounsfield Units (HU) in the main pulmonary artery was defined as the level for acceptable enhancement (1)
2. According to published studies conducted at regional centres, CTPA should detect pulmonary emboli in between 15.4% and 37.4% of patients, with alternate diagnoses noted in up to 56% (2)

Target:
1. Detection of pulmonary emboli in at least 15%, with alternate diagnoses in at least a further 50% of CTPA’s performed.
2. No more than 11% of CTPA’s having a HU <200 in the main pulmonary artery
Methodology: Data was collected from 50 consecutive CTPA scans performed between the 1st January 2015 and 15th February 2015. The indicator used was a circular region of interest, which was measured in the largest axial image of the main pulmonary artery with a diameter of approximately 50% of the vessel.

\[\text{Adequate enhancement} \quad \text{Inadequate enhancement} \]

Conclusion:
- ✓ Target of 15% of scans being positive achieved
- ✓ Target of 50% alternate diagnoses achieved
- x 16 % HU <200, target not achieved
- x Excess scanning of the thyroid (82%)

Recommendations:
1. Bolus tracking protocols to be considered in selected patients
2. Radiographer education during scanogram planning to reduce dose to solid organs
3. Risk stratification of appropriate patients to nuclear medicine for a VQ scan.
4. Re-Audit in 12 months time

References:

The other side of the fence!

S. Patel, S. Harave, Liverpool/UK

Learning Objectives: To review presentation, anatomical location, severity and outcome of injuries from horse-riding related trauma in paediatric patients under 18 years age.

Background: Horse-riding is a popular sport, more popular amongst youngsters. Injuries related to horse-riding are variable from minor abrasions to severe injuries with long-term disabilities. Awareness of these injuries and nature of injuries is essential to avoid underestimation of long-term consequences.

Findings/Procedure: Retrospective analysis of 35 patients attending the emergency department at Alder Hey Children’s Hospital, during April 2007-September 2016, due to horse-riding related trauma. The commonest injuries were extremity fractures (70%) mainly in the upper limb, head injuries (20%) and soft tissue injuries (10%). Total of 34 patients were girls (97.2%). 33 out of 35 patients (94.2%) were injured while mounted on horse, and common mechanism of injury was falling off the horse. 12 patients (34%) underwent surgical procedures for limb fracture fixation. There were no deaths in cohort of our
study. 4% of children had limb limiting disability lasting longer than 12 months after discharge needing rehabilitation. 100% of these patients had appropriate modality of imaging on initial presentation, most of which were conventional plain films for limb injuries and CT/USS of abdomen based on clinical concern for internal organ injuries.

Conclusion: Horse-riding related trauma is known entity in the society. Although literature shows that there is evidence of serious injuries/death, our study did not show any serious injuries. Good awareness, adequate training will help minimise number of untoward incidents due to horse-riding. We found that good initial assessment from A&E doctors would help us in suggesting appropriate initial imaging and save the radiation burden on young population.

MRI in Acute Traumatic Spinal Cord Injury: A review and case report

C. Watura; London/UK

Learning Objectives:
- Role of magnetic resonance imaging (MRI) in acute spinal cord injury (ASCI).
- MRI sequences that should be considered, in addition to routine T1- and T2-weighted imaging (WI).
- Characteristics demonstrated on each sequence.

Background: Spinal cord imaging is challenging. MRI is the imaging modality of choice for ASCI and is increasingly performed in spinal trauma.[1, 2]
A clinical case is presented to illustrate how characteristics of ASCI on varying MRI sequences may be usefully interpreted in day-to-day practice.

Findings/Procedure: A 59-year-old male presented with tetraplegia following a fall from a horse involving neck hyperflexion.

Acute cord contusion is iso/hypointense on T1WI. Cord swelling may be apparent. T1WI demonstrates cord transection best.

Fig. 1: T1-weighted sagittal. No perceptible cord signal change. Cord morphology appears normal.

Acute cord contusion and oedema are hyperintense on T2WI, indistinguishable from normal soft tissue fat signal.

Fig. 2: T2-weighted sagittal. High signal ring in cord at C3/4 represents oedema (arrow). Prevertebral soft tissue oedema is noted at this level.

T2*-weighted gradient recalled echo (GRE) is most sensitive for acute cord haemorrhage (hypointense).

Fig. 3: T2*-weighted GRE sagittal. Central hypointense focus in cord at C3/4 represents intramedullary haemorrhage (arrow).

Short tau inversion recovery (STIR) is most sensitive for associated ligamentous injury.[4]

Fig. 4: T2-weighted fat-supressed STIR sagittal. High signal ring in cord at C3/4 represents oedema (arrow). Soft tissue oedema anteriorly and posteriorly represents ligamentous injury at this level.
**Conclusion:** Additional MRI sequences to conventional T1WI and T2WI should be considered for evaluating ASCI. T2*-weighted GRE is more sensitive for haemorrhage, STIR more sensitive for ligamentous injury.[3,4]

**References:**

---

**The Experience of Radiology at a Major Trauma Centre:**
An Audit to evaluate Limb Fracture Detection on Scanograms of Whole Body Trauma CTs

D. Hikmat, L. Smith, W. Boswell, G. Retnasingam, Liverpool/UK

**Learning Objectives:** Calculate the true peripheral fracture (TPF) detection rate of initial whole body (PAN-CT) trauma scanogram in our institute. We will audit this against current NICE guidelines and our local set target of 75%.

**Background:** At our regional Major Trauma centre, radiologists are present at the time of trauma scan to provide a preliminary report. Latest NICE guidelines state that scanograms as well as clinical findings should be used to direct CT-imaging for limb trauma in adults.

**Procedure/Findings:** All patients with PAN-CT scans over a 4 month period were included (100 patients). A senior radiology registrar assessed scout images for peripheral fractures, excluding axial skeleton fractures. Comparison was made against plain radiograph report.

Main indication for PAN-CT was road traffic collisions. 45 patients had subsequent plain films within 20minutes to 2days after CT. 20 patients had a TPF. 2 of those fractures were demonstrated on the scout. 18 out of the 20 TPF had plain radiographs. Only 5.5% of scanograms were matched to a positive fracture radiograph. 50% of scanograms didn’t match the positive upper limb fracture demonstrated on radiograph and 44.4% weren’t possible to assess.

**Conclusion:** The use of scanograms for upper limb fractures is non-diagnostic. Limitations were lack of scout extension to include lower limbs and suboptimal scanograms. Clinical history and examination of patients should remain the primary assessment.

---

**The role of Multi-Slice Computed Tomography (MSCT) imaging in the diagnosis and surgical planning of pelvic fractures**

F. Gaudino¹, F. Greco¹, M. Trinci¹, G.L. Buquicchio¹, M. Galluzzo¹, V. Miele²; ¹Rome/IT, ²Florence/IT

**Abstract:** Pelvic ring fractures are a common consequence of high-energy blunt trauma, as may result from motorvehicle collisions and falls from great height, and occur in a younger adult population; frequency is continuously increasing. The importance of such fractures lies in the high rates of morbidity and mortality due to associated injuries to different organs and systems, particularly pelvic viscera and vascular structures. Outcome improvement depends from acute management: the appropriate orthopedically treatment of pelvic ring fractures (immobilisation, positioning of external fixation or surgical stabilisation) depends on a thorough understanding of the type of fracture and the biomechanical basis of the various types of lesions. Classification systems based on the force-vectors of pelvic injuries provide a logical approach to the management of pelvic ring disruption and allow early and aggressive treatment. Advantages of a “restitutio ad integrum” of anatomical reports in a young population offers a fast postoperative recovery that avoids probable complication due to a long period in
bed. MSCT is the technique of choice in the management of polytrauma patients; in particular, with axial back reconstructed imaged, Multiplanar Reconstruction (MPR) and Volume Rendering (VR) 3D reconstructions views, reproducing radiological standard projections, it is a powerful modality in classifying the various type of fractures, the mechanism and the severity of injury. Purpose of this work is to value diagnostic capacity of MSCT with MPR and VR 3D reconstructions views in evaluation and management of pelvic ring fracture.

