Acute nursing care of the older adult with fragility hip fracture: An international perspective (Part 2)

Ann Butler Maher RN, MS, FNP-BC, ONC (Family Nurse Practitioner) a,* 1, Anita J Meehan RN-BC, MSN, ONC (Clinical Nurse Specialist, Gerontology/Director) b, 1, Karen Hertz RN, BSc(Hons), MSc (Advanced Nurse Practitioner T&O) c, 2, Ami Hommel RN, CNS, PhD (Associate Professor) d, 3, Valerie MacDonald RN, BSN, MSN, ONC (Clinical Nurse Specialist) e, 4, Mary P O’Sullivan RGN, RM, BNS/RNT, MSc Nursing (Clinical Development Co-ordinator) f, 5, Kirsten Specht RN, MPH (PhD Student/Research Nurse) g, 6, Anita Taylor RN, OrthoNCert, GradDipOrtho, MNSc (Orthopaedic Nurse Practitioner) h, 7

a Long Branch, NJ, USA
b NICHE Program, Akron General Medical Center, Akron, OH, USA
c University Hospital of North Staffordshire, UK
d Dept. of Orthopaedics, Skane University Hospital, Lund/Dept. of Health Sciences Lund University, Sweden
e Fraser Health Authority, BC, Canada
f Cork University Hospital, Wilton, Cork, Ireland
g Dept. of Orthopaedics, Vejle Hospital, Vejle, Denmark
h Royal Adelaide Hospital, Adelaide, SA, Australia

* Corresponding author. Address: 35 Pavilion Avenue, Long Branch, NJ 07740, USA. Tel.: +1 732 571 1218.
E-mail address: annmaher@verizon.net (A.B. Maher).

1 International Collaboration of Orthopaedic Nurses.
2 Royal College of Nursing Society of Orthopaedic and Trauma Nursing.
3 Swedish Orthopaedic Nurses Association.
4 Canadian Orthopaedic Nurses Association.
5 Irish Orthopaedic Nurses Section.
6 Danish Orthopaedic Nurses Association.
7 Australian and New Zealand Orthopaedic Nurses Association.

1878-1241/$ - see front matter © 2012 Elsevier Ltd All rights reserved.
http://dx.doi.org/10.1016/j.ijotn.2012.09.002
Summary

The second part of this paper provides those who care for orthopaedic patients with evidence-supported international perspectives about acute nursing care of the older adult with fragility hip fracture. Developed by an international group of nurse experts and guided by a range of information from research and clinical practice, it focuses on nurse sensitive quality indicators during the acute hospitalisation for fragility hip fracture. Optimal care for the patient who has experienced such a fracture is the focus. This includes (in the first, earlier, part):

- Pain
- Delirium
- Pressure Ulcers
- Fluid Balance/Nutrition
- Constipation/Catheter Associated Urinary Tract Infection

Vigilant nursing assessment and prompt intervention may prevent the development of the complications we discuss. If they do occur and are identified early on, they may resolve with appropriate and timely nursing management.

This "tool kit" has been developed under the auspices of the International Collaboration of Orthopaedic Nursing (ICON) a coalition of national associations of orthopaedic nursing (www.orthopaedicnursing.org).

© 2012 Elsevier Ltd All rights reserved.

Pressure ulcers

Significance of problem/risk factors

A pressure ulcer is localised injury to the skin and/or underlying tissue usually — over a bony prominence — as a result of pressure or pressure in combination with shear (EPUAP and NPUAP, 2009). Pressure ulcers are common and present a major challenge for patients with hip fracture (Baath et al., 2010). While pressure and shearing force are the causative factors in pressure ulcer development, tissue tolerance is a key variable (DeFloor and Grypdonck, 2004). The probability of pressure ulcer development increases with the duration and magnitude of the force acting on the tissue. Shear greatly increases the risk of pressure ulcer development because it produces tissue ischemia that further reduces tissue tolerance for pressure. Inability to reposition the body — often present in the elderly — is an additional risk factor (Moore and Cowman, 2009).

Following hip fracture, pressure injury resulting in skin breakdown is devastating for the patient and costly in terms of resources needed to treat the wound(s) (Chaves et al., 2010; Remaley and Jaeblon, 2010). Lindholm et al. (2008) reported pressure ulcer prevalence as 10% on admission and 22% at discharge in a Pan-European study of hospitalised hip fracture patients while Campbell et al. (2010) reported prevalence rates of 16–55% in hip fracture patients in Canada. In the United States, Baumgarten et al. (2009) found the highest incidence of acquired pressure ulcer occurs in the hospital setting. Assessment of risk factors and strategies to prevent pressure ulcer formation among older patients serves to avoid unnecessary
suffering, improve outcomes and control resource consumption.

Houwing et al. (2004) showed that advanced age and time on the operating table were risk factors for patients with hip fractures. More recently, Haleem et al. (2008) found, in their review of 4654 consecutive patients with hip fractures, that the important factor in pressure ulcer development was delay to surgery. Specifically, delay between admission to hospital and time of surgery was the most important risk factor. Patients operated on within 24 h of admission develop significantly fewer pressure ulcers compared to those whose surgery was delayed longer than 24 h (Al-Ani et al., 2008; Hommel et al., 2007a).

