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Pelvic fractures: classification and nursing management

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Abstract

Fractures to the pelvis can occur as a result of low-energy or high-energy trauma. Pelvic fractures may be associated with significant internal bleeding and injury to the organs within the pelvis. Patients with pelvic fractures often have complex healthcare needs; fractures resulting from high-energy trauma may be associated with multiple injuries, whereas fractures resulting from low-energy trauma, such as falls, may be associated with multiple patient comorbidities. Nurses have a fundamental role in the assessment and observation of the patient following pelvic fracture and are crucial in identifying any changes or deterioration in the patient's condition that require prompt intervention. This article focuses on the relevant anatomy of the pelvis, epidemiology and classification of pelvic fractures, and outlines the management and complications of pelvic fractures.

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Aims and intended learning outcomes

This article provides an overview of pelvic fractures, including the epidemiology and classification of fractures and management strategies. After reading this article and completing the time out activities you should be able to:

- Outline the causes and mechanisms of injury associated with pelvic fractures.
- Describe two pelvic fracture classification systems.
- Summarise the different interventions that may be used to stabilise the pelvis.
- Discuss the nursing management of patients with pelvic fractures.

Introduction

Orthopaedic injuries are common following blunt trauma incidents such as road traffic accidents, falls or crush injuries. Penetrating injuries, including gunshot or knife injuries, are becoming increasingly common. Orthopaedic injuries resulting from low-energy trauma, such as a fall from standing height, are also common, especially in older people. The severity of a pelvic fracture can vary from a minor injury to substantial trauma, which can be associated with significant mortality. Nurses have a central role in monitoring patients after these types of injuries and are therefore in an excellent position to identify potentially life-threatening situations or deterioration in a patient's condition.

The pelvis is a large cavity into which a substantial volume of blood can be lost without any clear external signs. Complications following major pelvic

trauma include exsanguination, genitourinary trauma or damage to the bowel, vagina or neural structures (Kobziff 2006). It is essential that a prompt and thorough assessment is made after any trauma or when pelvic injury is suspected.

Patients who have endured significant trauma pose many management challenges for the healthcare team. Significant trauma to the pelvis often requires prolonged periods of immobilisation and in some cases the patient may have to lie completely flat. This can make patient management more complex with, for example, difficulties in eating and drinking, toileting needs and complications associated with prolonged periods of immobilisation such as pressure ulcers.

TIME OUT

1 Identify who reviews patients as they are admitted to the emergency department, and which members of the healthcare team the patient may encounter before being admitted to the ward. Is it the same for high-energy and low-energy fractures?

Epidemiology

The incidence of pelvic ring fracture has been estimated to be approximately 23 per 100,000 people per year (Balogh *et al* 2007), with the prevalence of pelvic fractures after blunt trauma between 5% and 11.9% (Lee and Porter 2007). Patients with unstable pelvic fractures are typically poly-traumatised following a high-energy trauma (Krappinger *et al* 2010). Up to 40% of patients with an unstable pelvic ring fracture will die as a result of their injuries (Schmidt *et al* 2010). However, it should be noted that statistics on mortality associated with pelvic fractures vary greatly, mainly because of variations in the patient populations studied, for example, multiple trauma, patients in shock on arrival to hospital, older patients and stable or unstable injuries. In a study of 63,000 patients with stable or unstable pelvic fractures, Sathy *et al* (2009) reported mortality rates of 8.4% and 13.6% for patients at two different trauma centres. Statistics presented in the literature are likely to be dependent on many factors, including the severity of injuries and associated trauma, the experience and resources available and the patient's pre-existing health status. Pelvic fractures are only one variable contributing to morbidity and mortality; the severity of associated injuries, for example, head injury, is often a better predictor of mortality than the presence of an unstable pelvic fracture (Lunsjo *et al* 2007).

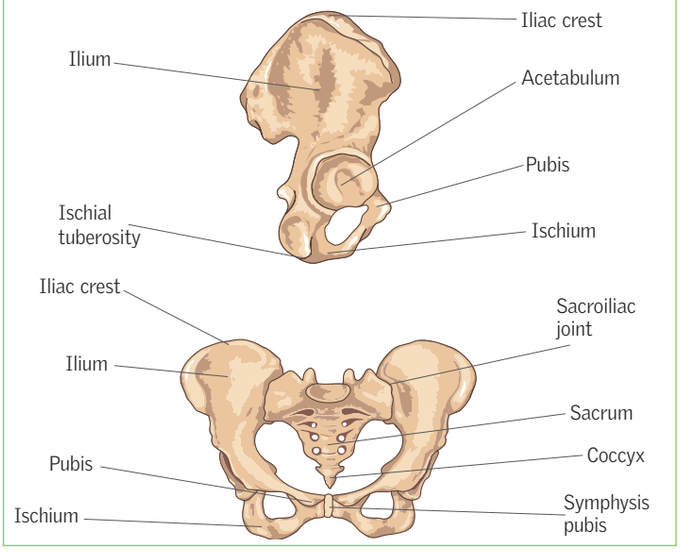
Major pelvic injuries are usually as a result of high-energy trauma such as a road traffic accident or a fall from height. Haemodynamic instability is a major predictor of death; therefore, prompt assessment and early management of patients with pelvic ring fractures is crucial. In cases of haemodynamic instability, emphasis is on timely immobilisation and stabilisation of the patient rather than stabilisation of the pelvis.