Figure 1: Pelvic ring fracture characterized by vertical component of the sacrum with involvement of the foramina, both ischiopubic left ramus, trasverse process of L5, expression of pelvic ring instability.

Figure 2: AP compression with a «open book» pelvic fracture, right sacroiliac junction dislocation, diastasis of the symphysis pubis and coxofemoral joint anterior luxation.

Figure 3: Lateral compression with a «locked symphisis» and sacral fracture.

Figure 4: Pelvic ring disruption caused by falling from heights with a «vertical shear» force component.
Computed Tomography of calcaneal fractures

F. Greco¹, F. Gaudino¹, S. Ianniello¹, E. Berardi¹, M. Galluzzo¹, V. Miele²; ¹Rome/IT, ²Florence/IT

Abstract: The calcaneus, the more lower bone of the body, has the task of supporting the axial load from the weight of the body. Calcaneal fractures comprise 60% of all the tarsal bones fractures and 2% of all fractures. Diagnostic imaging plays a primary role in the diagnosis and classification of fractures. Conventional radiography is generally used in the evaluation of simple fractures. Computed tomography through the 3d and multiplanar reconstructions allows to classify these fractures, consenting a better visualization and characterization of fracture lines and the dislocation of bone fragments. Most of the complex calcaneus fractures are intra-articular. Sanders classification system the most used to describe this type of fracture. The classification of extra-articular fractures, however, is based on tripartite division of the anatomic calcaneal surface: posterior, middle and anterior areas. As Müller says „a classification is useful only if it considers the severity of the bone lesion and serves as a basis for treatment and for evaluation of the results“. Soft-tissue involvement in this fractures, has been correlated with poor functional outcomes. The type of treatment (conservative or surgical) depends on the radiological classification of the fracture.

Figure 1: Computed tomography sagittal MPR image of the hindfoot shows how an increased axial load compresses the lateral process of the talus in the angle of Gissane; the posterior facet rotates anteriorly (curved arrow). A primary fracture line extends inferiorly through the calcaneal body. Two secondary fracture lines can present with two possible exits at the level of the superior or posterior calcaneus surface.

Figure 2: Computed tomography sagittal and coronal MPR image of type C of extra-articular fracture.

Figure 3: Computed tomography sagittal MPR image of type 3BC of intra-articular fracture. Sagittal and coronal MPR image of type 3AC of intra-articular fracture.
Paediatric plain films in trauma – A pictorial review of the purpose and the pitfalls

R. Prasad, C. Landes; Liverpool/UK

Learning Objectives:
- To understand common positive findings on a paediatric trauma radiograph.
- To understand normal variant radiographic findings which are commonly mistaken for injuries.

Background: Paediatric radiographs are common in the trauma setting, but are often met with uncertainty and confusion from non-paediatric emergency and radiology staff members. We aim to provide a pictorial review of a selection of paediatric trauma radiographs displaying the most pertinent findings, as well as common pitfalls that should be avoided.

Findings/Procedures: We will display and describe plain films of the skull, upper limb, thorax, pelvic and lower limb. We will cover paediatric-specific injuries such as Salter Harris fractures, Greenstick fractures and torus fractures. We will describe the correct identification of normal variant apophyses, accessory ossicles and sternal ossification centres which can be misdiagnosed as injuries. Common non-accidental injury related radiographic findings will also be included.

Conclusion: Plain films of children presenting in a trauma setting can be a quick and efficient method of picking up clinically important injuries. We have covered the commonest paediatric plain film findings that a non-paediatric emergency physician or radiologist may be faced with in the trauma setting.

Renal trauma: Spectrum of findings and need for classification of severity by the radiologist

G. Giannopoulou, M. Stankin, E. Grouzi, K. Anthopoulos, G. Chrysanthakopoulou, A. Kazantzi; Patras/GR

Learning Objectives: To highlight spectrum of finding in renal trauma and classification examples according to AAST (American Association for the Surgery of Trauma).

Background: Urinary tract trauma accounts for 8-10% of trauma-related injuries. CT is the technique of choice for evaluating renal trauma, providing accurate information about the status of the renal parenchyma, blood vessels, and collecting system.
Findings/Procedure: CT scanning was performed with three phase contrast media protocol (arterial, nephrographic and excretory phase), facilitating multiplanar reconstruction.
We present 5 cases of renal trauma graded from I to V: 1) a case of grade I renal trauma rupture of a cystic renal lesion 2) a case of grade II renal trauma <1cm laceration, 3) a case expanding sub capsular hematoma compressing the left kidney grade IV, treated conservatively 4) a case of multiple renal lacerations graded IV in a 30 year old involved in motorcycle accident. No excretion was visualised at first CT. Conservative treatment was chosen. Follow up showed favourable resolution of traumatic lesions 60 year old man 5) Traumatic lesion grade IV of a horseshoe kidney of a 28 year old man and 6) complete disorganisation of right kidney grade V. Patient deceased from pulmonary emboli.

Conclusion: Early radiologic classification of severity in renal trauma leads to correct choice of conservative treatment versus invasive treatment.

Figure 1: Grade I renal trauma: rupture of renal cyst

Figure 2: Grade IV renal trauma with multiple lacerations treated conservatively.

Figure 3: Grade IV renal trauma of a horseshoe kidney

Figure 4: Grade V renal trauma depicting complete architectural desorganisation of the kidney
Acute traumatic aortic injury of thorax: Imaging and mimics

G. Giannopoulou, G. Tsamboukas, E. Grouzi, P. Kefalas, G. Chrysanthakopoulou, A. Kazantzi; Patras/GR

Learning Objectives: To pinpoint imaging findings of Acute Traumatic Aortic Injury (ATAI) and relative normal variants.

Background: Computed tomographic angiography (CTA) is the current method of choice for assessing traumatic injuries as it is fast and readily available in emergency departments. CTA is also very accurate for diagnosis of thoracic aortic injury. Direct findings include intramural hematoma, intimal flap and pseudoaneurysm. However, it is important to be aware of potential mimics of ATAI such as ductal remnants, a diverticulum or small bump, normal remnants of the embryologic ductus arteriosus.

Findings/Procedure: We present imaging findings and eventual outcome of two cases of aortic injury secondary to car accident. Total body CT including CTA was performed. The first was a man of 65 years old, received direct force to the chest and was transferred to the ER unstable. Imaging showed flail chest and severe Active extravasation of contrast media was depicted at the level of aortic isthmus. Immediately after CT was performed, the patient collapsed and deceased after multiple trials of resuscitation before treatment was possible. The second case was a 35 years old man, implicated in a severe motorcycle accident. He was hemodynamically stable. CT was performed showing multiple complicated pelvic fractures. CT of thoracic aorta depicted a periaortic hematoma and intimal flap of isthmus. It was treated with EVAR graft with favourable outcome.

Conclusion: Mortality of ATAI is estimated in 80-90%. CTA contributes to early diagnosis and efficient treatment. However radiologists should be aware of mimics and technical pitfalls that can make diagnosis more difficult.

Figure 1: Case 1: Acute traumatic injury of 65 year old patient with direct thoracic trauma. Extravasation of contrast at the level of isthmus. Patient deceased before treatment was possible.

