Treatment options:

- If a post-traumatic laparotomy is being performed, acute ORIF or application of external fixator recommended.
- Transfusion should include FFP and platelets, to prevent DIC and improve tissue oxygenation.
- Open fractures should be recognised early and debride:
  - Urgent bladder drainage with cystostomy tubes
  - Bowel diversion, washout and cholecystectomy
  - Ensure stoma is sited away from further incisions to approach and fix the pelvis.
  - GU – injury (4.6%), with urethral damage more common in men;
  - Always be suspicious if widening of pubic symphysis and SI joint (bladder injury) or with fractures of both superior and inferior pubic rami (urethral injury).
- Definitive fixation prevents deformity and reduces complications
  - Inlet views assess rotational disruption
  - Outlet views assess vertical displacement
- Anterior ring fractures require internal fixation, with symphysis diastasis usually amenable to plating via a Pfannenstiel-type incision.
- Posterior ring injuries with disruption of the sacro-iliac ligament can be managed by closed reduction and percutaneous screw fixation; alternative posterior plating or anterior plating (via lateral window of ilioinguinal approach) are possible
- Iliac fractures can be managed by closed reduction and percutaneous screws, or ORIF.

Mortality & complications:

- 10% mortality with haemodynamic instability on initial presentation
- 66% of pelvic or acetabular injuries have other visceral/skeletal injury
- late mortality usually due to sepsis
- sexual dysfunction 61%; persistent erectile dysfunction 19%
- starting DVT prophylaxis within 24 hours in injury reduced VTE rate to 3% (Steele, 2005, JBJS)

<table>
<thead>
<tr>
<th>Type</th>
<th>Units blood transfused</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateral compression</td>
<td>3.6</td>
<td>7% (HI common)</td>
</tr>
<tr>
<td>Anterior-posterior compression</td>
<td>14.8</td>
<td>20% (ARDS common)</td>
</tr>
<tr>
<td>Vertical Shear</td>
<td>9.2</td>
<td>0%</td>
</tr>
<tr>
<td>Combined mechanism</td>
<td>8.5</td>
<td>18%</td>
</tr>
</tbody>
</table>
Fractures of the Pelvis

Taken from Guthrie HC et al (2008) Fractures of the Pelvis, JBJS 92-B; 1481-88

- Categorised into survivors and non-survivors. Among non survivors:
  - Early death – haemorrhage and brain injury
  - Late death – sepsis, multi-organ failure

- Survivors have many long-term problems:
  - Mental health issues
  - Leg length discrepancy
  - Gait abnormalities
  - Urological or sexual dysfunction
  - Longterm unemployment

- Classification:
  - Anterior posterior compression
    - Leads to diastasis of the symphysis pubis
    - Also widening of SI joints
  - Lateral compression
    - Rotation of hemi-pelvis inwards
    - Fractures in the sacro-iliac region and pubic rami
  - Vertical shear – disruption of SI joint
  - Combination mechanism

- Must exclude open fracture (including bowel), and GU injury.

- Radiological sign suggestive of instability is associated transverse process avulsion

- Haemorrhage usually from disruption of pre-sacral and paravesical venous plexi.
  - <20% incidence of internal arterial injury
  - Predictors of major haemorrhage:
    - Hct < 30% in A&E
    - Pulse > 130 min⁻¹
    - Displaced fracture of obturator ring
    - Wide diastasis of pubis symphysis
    - Transfusion rate of 0.5 units/hour → indicator for angiography
      - But angiographic embolization does have complications: distal soft tissue necrosis, subsequent infection & sepsis
      - Packing can be performed by general surgeons in absence of early angiogram facilities; packs must be removed by 48 hours