Low-energy trauma, such as a fall, can cause pelvic fractures in patients with existing pathology, such as osteoporosis. The most common pelvic fractures associated with osteoporosis are of the pubic rami and are generally classified as stable (Krappinger *et al* 2010). Other common pelvic injuries involve the acetabulum and do not result in the disruption of the pelvic ring (Hauschild *et al* 2008). The incidence of low-energy pelvic fractures generally increases with age because of the presence of osteoporosis or other pathology such as Paget's disease and the increased risk of falls (Krappinger *et al* 2010). Although low-energy fractures are not usually associated with displacement or other associated injuries, it is important that a thorough initial assessment is carried out to determine the stability of the fracture.

Complete time out activity 1

FIGURE 1

Anatomy of the pelvis



Anatomy

The pelvic girdle comprises two innominate or hip bones and the sacrum (Kobziff 2006). The innominate bones consist of the ilium, ischium and the pubis (Figure 1). The ilium articulates with the sacrum at the sacroiliac joint. The pubis articulates at the symphysis pubis, which

consists of articular cartilage and fibrous tissue. The acetabulum is the fossa formed by the ilium, ischium and the pubis bones and functions as the socket for the head of the femur. The pelvis may be referred to as the greater (false) pelvis and the lesser (true) pelvis, which relates to the superior and inferior parts of the pelvis. The pelvis is divided by an oblique line from the sacral promontory (posterior pelvis) and the symphysis pubis (anterior pelvis) to create the division between the superior and inferior pelvis.

Stability of the pelvis is dependent on bony and ligamentous structures. The posterior elements (sacrum, sacroiliac joints and ilia) function as the weight-bearing elements of the pelvis, while the anterior part of the pelvis is not involved in normal weight-bearing activity (Walla 2004).

Several ligaments stabilise the pelvis: the posterior sacroiliac ligament runs from the sacrum to the posterior iliac spine (part of the iliac crest) and provides most of the ligamentous stability to the sacroiliac joints. The sacrotuberous ligament also maintains stability of the pelvis and runs from the ischial tuberosity to the coccyx and the lateral crest of the sacrum and the posterior iliac spine (Abrahams *et al* 2005). Other ligaments of the pelvis include the sacrospinous, iliolumbar and lumbrosacral ligaments.

Bleeding in many patients with pelvic fractures is either as a result of injury to the venous sacral plexus or fractured bone surfaces (Knops *et al* 2011).

Presentation

Any history of significant blunt trauma should be treated with a high index of suspicion for a pelvic fracture. Important factors to consider when taking the patient's history are the type of injury, location of pain and where pain radiates to (Kobziff 2006). In women of child-bearing age it is also important to enquire about the date of their last menstrual period and the possibility of pregnancy.

There may be evidence of swelling, tenderness and bruising of the pubis, iliac bones, hips or sacrum, or the patient may report crepitus. Leg length discrepancy or rotational deformity of a lower limb may suggest a fractured femoral neck or migration of an unstable pelvis. The type and extent of injury needs to be determined promptly. It is important that any movement of the patient does not displace fracture segments because there is an increased risk of fracture-related haemorrhage. Springing the pelvis (distraction) is an unreliable test for trauma and should be avoided as this can cause additional injury and haemorrhage.

After a low-energy trauma the patient is likely to present with pain and local tenderness around the hip and inguinal area; it is unlikely that there will be obvious clinical signs such as haematoma or limb shortening (Krappinger *et al* 2010). The patient may be uncomfortable and unable to mobilise without experiencing severe pain. Patients with stable fractures of the pelvis are likely to have normal vital signs; however, care should be taken with older people when interpreting initial vital signs as normal systolic blood pressure may indicate hypotension in a patient with pre-existing hypertension (Demetriades *et al* 2001). In the older population, arteriosclerosis can impair vasospasm and clotting is frequently impaired by the use of anticoagulants (Kimbrell *et al* 2004). It is therefore important that any trends in hypotension or increasing tachycardia are recognised early and treated without delay. The use of scoring systems such as the modified early warning scoring tool (Higgins *et al* 2008) is useful to quantify trends in a patient's vital signs and prompt rapid action as required.

Depending on which surrounding structures have been injured, other signs of pelvic fracture may include:

- Haematoma.
- Vaginal bleeding.
- Rectal bleeding.
- Urethral bleeding.
- Swollen testicles.
- Neurological and vascular abnormalities in both legs.