Figure 2: Case 2: Acute traumatic injury of 35 year old patient with indirect thoracic trauma. Intimal flap at aortic arch and periaortic hematoma was depicted. Patient treated with success.
Traumatic injury to the bladder

C. Mockford, M. Piorkowska, L. Meacock, B. Batohi; London/UK

Learning Objectives:
- Mechanisms of injury resulting in risk of bladder injury.
- Optimisation of CT trauma protocols to identify bladder injury.
- CT features of bladder injury with a review of classification systems.
- Implications of radiological findings on management.
- The role of cystography for follow-up of bladder injury.

Background: Bladder injury is usually the result of significant pelvic trauma. Multidetector Computed Tomography (MDCT) Trauma scanning has a central role in the evaluation of patients undergoing significant trauma. CT reformatting allows for identification of characteristic features of the five types of bladder injury1. The majority of traumatic bladder injuries are secondary to blunt trauma. Deceleration forces acting on the pelvis may result in acute rupture, particularly in a distended bladder, or pelvic fractures causing direct bladder perforation. It is widely recognised that delay in diagnosis and treatment of bladder injury is associated with increased mortality and morbidity2.

Findings/Procedure: This case series will illustrate typical CT findings associated with bladder injury with an emphasis on specific review areas, the use of reformats and distinction between intra- and extra-peritoneal bladder rupture. Indications for delayed phase imaging and cystography, as well as their interpretation, will be discussed.

Conclusion: Optimal use of MDCT to aid recognition of an acute bladder injury is crucial to guide timely treatment and reduce patient morbidity and mortality.

References:

Pituitary Apoplexy-imaging features of an emergency with potentially Catastrophic outcome

S. Arya, K. Das, S. Biswas; Liverpool/UK

Learning Objectives:
1. To emphasize the importance of reviewing the sella on emergency CT head scans to exclude pituitary apoplexy in patients presenting with acute headache.
2. To review the MRI findings of pituitary apoplexy, which may be the first presentation of a patient with a pituitary tumour.

Background: Pituitary apoplexy (PA) is a rare life-threatening disorder caused by the expansion of a normal or neoplastic gland secondary to haemorrhage. Its clinical presentation can be catastrophic, which may lead to permanent visual loss or death.

Findings/Procedure: The sella is an important review area for emergency CT head scans, as PA may be the first presentation of a pituitary tumour. Acute PA may present, as hyper density in the sella on unenhanced CT. MRI is superior to CT in the diagnosis of PA. It is the modality of choice for imaging patients presenting with strong clinical suspicion of PA - whether they are previously known to have a pituitary tumour or not. MRI is able to identify the haemorrhage, underlying tumour and the effect on adjacent structures such as the optic chiasma and cavernous sinuses. Examples of CT and MR images with pituitary apoplexy describing the findings are presented.
Conclusion: Pituitary gland/sella is any important review area in nonenhanced CT head. MRI is the imaging modality of choice in patients with strong clinical suspicion for PA. It is important to be aware of the imaging features of PA and its effect on adjacent neural structures.

Syndromes not well known in Emergency Radiology that we should all know

R. Sabatel, M. Fuentes, G. Sabatel, A. Alonso, M. Pastor; Santa Cruz de Tenerife, Canary Islands/ES

Learning Objectives:
- Encourage the dissemination of scientific information related to multiple aspects of Emergency Radiology
- Avoid possible diagnostic errors in urgent pathology

Background:
1 Eagle Syndrome
   Patient with intermittent cervical pain for months
2 Bone hypertrophy as a results of training that simlulate neoplasm
   Civil servant goes to the emergency room by hematuria
   After the radiological findings in a second interrogation of clinical picture we knew he is practicing martial arts for long time
3 Aggressive granulomatous associated to total hip replacement
   A patient comes to the emergency room for pain in the left hip

Findings/Procedure:
1 When performing a CT we can see a subtle thickness of the right carotid wall and a very long styloid apophysis
2 When performing a CT shows a diffuse increase of the left hip that impresses of neoplasm
   Bone scan reported according with neoplasm
   According the second clinical picture, and the bibliography we diagnosed bone hypertrophy as a results of training
   The next CT after a year showed subtle changes
3 X Ray plain film and CT shows a large, lytic ovoid lesions
   It is a different entity compared to mechanical loosening or deep infection
   They are generally of late appearance between 8 and 16 years following the operation

Conclusion: We try to improve the knowledge of urgent radiology no well known and speed up in the performance of a correct diagnosis in a high-risk activity avoiding mistakes.
We try to warn about paying especial attention to the clinical picture in some cases.
CT imaging of select thoracic and abdominal oncologic emergencies

D. Fonseca, S. Dias, J. Abreu e Silva, N. Almeida Costa, D. Foyedo, M. Gouvêa; Porto/PT

**Learning Objectives:** Review and illustrate computed tomography (CT) imaging findings of select thoracic and abdominal emergencies on oncologic patients.

**Background:** Cancer is the leading cause of death in the developed world and in 2012 an estimated 8.2 million people died from cancer worldwide. An oncologic emergency is a clinical condition resulting from a metabolic, neurologic, cardiovascular, hematologic and/or infectious change on an oncologic patient that requires immediate intervention to prevent loss of life or quality of life. On many of these emergencies, imaging studies are critical for diagnosing and prompt intervention. CT is generally the best imaging method of diagnosing most of these thoracic and abdominal emergencies due to providing high-resolution images while being widely available, fast and painless.

**Findings/Procedure:** Working in an oncology setting, on Oporto’s Portuguese Oncology Institute (IPO-Porto), we deal with oncologic emergencies on a daily basis. After conducting a literature review on the proposed subject there was a research of IPO-Porto patients’ with oncologic emergencies in which prompt diagnosis is key for immediate intervention, such as: pulmonary thromboembolism, esophagorespiratory fistula, superior vena cava syndrome, intestinal obstruction, intussusception, urinary tract obstruction, and others. On the basis of CT imaging findings we selected the most representative cases for the purpose of this review.

**Conclusion:** As cancer incidence is on the rise and oncologic patients are surviving longer, radiologists should be aware of these oncologic emergencies and should be able to promptly diagnose them so as not to delay appropriate patient care.

---

**Figure 1:** 54 years old man with colon cancer under chemotherapy through central venous catheter presents with clinical suspicion of superior vena cava syndrome. CT confirms superior vena cava thrombus extending to both brachiocephalic veins.

**Figure 2:** 71 years old man with esophageal carcinoma. 4 months after esophageal prosthesis insertion this patient had tumor growing on the prosthesis’ proximal end and developed a fistula to the main left bronchus well demonstrated by CT.

**Figure 3:** 46 years old man with right hydronephrosis caused by a large retroperitoneal sarcoma.

**Figure 4:** 46 years old woman with breast cancer and mediastinal lymph node metastasis with impaired cardiac function due to large pericardial effusion. On this CT image we can see both the pericardial effusion and a mediastinal metastasis which probably infiltrates the pericardium.
Lower abdominal quadrant pain: more than meets the eye

N. Almeida Costa, D. Fonseca, H. Cunha, M. Gouvêa; Porto/PT

Learning Objectives:
- Review the different conditions that can cause lower abdominal quadrant pain.
- Recognize the radiological appearances of acute pathology that might affect this region.
- Understand the best modality of diagnosis for each condition.