Complete time out activity 2

Classification of pelvic fracture

There are several pelvic injury classification systems available. These are useful tools for describing pelvic injury and assisting in making decisions regarding treatment (Olson and Burgess 2005); however, there is currently no universally agreed classification system for pelvic fractures. As with other fractures, pelvic fractures can be referred to as open or closed fractures; further description of fractures as haemodynamically stable or unstable also helps clinicians assess the severity of the injury. The two most commonly used classification systems are the Tile classification (Tile 1988, Tile *et al* 2003) and the Young-Burgess classification (Burgess *et al* 1990).

The Tile classification considers the stability of the pelvis whereas the

2 Revise the anatomy of the pelvis and identify the structures within the pelvis that could be injured as a result of a fracture.

Young-Burgess classification is based on the mechanism of injury. The Tile classification categorises injuries according to the stability of the pelvic ring and integrity of the posterior sacroiliac complex. Categories A (stable), B (partially stable) and C (unstable) can be subdivided into different subtypes depending on the nature of the injury (Box 1).

The Young-Burgess classification considers whether the injury was sustained through anteroposterior (AP) compression, lateral compression (LC), vertical shear or a combined mechanism of injury (Figure 2). AP compression injuries, such as crush injuries or those commonly caused by motorcycle accidents, are classified as grade I, II and III depending on the severity of injury with varying diastasis (forced separation of the bones) of the symphysis pubis or sacroiliac joint (Guthrie *et al* 2010). APIII refers to the 'open book pelvis' in which there is complete disruption of the sacroiliac ligaments (Kobziff 2006).

LC injuries are sustained through force applied to the lateral aspect of the pelvic ring, such as a pedestrian being struck by a vehicle from the side, and are divided into three grades. LC I and LCII are not usually caused by a force strong enough to open the pelvis significantly; however, damage to the internal organs may still occur from fracture fragments. Patients with an LC III injury are often referred to as having a 'windswept pelvis' (Kobziff 2006), and this type of injury has the potential to cause significant damage to structures within the pelvis.

Vertical shear injuries, which can be caused by jumping from a height, are associated with ipsilateral disruption to the ligaments and iliac or sacroiliac regions (Kobziff 2006). Complex mixed pattern of injuries are a combination of injury types and do not fit into a single category.

BOX 1

Tile classification of pelvic fracture

Type A: Stable
- A1: Fractures of the pelvis not involving the ring.
- A2: Stable, minimally displaced fractures of the ring.

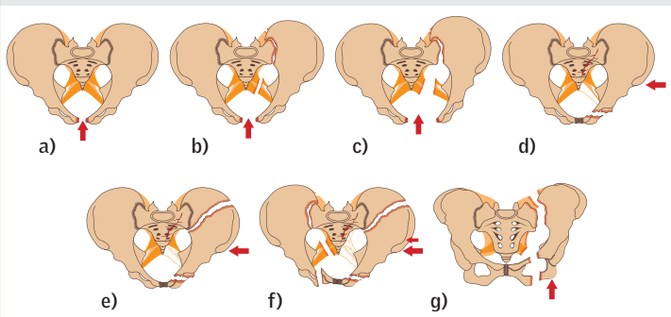
Type B: Rotationally unstable, vertically stable
- B1: Open book.
- B2: Lateral compression: ipsilateral.
- B3: Lateral compression: contralateral (bucket handle).

Type C: Rotationally and vertically unstable
- C1: Unilateral.
- C2: Bilateral.
- C3: Associated with an acetabular fracture.

(Adapted from Tile 1988)

FIGURE 2

Young-Burgess classification of pelvic fracture



a) Anteroposterior compression type I.
b) Anteroposterior compression type II.
c) Anteroposterior compression type III.
d) Lateral compression type I.
e) Lateral compression type II.
f) Lateral compression type III.
g) Vertical shear.
The arrow in each panel indicates the direction of force producing the fracture pattern.

(Figure adapted from Hak *et al* 2009)

Investigation

Instability is determined by mechanism of injury, appearance on imaging and clinical assessment (Guthrie *et al* 2010). Patients who have sustained a pelvic fracture as a result of substantial trauma are likely to have significant injury to other parts of the skeleton or other body systems. Harvie *et al* (2008) reported that two thirds of patients with pelvic and acetabular fractures had other significant injuries. It is important that a secondary assessment is carried out once the patient is stabilised to identify any other injuries.

Radiographs are commonly used to identify fractures in trauma patients. An anterior-posterior view of the pelvis will enable identification of the majority of pelvic fractures. In patients with a pelvic fracture there may be alterations to the normal contours of the pelvis (referred to as Shenton's lines), asymmetry and widening of the symphysis pubis or sacroiliac joints. An anterior-posterior view does not, however, allow the degree of bone displacement to be calculated effectively and small fractures may be missed (Kobziff 2006). Other views may be used, for example inlet views, which are useful for assessing rotational displacement and instability, and outlet views to assess for

vertical displacement and instability (Guthrie *et al* 2010). Computed tomography (CT) scans can also be used to evaluate the pelvic anatomy and determine the extent of injury. CT scans allow a more exact quantification of fracture displacement and the presence of haemorrhage.

A thorough assessment of other injuries is required including inspection of the skin and skin folds to detect the presence of open fractures. A peripheral neurological and vascular examination of the lower limbs should be carried out to ascertain whether there is any neurological or vascular injury that may affect how the patient is managed. Pelvic displacement may affect lumbar and sacral nerve roots; however, neurological problems may occur elsewhere from other injuries. A neurological assessment chart is useful for documenting assessment of myotomes (muscle power) and dermatomes (sensation) in the acute trauma patient (refer to http://tinyurl.com/668gmys). A brief vascular assessment may be done by assessing pulses and limb warmth.

A digital rectal examination should be carried out to assess sphincter tone, sensation and to establish the position of the prostate (Kobziff 2006). The presence of blood should also be noted as this may indicate bowel trauma. Signs of urethral injury may include bleeding from the urethra or scrotal haematoma. Urinalysis may show gross or microscopic haematuria; however, specialised imaging may be required to evaluate the extent of genitourinary injuries (Walla 2004).

Complete time out activity 3

Patient management

Haemorrhage

Pelvic ring injuries resulting from significant force or trauma are frequently associated with life-threatening haemorrhage and injury to other sites and internal organs (Schmidt *et al* 2010). In cases of significant trauma, it should not be presumed that the pelvis is the site of bleeding, because death often occurs as a result of associated injuries and complications rather than the pelvic fracture itself. In the case of extensive trauma the patient should be assessed and treated for hypovolaemia. It may be advisable to anticipate coagulopathy and ensure blood products (packed red cells, platelets and fresh frozen plasma (FFP)) are available for transfusion.

Pelvic stabilisation

Returning bony pelvic components back into position (apposition) reduces the pelvic volume and causes tamponade of the bleeding sources, thus reducing the potential for haemorrhage within the pelvis (Moss and Bircher 1996). Keeping the pelvis stable prevents dislodgement of clots and re-initiation of the thrombotic process. Rolling the patient onto the affected side should be avoided because this may cause additional trauma by moving the fracture fragments and may potentially lacerate internal structures or increase haemorrhage at the fracture site.

The initial goal of pelvic fracture treatment is to stabilise the pelvis to minimise movement of fragments, decrease pain and prevent further injury (Bongiovanni *et al* 2005). Appropriate stabilisation of the pelvic ring should be instigated at the earliest possible opportunity, preferably before moving the patient at the scene of the injury (Knops *et al* 2011). Non-invasive techniques to stabilise the pelvis are suitable for application at the trauma scene or on arrival at the emergency department. Numerous methods of stabilising the pelvis have been used, ranging from the use of bed sheets (Starr *et al* 2002), pelvic binders that are manufactured for the purpose (Schmidt *et al* 2010) or military anti-shock trousers (Lee and Porter 2007). The use of an appropriate pelvic splint or brace, when available, is preferable to improvised immobilisation techniques.

Care should be taken to ensure that the binder or brace is applied correctly and not so tightly that it over-corrects the anatomical position of the pelvis (Knops *et al* 2011). Circumferential pressure should be applied to the greater trochanter region rather than across the iliac crests (Nunn *et al* 2007). If the brace is left in place for extended periods of time, pressure ulcers and soft tissue injuries may occur; although this is not satisfactory, it may be preferable to removing the pelvic binder and disrupting pelvic stability and clot formation. Removal of pelvic bracing should occur only under close medical observation of the patient. Complete time out activity 4

External fixation may be appropriate in patients who are not able to undergo immediate internal fixation of pelvic injuries because of haemodynamic instability or significant damage to the soft tissues (Guthrie *et al* 2010). Although definitive management in the early stages following injury may be appropriate for fracture

3 Find out if there is a protocol where you work for administration of blood products to trauma patients or those who may be haemorrhaging.

4 Pin site management continues to be debated within current practice. Find out what your local policy is for managing patients with an external fixator and make your own notes on this. Then discuss the management of a patient with an external fixator with an experienced member of staff.

fixation, it does not take into account the patient's physiological status or the stress response induced by surgical intervention. It may therefore be necessary to delay definitive fixation until the patient's condition has stabilised. The application of external fixation provides stability to the pelvis and reduces movement until definitive surgery can be scheduled. In some cases, external fixation may be sufficient. However, patients who are treated with external fixation are at risk of pin site infection. Mason *et al* (2005) reported a 50% pin site infection rate in patients treated with definitive pelvic external fixators compared with 13% of those treated with temporary fixation before internal plating ($P<0.001$). Infection at the pin site may lead to osteomyelitis, pin loosening and consequential destabilisation of the frame fixation. Because of the increased risk of infection with prolonged application of external fixation, it is imperative that the pin sites and external fixator are managed with great care.