Background: Acute sigmoid diverticulitis is the most common cause of acute left lower quadrant pain in adults and appendicitis in the right lower quadrant, however, the differential diagnosis include a variety of pathologies. Other gastrointestinal causes of lower quadrant pain include inflammatory and infectious conditions of the distal colon/rectum, conditions affecting the appendix, epiploic appendages and omentum, and miscellaneous conditions. Gynecologic and genitourinary pathologies can also affect this region.

Findings/Procedure: Imaging is helpful in evaluating patients presenting with lower quadrant pain and should be guided by the overall clinical presentation, playing a definite role in the evaluation of patients with abdominal lower quadrant pain of unknown etiology and with atypical clinical presentations. Ultrasonography and CT are the methods of choice for the imaging of patients with lower quadrant pain.

Conclusion: The differential diagnosis of lower abdominal quadrant pain comprises an extensive variety of conditions evincing the importance of imaging in the study of this patients, particularly when the clinical presentation is atypical.

Thoracic Ultrasonography versus Chest Radiography for Managing Acute Dyspnea: A Mini Systematic Review

A. Prabata, L. Maharina; West Java/ID

Background: Dyspnea is one of most frequent complaints in healthcare facility, especially in emergency situation, which needs rapid and correct diagnosis to provide best treatment. Chest radiography (CXR) is routine imaging examination which is recommended for dyspneic patients, whereas thoracic ultrasonography (USG) is a novel, fast, and promising instrument for diagnosing lung and heart diseases.

Learning Objectives: The aim of this study is to know accuracy of thoracic ultrasonography versus chest radiography for acute dyspnea and whether it can replace chest radiography as routine examination.

Procedure: We made structured research on several databases including Sciencedirect, Proquest, Pubmed, and EBSCOHost. The selected studies underwent critical appraisal based on Oxford CEEBM diagnostic study clinical appraisal.

Findings: Seven diagnostic studies comprising of 904 participants met inclusion criteria, consisted of 752 participants with pneumonia and 152 participants with heart failure, were critically appraised. Sensitivity of thoracic ultrasound in pneumonia is better than chest radiography (68%-98.5% vs. 47%-77.7%) and also in heart failure (97% vs. 78%). Specificity of thoracic ultrasound is better than chest radiography in pneumonia (57% -98.5% vs. 59.5%-94%) and heart failure (79% vs. 50%). All of studies showed thoracic ultrasonography is better and statistically significant.

Conclusion: Our study indicates that thoracic ultrasonography is better than chest radiography for managing acute dyspnea and can become routine examination, especially in emergency situation.

Keywords: lung ultrasonography, chest radiography, acute dyspnea
Imaging suspected acute aortic syndrome: implementing cardiac gated CT angiography in a cardiothoracic centre

T. Campion, E. Cheasty; London/UK

Learning Objectives:
After reviewing this educational poster, the reader should:
- Be aware of the recent guidelines on CT imaging in suspected acute aortic syndrome
- Understand the reasoning behind and the challenges and benefits of using gated CT angiography
- Be familiar with the pertinent imaging findings in the context of acute aortic syndrome

Background: Acute aortic syndrome remains a significant cause of mortality and usually requires emergent treatment, which can be facilitated by appropriate imaging. Often this requires transfer to a specialist centre, and it is useful if the referring hospital is able to provide imaging of sufficient quality to preclude the need for repeat scanning.

Findings/Procedure: The recent British Society of Cardiovascular Imaging guidelines now mandate the use of cardiac gated imaging in the investigation of acute aortic syndrome, which requires specific training but provides images of superior diagnostic quality. In this educational poster, we will discuss the logistical issues in implementing this protocol in a cardiothoracic centre within a larger trust, and review the pertinent imaging findings in acute aortic syndrome (including aortic dissection, intramural haematoma, and penetrating atherosclerotic ulcer), important artefacts and pitfalls, and significant incidental findings.

Conclusion: Appropriate and timely imaging is crucial for the diagnosis and management of acute aortic syndromes, and institutional protocols should be optimised to deliver the highest quality images to guide treatment.
Multidetector computed tomography imaging of acute aortic syndrome

A.L. Amado Costa, A. Gomes, J. Leitão, J. Fonseca Santos; Lisbon/PT

Learning Objectives: To review the pathophysiology of acute aortic syndromes (AAS); to review and illustrate the most common imaging findings of AAS and their complications in Multidetector computed tomography (MDCT).

Background: AAS are life-threatening aortic emergencies which include intramural hematoma, penetrating atherosclerotic ulcer and aortic dissection. Prognosis of AAS is related to expeditious diagnosis and adequate management. As the clinical presentation of these entities may be similar, imaging plays a vital role in the diagnosis, having MDCT a high diagnostic sensitivity and specificity.

Findings/Procedure: Pathophysiology and imaging findings of AAS are reviewed and illustrated. Intramural hematoma is thought to result from rupture of the vasa vasorum leading to intramedial hematoma, which is usually crescent shaped and hyperdense on unenhanced MDCT scans. In penetrating atherosclerotic ulcer, an atheromatous plaque ulcers and erodes the internal elastic lamina into the media, being typically seen in MDCT scans as a contrast-filled pouch-like protrusion of the aorta or into the thickened aortic wall. Aortic dissection results from laceration of the intima and inner layer of the media, allowing blood to enter the media, forming a double lumen separated by a flap.

Conclusion: Radiology has an important role in the diagnosis, management, identification of complications and follow-up of AAS. MDCT is particularly useful in the acute setting. Familiarity with the imaging findings of AAS can facilitate prompt diagnosis.

Vectors of force and associated patterns of injury in trauma

C. Phillips, L.M. Meacock, London/UK

Learning Objectives:
- Understand how certain “packages” of bodily injury are commonly seen with different mechanisms of trauma
- Aid identification of abnormalities on cross-sectional imaging seen in association with these mechanisms
- Deliver a template for logical assessment of polytrauma imaging

Background: There is strong evidence to suggest that diagnostic accuracy in radiological reporting improves when the clinical information provided is detailed. This has importance for optimising patient care, especially in trauma where time can be critical. Understandably, if a radiologist can appreciate the most likely injuries associated with certain mechanisms of trauma then diagnostic yield in trauma reporting improves. This presentation draws on trauma imaging of the chest, abdomen and pelvis undertaken at a large central London trauma centre. We illustrate the traumatic injuries associated with differing mechanisms of blunt and penetrating injury and discuss the factors to consider when evaluating blunt vs. penetrating injury.

Findings: Right-sided trauma is often associated with right hepatic lobe and right kidney injury. The right hemidiaphragm, pancreatic head, duodenum and IVC are also vulnerable. Left-sided trauma is often associated with splenic, left kidney, left hemidiaphragm and pancreatic tail injuries. Midline and flexion/compression forces to the torso may cause pancreatic, aortic, left hepatic lobe, and small bowel injuries.

Conclusion: Certain packages of injury are seen in conjunction with different mechanisms of trauma. This review aims to provide insight into common injuries and subsequent patterns of organ damage enabling clinicians and radiologists to predict and confirm traumatic injuries on CT. As a result, this may improve the diagnostic yield of reporting trauma images and the clinical outcomes for the patient.
Importance of vascular signs in early CT diagnosis of internal hernia after Laparoscopic Roux-en-Y gastric bypass in emergency: Follow the thread of vessels to solve the swirl

F.M. Danza, V. Bordonaro, F. Lanza, M. Falcione, M.G. Brizi, R. Manfredi; Rome/IT

Learning Objectives: Investigate the importance of subtle vascular CT signs in the diagnosis of internal hernia (IH) following Roux-en-Y gastric bypass surgery (RYGBP).