Malunion of fractures in the pelvis may lead to leg length inequality or rotational deformity, while asymmetry of the ischial tuberosities can cause problems when sitting (Guthrie *et al* 2010). Reconstruction and internal fixation can be carried out once the patient is haemodynamically stable. The aim of internal fixation is to create stability and to prevent or correct deformity that may have occurred as result of fracture displacement (Guthrie *et al* 2010). Internal fixation maintains the anatomic reduction of the fracture, allows earlier mobilisation of the patient and improves patient management. There are various techniques and implants that can be used for internal fixation, although the use of these often depend on the type of injury and the surgeon's preference.

Injury to organs within the pelvis

Perforations of the bowel or lacerations to the rectum may occur because of shearing forces of fracture fragments. If laceration is evident, a diverting colostomy may be required (Walla 2004). Urological injuries may be caused by shearing forces or direct laceration from bony fragments. Where urological injury is suspected, urological opinion should be sought as early as possible. Associated bladder, urethral, prostate, scrotal and vaginal damage is common where there has been extensive damage to the pelvis and internal structures. Although these injuries can be addressed in the acute setting, sexual dysfunction may be a long-term problem requiring appropriate assessment at follow-up appointments.

Complete time out activity 5

Prolonged immobility

In patients with stable injuries, appropriate analgesia and mobilisation are key to preventing complications associated with prolonged immobility. Although osteoporotic fractures of the pubic rami are not routinely monitored in the same manner as fractures sustained by a high-energy injury, it is important to be mindful that vascular injury to the pubic rami can be significant in a patient with multiple comorbidities (Chiu *et al* 2009). Older patients are also more likely to develop coagulopathy, pleural effusions and pneumonia (Starr *et al* 2002).

Nursing care

The nurse has an essential role in monitoring any changes in vital signs that would indicate hypovolaemic shock. Large quantities of blood can accumulate in the retroperitoneal space before tamponade occurs (Bongiovanni *et al* 2005). The nurse's primary role is to assess the patient and be aware of the signs and symptoms of potential complications.

Evaluation of the trauma patient

A systematic approach to the evaluation and management of the trauma patient is required to optimise the patient's condition and recovery. An ABCDE (airway, breathing, circulation, disability, exposure) approach should be taken to patient assessment. Initially, the airway should be assessed for patency, with additional care being taken in patients who have unstable or suspected spinal fractures or spinal instability. Breathing should be evaluated by assessing respiratory rate, effort and use of accessory muscles. Depth of respiration should also be assessed when considering the adequacy of ventilation and oxygenation. Oxygen therapy may be required to maintain adequate oxygenation and perfusion of the vital organs. The percentage of oxygen delivered and the patient's oxygen saturations should be monitored and documented clearly. Circulatory status should be assessed by measuring blood pressure, pulse, fluid balance (including urine output) and capillary refill time. It is important that circulatory status is regularly monitored for signs of haemorrhage and hypovolaemia, and to ensure that vital organs such as the brain, heart and kidneys are

5 Make a list of some simple interventions that can be used to minimise the risk of developing complications associated with prolonged immobility. Discuss your ideas with other members of the multidisciplinary team.

perfused adequately. Patients who are haemodynamically unstable, or at risk of haemorrhage from their injures, should be observed closely with frequent assessment of vital signs. Assessment using the Glasgow Coma Scale and peripheral neurovascular examination are also important in the poly-traumatised patient to detect changes in neurological function or the development of compartment syndrome in the limbs.

Blood products and transfusion

As the patient with an unstable pelvic fracture has the potential to exsanguinate, it is essential that the nurse anticipates the need for transfusion. Fluid replacement should be approached with care as it can increase bleeding if not used judiciously. The patient may require large quantities of blood products such as packed red cells, platelets and FFP. The use of platelets and FFP maintain adequate levels of coagulation factors and, therefore, reduce the risk of further bleeding due to coagulopathy (Bongiovanni *et al* 2005). It is important that the appropriate protocol is adhered to with regards to transfusing large quantities of blood products, and careful liaison with a haematologist and the local blood bank are advised. The patient should be blood typed and cross-matched for blood products as soon as possible after arrival at hospital to ensure that appropriate blood products are available when required. The patient may be at risk of hypothermia and coagulopathy when large quantities of blood products are infused, therefore close observation for any changes in vital signs during this period is required (Bongiovanni *et al* 2005).

Complete time out activity 6

Pain management

Post-operatively, the nurse will carry out routine observations of vital signs, including observing the operative site for bleeding, monitoring blood pressure, pulse and fluid balance, and assessing respiratory function. Pelvic fractures can be extremely painful and require appropriate assessment and management of pain to promote a speedy recovery and participation in rehabilitation exercises. If a patient is in pain, he or she will be reluctant to mobilise and will be slow to return to his or her usual activities. Uncontrolled pain may also have a negative effect respiratory function, especially in the presence of rib fractures. Poorly managed pain may impede the ability to take regular deep breaths and therefore place the patient at an increased risk of lung consolidation and respiratory tract infection. It is important that patients with cognitive impairment are assessed carefully for pain as this group of patients may not be able to verbalise the need for additional pain relief. Behaviour such as moaning, sighing or a guarded posture may indicate the presence of pain, as would physiological signs such as tachycardia and an increase in blood pressure (Krappinger *et al* 2010). Side effects of analgesia, such as increased risk of gastrointestinal bleeding and renal failure, should be considered, particularly in older patients because of the increased prevalence of comorbidities.