Background: IH is a delayed complication of RYGBP consisting in herniation of small bowel loops through surgically created defects of peritoneal reflections. Clinical manifestations can vary from intermittent abdominal pain, related to transient herniation of bowel through the mesenteric defect, to an “acute abdomen” with small bowel obstruction (SBO). Therefore, an early CT diagnosis of IH is essential in emergency department, before its progression in SBO and wall ischemia.

Findings/Procedure: CT diagnosis of IH is difficult because, unlike the other types of abdominal hernia, the IH can not be detected by visualization of the orifice, but just by indirect changes, especially the anomalous course of mesenteric vessels and atypical bowel loops distribution.

Many CT signs of IH were originally described; among them, the most sensitive and specific is the “swirl sign”, a swirled appearance of mesenteric vessels into mesenteric root.

Other signs recently recognized are the “SMV beaking”, a decreased calibre of the superior mesenteric vein, and a reversed anatomic relationship of SMV and SMA: they present a higher specificity, especially in combination with the swirl sign, and they can also explain the intermittent abdominal pain in patients with a transient IH, not yet evolved in SBO.

Conclusion: Emphasize vascular features in suspected IH is essential for early diagnosis and can deepen its pathophysiologival implications. This new way to read CT signs needs an accurate assessment for achieving a correct preoperative diagnosis.

The mesenteric swirl sign on a CT image of a 43-year-old woman with an internal hernia after RYGBP. Enhanced axial CT image shows the swirled appearance of vessels and fat at the mesenteric root.

Contrast-enhanced coronal MIP image shows a decreased calibre of SMV with beaked appearance (SMV beaking sign), in a Patient with a surgically confirmed IH after LRYGB.
Gastrointestinal Stromal Tumor cases in Emergency Radiology Department

A. Žvigure, N. Zdanovskis, J. Podlesnaja, A. Mazalevska; Riga/LV

Learning Objectives: To demonstrate clinical presentation, US and CT imaging findings of Gastrointestinal Stromal tumors (GIST) in emergency department of Riga East Clinical university hospital.

Background: GISTs account for less than 1% of gastrointestinal tumors. They are the most common mesenchymal neoplasms of the gastrointestinal tract.1 Up to 75% of GISTs are discovered when they are asymptomatic or associated with nonspecific symptoms.2 We demonstrate 3 clinical cases of histologically confirmed GISTs which firstly were discovered in emergency Radiology department.

Findings/Procedure:

Case No. 1
Clinical presentation - Patient came to Emergency department with left abdominal pain and hematoma in given region.
Ultrasound findings - Abdominal mass with signs of cystic degeneration, size 22 cm. Large metastatic nodule in subdiafragmal region 6,8x4,4 cm.
CT findings - Mesenterial abdominal mass 23x12x25 cm with peritoneal dissemination. Metastatic node in subhepatic region 8,0x5,8x4,7 cm. Staging T4, N1, M1

Case No. 2
Clinical presentation - Patient came to Emergency department with abdominal pain and ileus symptoms. Probable colon disease.
Ultrasound findings - Mass in small pelvis 6x6x10cm.
CT findings - Mass in small pelvis 12,0x7,0x8,0 cm with connection to small intestines. Staging T4, N0, M0.

Case No. 3
Clinical presentation - Patient came to Emergency department with right hypogastric pain.
CT findings - Mass located in mesogastrium 8,5x9x9,1 cm with connection to small intestines and peritoneal dissemination T4, N1, M1.

Conclusion: Emergency department Radiologists need to identify these tumors, because these tumors can cause emergency conditions, such as, acute abdomen symptoms, ileus, and haemorrhages.

References:
Outcome Evaluation of Acute Ischaemic Stroke Patients Treated with Endovascular Thrombectomy: Early Experience of Single-Institution

T. Minett, Y. Joshi, J. Jones, N. Higgins; Cambridge/UK

Background: Stroke is the second leading cause of mortality and the third leading cause of disability-adjusted life-years worldwide. Evidence shows that in patients with acute ischemic stroke, endovascular thrombectomy significantly reduces disability at 90 days when compared with usual clinical stroke management alone. Our aim was to examine our initial single centre experience with endovascular thrombectomy for acute ischemic stroke and verify if our outcomes are within the UK standards for providing safe acute ischaemic stroke thrombectomy services.

Methods: We report on our 18 month initial experience in a normal working hours centre, from July 2015 to January 2017, on consecutive patients with acute ischemic stroke who received endovascular thrombectomy at Addenbrookes Hospital, Cambridge University Hospitals NHS Foundation Trust. Our primary outcome was frequency of successful recanalization measured by the thrombolysis in cerebral infarction (TICI) grading system (TICI score >2a) and frequency of symptomatic intracerebral haemorrhage (SICH) at 36 hours (SICH < 12%).

Results: Thirty-one patients were selected to receive endovascular treatment, however the procedure had to be abandoned in eight. Among the 23 patients who received endovascular mechanical thrombectomy, successful recanalization was achieved in 18 (72%) cases, and 2 (8%) patients had symptomatic intracerebral haemorrhage within 36 hours.

Conclusion: Our early experience in mechanical thrombectomy in a “real life” setting demonstrates we are in accordance with the UK standards for providing safe acute ischaemic stroke thrombectomy services. Our next step will be to shape our service to be able to offer a regional 24/7 service.

Hot off the scanner! The radiological primary report

C. Mockford, M. Piorkowska, L.M. Meacock; London/UK

Learning Objectives:
A structured approach to immediate recognition of life threatening injuries on polytrauma CT.
Use of the extended scanogram in determining CT protocols.

Background: A timely and accurate trauma CT report plays a vital role in the management of critically injured patients. The clinical primary survey established in ALTS focuses on identification of injuries posing a threat to life with the mnemonic ABCDE used to structure the initial approach. The secondary survey is a focused head to toe evaluation commencing once the patient’s vital signs are stabilizing. This concept is transferrable to polytrauma CT reporting. An initial primary CT report should be produced with the patient still on the scanner conveying evidence of life threatening injuries. The Radiologist should then analyze the complete study to produce a secondary final report. This presentation places emphasis on the importance of the radiological primary survey.

Findings/Procedure: Mechanism of injury and review of scout views determine the protocol used for scanning. Flow chart guidance for split-bolus, biphasic and delayed phase imaging is discussed.
Pictorial review of the following will be included:
A – Airway: obstruction, ETT
B – Breathing: pneumothorax, haemothorax, evidence of tension.
C – Cardiac and mediastinum: major vessel injury, pericardial effusion, mediastinal haematoma
D – Diaphragm
E – Everything below the diaphragm: free air, free fluid, solid organ injury, haemorrhage
F – Fractures of the pelvis
Conclusion: Adapting the ABCDE approach of the ATLS guidelines to trauma reporting may allow faster identification of injuries and improve communication between Radiology and clinicians.


The Median Arcuate ligament Syndrome and its potential rare complications: pancreatico-duodenal artery pseudoaneurysm with retroperitoneal haemorrhage

F.M. Danza, V. Bordonaro, M. Corvino, F. Lanza, M. Falcione, M.G. Brizi, R. Manfredi; Rome/IT

Learning Objectives: Provide clinical and radiological description of a rare complication of the median arcuate ligament (MAL) syndrome: bleeding from pseudoaneurysm of pancreaticoduodenal artery (PDA). This occurrence is to be included in the differential diagnosis (DD) of retroperitoneal haemorrhage.

Background: MAL is a fibrous arch that links left and right diaphragmatic crura crossing superior to the origin of celiac axis (CA); in some patients, this ligament cross anterior to the artery, compromising its blood flow. This condition represents a rare incidental finding on CT; in rare cases MAL syndrome cause nonspecific abdominal post-prandial pain, nausea, weight loss. On sagittal CT images it is characterized by a “J” shape at around 5 mm from the CA ostium; this finding differentiates this cause of narrowing from atherosclerotic stenosis, which typically occurs at the ostium.