Complications

Complications can occur at the time of injury or at any stage of care and rehabilitation. Patients may be immobile for prolonged periods of time and consequently at risk of developing complications such as pressure ulcers, respiratory tract infections or constipation. Difficulties in eating and drinking may lead to poor nutritional status, which will affect the general health of the patient. The use of a nursing tool, such as Roper, Logan and Tierney's activities of daily living (Roper *et al* 2000), may help the novice nurse to identify actual and potential complications and plan care accordingly.

Patients who are immobile for prolonged periods of time are at increased risk of developing a venous thromboembolism. The use of appropriate thromboprophylaxis should be considered with caution as the use of anticoagulants may be contraindicated in patients with active bleeding and anti-embolic stockings may not be appropriate in the presence of compartment syndrome or lower limb trauma.

Prolonged immobility or imposed flat bed rest place the patient at risk of developing pressure ulcers. A thorough assessment of the associated risk factors should be carried out using a formalised tool such as the Braden risk assessment scale (Defloor and Grypdonck 2005). The presence of pain or the obstruction of an external fixator may prevent the patient moving independently in bed. It is important that care is taken to help reposition patients, avoiding pressure over bony prominences (Moore 2010). Pillows may be used to support patients at a 30° angle to relieve pressure from the sacrum and other bony prominences. Areas at risk of pressure damage should be inspected at least once daily and ideally each

6 Write a list of the analgesics that you would use for patients in pain. Look up the doses and side effects in the British National Formulary and consider whether these drugs would be appropriate for older patients with multiple comorbidities. If not, can you suggest a suitable alternative?

time the patient is assisted to change position (Elliott 2010). Need for repositioning should be assessed on an individual basis, and frequency may need to be increased in the presence of pressure damage. Pelvic binders should remain *in situ* and should only be removed under medical supervision. It is important that medical staff are consulted before mobilising patients for the first time. It is also of key importance that medical staff are consulted with regards to any restrictions on positioning while the patient is on bed rest. Because of the nature of pelvic fractures and instability, turning the patient onto the side of injury should be avoided as this may displace bony fragments and cause additional trauma.

Constipation may be caused by various factors, including the use of opioid analgesics, poor fluid and fibre intake and prolonged periods of reduced mobility (Madsen *et al* 2010). Encouraging a higher intake of fruit and vegetables or a higher intake of bran may help alleviate constipation in combination with stool softeners and peristaltic stimulants. Patients who are constipated are also more likely to experience difficulties urinating and may experience episodes of urinary retention. Many patients with pelvic fractures will be catheterised in the acute phase to enable close monitoring of urine output and to avoid having to use bedpans or urinals. Patients with catheters have a higher risk of developing a urinary tract infection and therefore require regular meticulous catheter hygiene. In the case of suspected urinary tract infection, a urine sample should be obtained and sent for microbiological analysis and appropriate antibiotic treatment commenced.

Nursing management should aim to prevent iatrogenic illness and should consider venous thromboembolism prophylaxis, analgesics, nutritional status and osteoporotic assessment in older patients. Occupational therapy and physiotherapy services also play a fundamental role in the rehabilitation of the trauma patient. If a pelvic fracture occurred as a result of a fall, it may be appropriate to undertake a full falls assessment, which should consider different factors such as neurological or cardiac causes. Falls assessments are typically carried out by

References

Abrahams P, Craven J, Lumley J (2005) *Illustrated Clinical Anatomy.* Hodder Arnold, London.

Balogh Z King KL, Mackay P *et al* (2007) The epidemiology of pelvic ring fractures: a population-based study. *Journal of Trauma.* 63, 5, 1066-1073.

Bongiovanni MS, Bradley SL, Kelley DM (2005) Orthopaedic trauma: critical care nursing issues. *Critical Care Nursing Quarterly.* 28, 1, 60-71.

Burgess AR, Eastridge BJ, Young JW *et al* (1990) Pelvic ring disruptions: effective classification system and treatment protocols. *Journal of Trauma.* 30, 7, 848-856.

Chiu Y, Wong TC, Yeung SH (2009) Haemodynamic instability secondary to minimally displaced pubic rami fractures: a report of two cases. *Journal of Orthopaedic Surgery (Hong Kong).* 17, 1, 100-102.

Defloor T, Grypdonck MF (2005) Pressure ulcers: validation of two risk assessment scales. *Journal of Clinical Nursing.* 14, 3, 373-382.

Demetriades D, Sava J, Alo K *et al* (2001) Old age as a criterion for trauma activation. *Journal of Trauma.* 51, 4, 754-756.

Elliott J (2010) Strategies to improve the prevention of pressure ulcers. *Nursing Older People.* 22, 9, 31-36.