Findings/Procedure: Although MAL syndrome is considered a benign condition, a severe CA compression can increase compensatory blood flow in peripancreatic network to provide a collateral supply, causing wall vessels impairment, abnormal dilatation, fissuring wall and pseudoaneurysm formation, in particular in PDA. Other causes of PDA pseudoaneurysm with different pathogenesis are discussed in the DD. Rupture of PDA pseudoaneurysm is associated with high mortality, due to retroperitoneal bleeding, and it requires urgent embolization or surgical treatment.

Conclusion: MAL syndrome is a controversial entity, often representing an incidental finding on CT in asymptomatic patients. However, it is important to include MAL syndrome in DD of acute abdominal pain, especially for its rare but possible correlation with development of PDA pseudoaneurysm, potentially at risk of bleeding.

Sagittal MIP image in a patient with abdominal pain shows compression of the celiac artery with a J-shaped appearance, caused by the compression of median arcuate ligament.

Axial CT image showing a large hematoma around the duodenum and the head of pancreas caused by the rupture of PDA pseudoaneurysm.
Pictorial review of the splenic lesions and anomalies: The oft-overlooked organ

K. Parikh, Ann Arbor/US

Objectives:
- Understand the imaging appearance of the common splenic lesions and anomalies at computed tomographic (CT) examinations
- Review the management guidelines of incidental splenic lesions as outlined by the American College of Radiology (ACR)

Background: Because of their relative rarity, splenic findings are often overlooked by the trainees during the review of the abdominopelvic CT examinations. However, with the improving resolution of today's scanners, these lesions are detected more frequently than ever before. As such, it is important to have both a concrete understanding of their appearance as well as their management.

Findings/Procedure: Major etiologies of the splenic findings in our experience can be characterized into 5 distinct categories:
- Congenital: epithelial cyst, accessory spleen, wandering spleen, polysplenia/asplenia
- Traumatic: contusion, rupture, infarction, splenic vein thrombosis, splenic artery dissection
- Benign: acquired cyst, abscess, hamartoma, hemangioma, lymphangioma, echinococcal cyst, littoral cell angioma
- Malignant: lymphoma, metastases, angiosarcoma
- Infiltrative: sarcoid, amyloidosis, siderosis

Understandably, there is some overlap between these 5 categories. Nonetheless, this categorization provides an easy tool for readily identifying the significance of the findings. Here we will briefly review the CT appearance and pathophysiology of these major etiologies. Additionally, we will review the management guidelines of incidental splenic lesions as outlined by the ACR.

Conclusion: Understanding the imaging findings and management of the major splenic lesions is crucial for budding radiologists as they are likely to encounter them often with improving CT resolution.

Representative images:
Spontaneous abdominal bleedings: advantages and limits of CT imaging

P. Pellizzoni, F. Bianchi, S. Accogli, M. Tonerini, D. Caramella, E. Orsitto; Pisa/IT

Learning Objectives: To illustrate the key-role of Angio-TC in spontaneous abdominal bleedings and its limits in order to correct management of a potentially fatal disease.

Background: CT offers advantages in anatomic abdominal evaluation; CT specific signs associated with bleeding offer valid element to diagnosis, with some limits.

Findings/Procedure: CT scan should be performed with a multiphasic study. CT is very accurate in exploration of peritoneal and retroperitoneal spaces and abdominal wall looking for parenchymal, tumoral, vascular, muscular or subcutaneous tissues sources of bleeding. CT useful signs in detection and characterization of bleedings are: hyperdense collection and the sentinel clot sign; extravascular blush of c.m. in the early arterial phase that increases later (differential diagnosis between active arterial bleeding and pseudoaneurysms); a blush in the venous phase (venous bleeding); layering and signal flare signs (anticoagulation therapy); areas of tessutal enhancement in hematomas (suspect tumor). In aneurysm rupture the main signs of impending rupture are: crescent sign, fissuring thrombus and the draped aortic sign. Ct limits in spontaneous abdominal bleedings mainly are false negatives for active arterial bleeding (very small sources of bleedings overlooked, arterial vasospasm reflex, compression effect). Clinical and laboratory correlation is then necessary to refer the patient to an investigation with traditional angiographic study.

Conclusion: Knowledge of CT advantages and limits related to bleedings allows a better impact on therapeutic course.
Unrecognized muscle injuries following limb trauma—a factor delaying patient recovery

L. Meacock¹, H. Lee¹, C.K. Chuen², P. Holder², S. Menon², M. Norris², M. Thilagarajah², G. Constantinescu²; ¹London/UK, ²Dartford/UK

**Learning Objectives:** Initial evaluation of limb trauma primarily includes x-rays and CT evaluation. Suspected tendon injuries are usually assessed with ultrasound. However, these modalities may not detect or underestimate synchronous, significant muscle injuries. Early, limited and targeted MRI examination helps detect significant, unrecognized muscle injuries and help integrated management of trauma in these patients.

**Background:** Several limb trauma patients, initially assessed by x-ray, CT and ultrasound failed to recover and progress satisfactorily following their initial management. Limited and targeted MRI evaluations revealed significant, unrecognized muscle injuries preventing recovery.

**Findings/Procedure:** 7(n=7) patients were referred to the Radiology Department within a year for dedicated, limited and targeted MRI studies, as they failed to recover, following limb trauma, with the initial management. Grade 3 muscle ruptures, myo-tendinous junction tears and extensive muscle oedema were detected and characterized with MRI. Other unsuspected, adjacent injuries were identified and further characterized (such as non-displaced fractures not seen on plain films).

**Conclusion:** Limited and targeted MRI scanning can be extremely helpful in the early assessment of limb trauma, for the detection of unsuspected severe muscle injuries, impeding timely recovery following trauma. This would allow accurate and comprehensive injury evaluation, facilitate the therapeutic decisions and avoid more costly financial implications for the Hospital Unit and for the patients.

Undetected lower limb fractures—the expanding diagnostic role of MRI in posttraumatic lower limb injuries

L. Meacock¹, H. Lee¹, C.K. Chuen², S. Menon², S. Morgan², R. Singh², G. Constantinescu²; ¹London/UK, ²Dartford/UK

**Learning Objectives:** The first line investigation in lower limb trauma is plain film X-rays, in most UK trauma centres. When the X-rays are normal and symptoms improve, soft tissue injury is presumed and the patients are discharged. Patients returning to the Fracture clinic unable to weight-bear (either difficult or not possible), require a second line investigation to detect possible, unsuspected injuries. Targeted MRI investigation often reveals small, subtle fractures, undetected on plain films.

**Background:** 37(n=37) patients with lower limb trauma, were referred to the Radiology Department for targeted MRI investigation, following initial negative X-ray investigations, within a year period, to our Hospitals. These patients returned to the Trauma Clinic, as they were unable to weight bear, after their initial assessment. Subtle, undisplaced fractures were detected, alongside soft tissue injuries in these patients.

**Findings/Procedure:** Of the 37(n=37) patients referred for targeted MRI investigation following their return to the Trauma Clinic, 29(k=29) patients were found to have subtle, undisplaced or minimally displaced fractures of the: femoral neck and acetabula, femoral condyles, tibial plateau and tarsal bones. 8 patients (m=8) had significant soft tissue injuries comprehensively assessed with MRI.