Guthrie HC, Owens RW, Bircher MD (2010) Fractures of the pelvis. *Journal of Bone and Joint Surgery.* 92, 12, 1481-1488.

Hak DJ, Smith WR, Suzuki T (2009) Management of hemorrhage in life-threatening pelvic fracture. *Journal of the American Academy of Orthopaedic Surgeons.* 17, 7, 447-457.

Harvie P, Chesser TJ, Ward AJ (2008) The Bristol regional pelvic and acetabular fracture service: workload implications of managing the polytraumatised patient. *Injury.* 39, 8, 839-843.

Hauschild O, Strohm PC, Culemann U *et al* (2008) Mortality in patients with pelvic fractures: results from the German pelvic injury register. *Journal of Trauma.* 64, 2, 449-455.

Higgins Y, Maries-Tillott C, Quinton S, Richmond J (2008) Promoting patient safety using an early warning scoring system. *Nursing Standard.* 22, 44, 35-40.

Kimbrell BJ, Velmahos GC, Chan LS, Demetriades D (2004) Angiographic embolization for pelvic fractures in older patients. *Archives of Surgery.* 139, 7, 728-732.

Knops SP, Schep NW, Spoor CW *et al* (2011) Comparison of three different pelvic circumferential compression devices: a biomechanical cadaver study. *The Journal of Bone and Joint Surgery.* 93, 3, 230-240.

Kobziff L (2006) Traumatic pelvic fractures. *Orthopaedic Nursing.* 25, 4, 235-241.

Krappinger D, Kammerlander C, Hak DJ, Blauth M (2010) Low-energy osteoporotic pelvic fractures. *Archives of Orthopaedic and Trauma Surgery.* 130, 9, 1167-1175.

Lee C, Porter K (2007) The prehospital management of pelvic

specialist multidisciplinary services; it is therefore important that referrals are made in appropriate cases before discharge from hospital if it has not been possible to assess the patient fully before discharge. Long-term complications, such as impotence and dyspareunia (abnormal pain during sexual intercourse), should be assessed as part of outpatient follow up to ensure that appropriate help and support are provided. The potential for long-term pain and disability should also be considered carefully at follow-up consultations and managed with appropriate input from members of the multidisciplinary team.

Conclusion

Patients with pelvic fractures often have complex healthcare needs, which can prove challenging. The nurse has a fundamental role in monitoring patients during the acute phase of trauma and offering support and reassurance throughout the recovery process. Effective communication and co-ordination between staff is imperative, not only with regards to continuing care within the NHS, but also between paramedics and hospital staff and between departments. Involvement of the multidisciplinary team is essential to ensure effective and prompt recovery of patients with pelvic fractures and to help minimise complications associated with the injuries sustained and prolonged periods of immobility. It is essential that all on-going care needs are addressed before discharge from hospital and appropriate follow-up care put in place.

Stable pelvic fractures can increase the social dependence of older people. The involvement of the multidisciplinary team will facilitate a multifaceted approach to care and enable a holistic assessment of the patient and his or her functional capabilities. The use of clear guidelines can standardise and optimise patient care by structuring the approach to patient management and ensuring that care is based on appropriate clinical evidence **NS**

Complete time out activity 7

7 Now that you have completed the article, you might like to write a practice profile. Guidelines to help you are on page 60.

fractures. *Emergency Medicine Journal.* 24, 2, 130-133.

Lunsjo K, Tordes A, Hauggaard A, Blomgren R, Kopke J, Abu-Sidan FM (2007) Associated injuries and not fracture instability predict mortality in pelvic fractures: a prospective study of 100 patients. *Journal of Trauma.* 62, 3, 687-691.

Madsen L, Magor C, Parker BA (2010) Comparison of two bowel treatments to prevent constipation in post-surgical orthopaedic patients. *International Journal of Orthopaedic and Trauma Nursing.* 14, 2, 75-81.

Mason WT, Khan SN, James CL, Chesser TJ, Ward AJ (2005) Complications of temporary and definitive external fixation of pelvic ring fractures. *Injury.* 36, 5, 599-604.

Moore Z (2010) Bridging the theory-practice gap in pressure ulcer prevention. *British Journal of Nursing.* 19, 15, S15-S18.

Moss MC, Bircher MD (1996) Volume changes within the true pelvis during disruption of the pelvic ring – where does the haemorrhage go? *Injury*. 27, Suppl 1, S21-S23.

Nunn T, Cosker T, Bose D, Pallister I (2007) Immediate application of improvised pelvic binder as first step in extended resuscitation from life-threatening hypovolaemic shock in conscious patients with unstable pelvic fractures. *Injury*. 38, 1, 125-128.

Olson SA, Burgess A (2005) Classification and initial management of patients with unstable pelvic ring injuries. *Instructional Course Lectures.* 54, 383-393.

Roper N, Logan WW, Tierney AJ (2000) *The Roper-Logan-Tierney Model of Nursing: Based on Activities of Living.* Churchill Livingstone, Philadelphia PA.

Sathy AK, Starr AJ, Smith WR *et al* (2009) The effect of pelvic fracture on mortality after trauma: an analysis of 63,000 trauma patients. *The Journal of Bone and Joint Surgery* (American Volume). 91, 12, 2803-2810.

Schmidt A, Anglen JO, Nana AD, Varecka TF (2010) Adult trauma: getting through the night. *The Journal of Bone and Joint Surgery* (American Volume). 92, 2, 490-505.

Starr AJ, Reinert CM, Frawley WH *et al* (2002) Pelvic ring disruptions: prediction of associated injuries, transfusion requirement, pelvic arteriography, complications and mortality. *Journal of Orthopaedic Trauma.* 16, 8, 553-561.

Tile M (1988) Pelvic ring fractures: should they be fixed? *Journal of Bone and Joint Surgery* (British Volume). 70, 1, 1-12.

Tile M, Helfet DL, Kellam JF (2003) *Fractures of the Pelvis and Acetabulum.* Third edition. Lippincott Williams and Wilkins, Philadelphia PA.

Walla DJ (2004) Pelvic fractures. In Brown DE, Neumann RD (Eds) *Orthopaedic Secrets.* Third edition. Hanley and Belfus, Philadelphia PA, 286-289.

Pelvic fractures

TEST YOUR KNOWLEDGE AND **WIN** A £50 BOOK TOKEN

1. What is the incidence of pelvic ring fracture per 100,000 people per year?
a) 13 ❑
b) 23 ❑
c) 33 ❑
d) 43 ❑

2. Which of the following is not a bone of the pelvis?
a) Ilium ❑
b) Ischium ❑
c) Sacrum ❑
d) Acetabulum ❑

3. Other signs of pelvic fracture include?
a) Haematoma ❑
b) Rectal bleeding ❑
c) Neurological or vascular abnormalities in both legs ❑
d) All of the above ❑

4. An 'open book pelvis' occurs with:
a) Ipsilateral disruption to ligaments ❑
b) Complete disruption of the sacroiliac ligaments ❑
c) Lateral compression injury ❑
d) Vertical shear injury ❑

5. What does the 'E' in the ABCDE assessment stand for?
a) Exacerbation ❑
b) External ❑
c) Exposure ❑
d) Exsanguination ❑

6. Pin site infection may lead to:
a) Osteomyelitis ❑
b) Pin loosening ❑
c) Destabilisation of the frame fixation ❑
d) All of the above ❑

7. Orthopaedic injuries resulting from low-energy trauma are common in:
a) Children ❑
b) Older people ❑
c) Motorcycle riders ❑
d) Hospital workers ❑

8. What percentage of patients with unstable pelvic ring fractures will die?
a) Up to 40% ❑
b) Up to 50% ❑
c) Up to 60% ❑
d) Up to 70% ❑

9. The most common fractures associated with osteoporosis are of the:
a) Sacroiliac joint ❑
b) Coccyx ❑
c) Pubic rami ❑
d) Ischium ❑

10. Which of the following interventions should not be done if a pelvic fracture is suspected?
a) Neurological assessment of lower limbs ❑
b) Rectal examination ❑
c) Computed tomography ❑
d) Distraction ❑

This self-assessment questionnaire was compiled by Rebecca Akkermans

The answers to this questionnaire will be published on November 23

The answers to SAQ 616 on continence care, which appeared in the October 26 issue, are:
1. d 2. c 3. a 4. a 5. d
6. c 7. b 8. c 9. b 10. a

Report back

This activity has taken me ____ hours to complete.

Other comments:

_____

_____

_____

Now that I have read this article and completed this assessment, I think my knowledge is:
Excellent ❑
Good ❑
Satisfactory ❑
Unsatisfactory ❑
Poor ❑

As a result of this I intend to:

_____

_____

_____

How to use this assessment

This self-assessment questionnaire (SAQ) will help you to test your knowledge. Each week you will find **ten multiple-choice questions that are broadly linked to the learning zone article.** Note: There is only one correct answer for each question.

Ways to use this assessment

- You could test your subject knowledge by attempting the questions before reading the article, and then go back over them to see if you would answer any differently.
- You might like to read the article to update yourself before attempting the questions.

Prize draw

Each week there is a draw for correct entries. Please send your answers on a postcard to Zena Latcham, Nursing Standard, The Heights, 59-65 Lowlands Road, Harrow-on-the-Hill, Middlesex HA1 3AW, or send them by email to zena.latcham@rcnpublishing.co.uk. Subscribers can complete the assessment at www.nursing-standard.co.uk by clicking on the CPD link on the left of the homepage.

Ensure you include your name and address and the SAQ number. This is SAQ 618. Entries must be received by 10am on Tuesday November 22 2011.

When you have completed your self-assessment, cut out this page and add it to your professional portfolio. You can record the amount of time it has taken. Space has been provided for comments.

You might like to consider writing a practice profile, see page 60.