**Conclusion:** Early, accurate diagnosis of traumatic lesions is important in order to facilitate speedy recovery and return to normal and professional activities. The early use of multiplanar, non-invasive capabilities of MRI, allows precise diagnostic and comprehensive assessment of the lower limb injuries and reveals the exact location and extent of unsuspected lesions. Appropriate treatment is thus facilitated and possible complications avoided.
Splenic artery embolisation in blunt splenic injury: is it all it is cracked up to be?

T. Gibson, London/UK

**Learning Objectives:**
1. Indications and contraindications for SAE
2. Consequences of splenic artery embolisation

**Background:** Splenic preservation is important owing to the 1-2% lifetime risk of overwhelming post-splenectomy infection (OPSI) which has a 50% mortality rate. Hence, trend is towards non-operative management (NOM) of splenic injury. Splenic artery embolisation (SAE) may form part of this conservative approach, however, also carries 20% risk of major complications. Operative management (OM) felt to be associated with greater morbidity and mortality, although may result from higher injury severity in patients requiring OM.

**Findings:**
2. SAE has - variably - been shown to improve success rates of NOM and splenic salvage rates, reducing the frequency of operative intervention. Unfortunately, AAST grading system has a poor predictive value with regards to which patients may be best managed by NOM +/- SAE or OM.
   - Major complications include persistent haemorrhage (11%), splenic abscess (3%), contrast-induced nephropathy, symptomatic splenic infarction, and coil migration (1-2%).
   - No statistical difference shown between OM and SAE for cost-effectiveness or patient LoS.
   - Patients appear to have normal immunological function post-SAE.

**Conclusion:** Clinical uncertainty exists over exact role of SAE in BSI management. Further studies needed to evaluate more predictive CT scoring tools and compare NOM +/- SAE vs OM.

Imaging of appendicitis: What is ultrasound good for?

A. Manzella, Recife/BR

**Learning Objectives:**
1. To discuss the role of ultrasound in the diagnosis of appendicitis
2. To review the imaging findings of appendicitis with emphasis on ultrasound
3. To address the most important diagnostic pitfalls

**Background:** Acute appendicitis is the most common cause which requires surgery. The diagnosis of this illness is based on clinical history in association with physical examination, however imaging can be useful especially in cases of atypical pain and to rule out other possible causes of abdominal pain. Although US sensitivity is inferior when compared with computed tomography (CT), it is significantly faster to perform, avoid radiation, especially in children and contrast risks, it has lower costs and is easily found, therefore it is the preferred imaging modality for the initial evaluation of pain in the right lower quadrant. The purpose of this presentation is to discuss the role of ultrasound in the diagnosis of appendicitis and review some of the most common ultrasound findings as well as uncommon aspects of this pathology.

**Findings/Procedure:** The authors use cases from the archives of their institution to illustrate the imaging findings. Schematic drawings are also used as illustrations. The surgical findings will also be illustrated in some cases.
Conclusion: Although the diagnosis of acute appendicitis is usually made on the basis of clinical findings ultrasound plays an important role in the diagnosis, evaluation of complications and follow up, contributing to clinical management particularly in children and in atypical cases.

Shock due to faecal impaction: an illustrative case report

J.S. Baik, T. Seers, S. Qureshi, S. Nadel; London/UK

Learning Objectives: This case illustrates a severe manifestation of a common presentation in the paediatric population.

Background: Chronic constipation is extremely common in children and even more so in children with neurological comorbidities.

Findings/Procedure: A 15-year-old male with a history of quadriplegic cerebral palsy presented with a two-day history of worsening profuse diarrhoea and a 12-hour history of faeculent vomiting which progressed to 'coffee ground' vomiting. He displayed clinical signs of shock, with hypotension, metabolic acidosis and hyperlactaemia, requiring intubation, ventilation and fluid resuscitation (130ml/kg in the first 4 hours) with inotropes. Initial investigations revealed a CRP of 350mg/L and WCC of 30x10^9/ml. Broad-spectrum antibiotics were started on presentation with a provisional diagnosis of systemic sepsis and shock.

He had a markedly distended abdomen and plain abdominal radiographs showed markedly dilated loops of large bowel. CT abdomen showed a large faecal ball that measured approximately 10 cm in maximal diameter. There was an associated severe generalised dilatation of the entire colon (ascending colon maximal diameter 8 cm) with several intraluminal smaller faecal balls and air fluid levels. There was no sign of visceral perforation. There was also evidence of pneumatosis coli, particularly on the right side.

He was taken to theatre as an emergency for manual disimpaction and was subsequently extubated uneventfully and discharged on an increased laxative regimen.

Conclusion: Faecal impaction may present with shock in the absence of an infective aetiology and should be considered in the emergency setting in children with complex comorbidities and a history of chronic constipation.
Incorporating Cerebrovascular Imaging into a Single-Pass Polytrauma Acquisition: Methods, Issues and Diagnoses

T. Ptak, Boston/US

Learning Objectives:
- Familiarize the reader with shortfalls of poly-trauma imaging, especially in vascular injury.
- Recognize/discuss shortcomings of the whole-body single-pass soft tissue/vascular paradigm.
- Introduce protocol design and software innovations designed to address shortcomings.
- Illustrate strengths and advantages of the whole-body acquisition with common diagnoses.

Background: Commonly, evaluation of the cranio-cervical vasculature is required following evaluation of the cervical spine and skull base, as evaluated using selection criteria such as the EAST recommendations. Incorporation of the head and cervical spine into the single-pass whole-body exam, either with or without cranio-cervical CTA continue to pose challenges.

Findings/Procedures: A whole-body polytrauma protocol was devised on a Revolution CT (GE Healthcare, Milwaukee, WI) scanner, optimized for portal venous/solid visceral and head to toe intravascular arterial and venous enhancement, soft tissue and bone detail. A bi-phasic contrast bolus was employed for optimal timing. A delayed scan (1, 3 or 7 minutes) could be added to further investigate for vascular occlusion, active bleeding or bladder injury. A model-based iterative reconstruction method improved the quality of images acquired in arms down whole-body single-pass acquisitions. Problem areas including the common carotid and vertebral vessels acquired through the shoulders were improved, with hand and arm artifact also minimized for the chest and upper abdomen acquisitions.

Conclusion: Commonly under-evaluated and under diagnosed injuries can be addressed more efficiently and with consistently higher quality using whole-body acquisition and software image processing enhancements.

Predictors of significant ligament injury on CT of the cervical spine when a cervical fracture is absent

G. Chilvers, U. Janjua, S. Choudhary; Birmingham/UK

Purpose: Recent guidelines suggest the cervical spine can be safely cleared solely on multi-detector computed tomography (MDCT) scans. However, available literature defining CT findings of significant ligament injury in the absence of cervical spine fractures is limited. We aim to identify CT parameters which predict significant ligament injury in the cervical spine when fractures are absent.

Methods and Materials: In this retrospective study all polytrauma patients imaged with MDCT over a 5-year period were identified. Patients with suspected ligament injury were collated based on CT report and their imaging was reviewed. Predefined predictors of ligament injury were recorded for each study with comparison to subsequent MRI as reference standard.

Results: CT predictors of significant ligament injury at the cranioocular junction include basion-dens interval >10mm, widened C0/C1 facet joint space >3mm or loss of congruity, widened C1/2 facet joint space >6mm, increased AADI >3mm and atlas offset ≥2mm. In the subaxial cervical spine, facet subluxation >50% was the only reliable predictor of ligament injury. Asymmetry of lateral atlanto-dens interval, subluxation at C1/C2 facet, subaxial facet joint widening or minor incongruence and asymmetry of disc space were seen in many studies with normal MRIs.
**Conclusion:** When fractures are absent, signs of significant ligament injury on CT at the craniocervical junction are increased basion-dens interval, lateral offset of atlas, widened or incongruent anterior atlanto-dens interval and widened C0/C1 and C1/C2 facet joints. In the subaxial cervical spine, >50% subluxation of a facet joint is an indicator of significant injury.

Imperial College Healthcare NHS Trust notice: The contents of this e-mail are confidential to the ordinary user of the e-mail address to which it is addressed and may also be privileged. If you are not the addressee of this e-mail you may not copy, forward, disclose or otherwise use it in any form whatsoever. If you have received this e-mail in error please telephone the Imperial College Healthcare NHS Trust on +44 (0)20 3311 3311 and ask for the person who sent you the email. Please also delete the message from your computer.

Poster Abstracts appear as submitted and have not been checked for correctness and completeness. Subject to changes, printing and typesetting errors.
CME Accreditation

We are pleased to inform you that the ESER/BSER Annual Scientific Meeting 2017 was granted 12 European CME credits (ECMEC) by the European Accreditation Council for Continuing Medical Education (EACCME).

Disclosure Statement

Potential Conflict of Interest Disclosures
It is the policy of the ESER – European Society of Emergency Radiology to ensure balance, independence, objectivity, and scientific rigour in the congress programme. Knowledge of possible relationships with sponsors of any kind is mandatory in order to reinforce the educational and scientific message and to relieve any suspicion of bias.
Any potential conflict of interest involving the organising committee should be made known so that the audience may form their own judgements about the presentation with a full disclosure of the facts. It is for the audience to determine whether the presenter’s external interest may reflect a possible bias in either the work carried out or the conclusions presented.

The ESER/BSER 2017 congress president, Dr. Elizabeth Dick, did not disclose any relationships.
ESER/BSER 2017 Faculty

A. Agrawal, Delhi/IN
N. Ahmadi, Amsterdam/NL
G. Antoniades, Hull/UK
A. Atinga, London/UK
R. Basilico, Chieti/IT
D. Bew, London/UK
N. Bharwani, London/UK
A. Blanco Barrio, Murcia/ES
S. Cross, London/UK
J. Curtis, Liverpool/UK
D. Dalili, London/UK
A.M. Deganello, London/UK
M. De La Hoz Polo, London/UK
E. Dick, London/UK
A. Drought, London/UK
M. Dumba, London/UK
D. Elias, London/UK
W. Gedroyc, London/UK
I. Gibb, Portsmouth/UK
R. Greenhalgh, London/UK
P. Healey, Liverpool/UK
M. Hopper, Cambridge/UK
O. Jaffer, London/UK
E. Kashef, London/UK
K. Katulska, Poznan/PL
J. Keogh, UK
M. Khan, London/UK
N. Khandelwal, Chandigarh/IN
C. Landes, Liverpool/UK
E. Loney, Darlington/UK
P. McParland, Portsmouth/UK
L. Meacock, London/UK
F. Mück, Munich/DE
K.H. Nieboer, Brussels/BE
M. Osborn, London/UK
A. Raithatha, London/UK
M. Roddie, London/UK
M. Scaglione, Castel Volturno/IT
S. Shamshuddin, Lancaster/UK
A. Shekkeris, London/UK
S. Vaidya, London/UK
D. Varma, Victoria/AU
S. Wirth, Munich/DE
General Information

**Congress Venue**
Imperial College London | Sir Alexander Fleming Building
Exhibition Road
SW7 2AZ London
United Kingdom

**Floor Plan**

GROUND FLOOR

- Entrance
- Registration
- Poster & Industry Exhibition
- Catering
- to the first floor

FIRST FLOOR

- Lecture room 1
  - LT G16
- Workshop room 1
  - 119
- Workshop room 2
  - 120
- Workshop room 3
  - 121
- Workshop room 4
  - 122
- Lecture room 2
  - LT G34

Floor plan of the congress venue showing the layout of the ground and first floors.
Onsite Congress Office
In case of any questions, kindly consult the ESER registration desk, staff persons will be happy to assist you.

Conference Language
The meeting will be held in English. No simultaneous translation will be offered.

Badge
You are kindly asked to keep your badge visible on the congress grounds at all time.

Certificate of Attendance
The Certificate of Attendance/CME Accreditation will be handed out on the last congress day at the registration desk.
Innovationen, die die Radiologie verändern


Erfahren Sie mehr unter:
www.philips.de/healthcare
Registration fee for delegates includes:
- admittance to all scientific sessions
- admittance to the technical exhibition
- congress programme and abstracts
- certificate of attendance
- coffee breaks

List of participating countries*
*as per March 2017

Australia  Belgium  Canada  Estonia  Finland  France  Georgia
Germany  Greece  Hungary  India  Italy  Latvia  Lithuania
Malta  Netherlands  Norway  Pakistan  Poland  Portugal  Republic of Korea
Saudi Arabia  Slovenia  Spain  Switzerland  Turkey  United Kingdom  United States of America

Onsite Payment
Onsite payment can only be made by credit card (Visa or Mastercard) or in cash (Euro).
Please understand that no other payment facilities like cheques, etc. will be accepted.

Name Changes
Name changes will be treated like the cancellation of the registration and a new registration of the other participant.

Future Meeting Desk
This area offers you an overview of future meetings in the field of radiology and related disciplines, from all over the world.
Feel free to contribute flyers and posters to promote your own meetings and courses.
POLYTRAUMA

CHEST PAIN

STROKE

Revolution™    I   Redefine what’s possible with CT.

Developing new clinical protocols in emergency radiology with computed tomography

Follow the Live Event @ www.gehealthcare.com/ESER
Recording
Video- or audio-recording of any sessions or presentations is not allowed without the speaker’s/organiser’s prior written permission.

Mobile Phones
Please do not forget to switch off your mobile phones before entering any of the lecture rooms.

Safety
The safety of all congress delegates and participants is of utmost importance to ESER and BSER. Security measures and precautions at the ESER/BSER venue have been tightened to ensure maximum security for all attendees. Badges must be worn visibly on the congress grounds at all times. The ESER reserves the right for staff to check participants’ identification upon admission to and/or inside the congress venue. Participants may at any time be requested to present adequate proof of identity in the form of a passport, driver’s license, national or military identification or student ID. Documents for the proof of identity must include a photograph and signature.

Disclaimer/Liability
ESER/BSER cannot accept any liability for the acts of the suppliers to this meeting or the attendees’ safety while travelling to or from the congress. All participants and accompanying persons are strongly advised to carry adequate travel and health insurance, as ESER/BSER cannot accept liability for accidents or injuries that may occur. ESER/BSER is not liable for personal injury and loss or damage of private property.
Gerade komplexe Abläufe sollten leicht von der Hand gehen!

Da machen wir keine Kompromisse.


Für die jederzeitige Rekonstruktion des Krankheitsverlaufs. Und die Überprüfung einer Diagnose, dem Vergleich mit Voraufnahmen und Ergebnissen anderer Untersuchungsmethoden.

agfahealthcare.de
The ESER/BSER Annual Scientific Meeting 2017
is kindly sponsored by

Industry sponsored Symposium

**Tuesday, April 25, 12:45-13:45**

**LR1**  
Industry sponsored symposium - Developing new clinical protocols in ER with CT

- Advanced cardiovascular CT-protocols in emergency medicine  
  U. Teichgräber, Jena/DE  
- Imaging workflow in acute stroke  
  G. Arenaza, San Sebastian/ES  
- War in Afghanistan (2001-2014) - The Coming of Age of Radiology in Trauma Management  
  M. Armstrong, Plymouth/UK
Notes
Notes