A predisposition to pressure ulcer development exists in older patients, particularly in orthopaedic settings, and those with co-morbidities such as diabetes, respiratory disease, low hemoglobin, low systolic blood pressure and altered mental status (Lindholm et al., 2008; Moore and Cowman, 2008; Campbell et al. 2010). The European Pressure Ulcer Advisory Panel (EPUAP) and the US National Pressure Ulcer Advisory Panel (NPUAP), in their 2009 joint document, recognise a number of contributing factors associated with the development of pressure ulcers. This also includes cardiovascular instability, oxygen use, nutritional status and skin moisture level. However, the significance and exact relationship between these factors has yet to be established.

Assessment/detection

Pressure ulcer risk assessment is a nurse-sensitive quality indicator (https://www.nursingquality.org/). Pressure ulcers can develop rapidly in the vulnerable patient, so a skin assessment is important within six hours of admission (Riordan and Voegeli, 2009) and may be repeated as needed based on changes in the patient’s condition.

Skin assessment

Skin assessment is a process that examines every body surface of the individual for abnormalities. The nurse looks at and touches the skin from head to toe, particularly over bony prominences and any tissue subjected to prolonged pressure such as the buttocks. During this assessment the nurse uses techniques for identifying blanching response, localised heat, oedema, and induration (hardness). Blanching may not be visible in darkly pigmented skin but its colour may be different from the surrounding tissue.

Document any disruption in skin integrity present on admission. This is helpful in developing a plan of care to treat ulcers and to monitor their status. Ask the patient about any areas that are painful or uncomfortable as sensory changes may precede tissue breakdown (EPUAP and NPUAP, 2009).

A comprehensive skin assessment includes five elements:

- Temperature
- Color/discoloration
- Moisture level
- Turgor
- Skin integrity (skin is intact or there are open areas, rashes, wounds, etc. present).

Specifics about checking each of these components can be found at: http://www.ahrq.gov/research/ltc/pressureulcertoolkit/putool7b.htm. Scroll down to Tool 3B, Elements of a Comprehensive Skin Assessment. Helpful photos for assessing darkly pigmented skin can be found at: http://www.puclas.ugent.be/puclas/e/.

Pressure ulcer risk assessment

The goal of pressure ulcer risk assessment is to identify those individuals who are at risk for the development of pressure ulcers so that preventive care can be planned and implemented. The process of assessing risk is multifaceted and includes the use of a validated risk assessment scale. A pressure ulcer risk assessment scale is a tool for establishing a risk score based on a series of risk factor criteria. Hospital policy or protocol identifies the frequency with which risk assessment is to be performed. Any change in the patient’s condition requires reassessment of risk for pressure ulcer (EPUAP and NPUAP, 2009).

Moore and Cowman (2008) found that despite widespread use of risk assessment tools, no randomised trials exist that compare them with unaided clinical judgment or no risk assessment in terms of pressure ulceration. Pancorbo-Hidalgo et al. (2006) compare various risk assessment tools with unaided clinical judgment in a systematic analysis of studies of predictive validity and find that the Braden Scale offers the best predictive validity and notes that both the Braden Scale and the Norton Scale are superior to clinical judgment. The Braden Scale is most frequently used in research and, along with the Norton Scale, is recommended by the Agency for Health Care Research and Quality (AHRQ) (Berlowitz et al., 2011).

The Braden Scale (http://www.bradenscale.com) consists of six subscales (sensory perception, moisture, activity, mobility, nutrition,
and friction/shear) scored from 1–4 or 1–3 (1 for low level of function and 4 for highest level or no impairment). Total scores range from 6–23. A lower score indicates higher levels of risk for pressure ulcer development. Scores of 18 or less indicate at-risk status. This threshold may need to be adjusted for specific patient populations (Berlowitz et al., 2011).

The Norton Scale consists of five subscales (physical condition, mental condition, activity, mobility, incontinence) scored from 1–4 (1 for low level of function and 4 for highest level of functioning). The subscales are added together for a total score that ranges from 5–20. Scores of 14 or less generally indicate at-risk status. Go to: http://www.ahrq.gov/research/ltc/pressureulcer-toolkit/putool17b.htm and scroll down to Tool 3E.

The Norton Scale consists of five subscales (physical condition, mental condition, activity, mobility, incontinence) scored from 1–4 (1 for low level of function and 4 for highest level of functioning). The subscales are added together for a total score that ranges from 5–20. Scores of 14 or less generally indicate at-risk status. Go to: http://www.ahrq.gov/research/ltc/pressureulcer-toolkit/putool17b.htm and scroll down to Tool 3E.


<table>
<thead>
<tr>
<th>Category/Stage Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I: Non-blanchable erythema</td>
<td>Intact skin with non-blanchable redness of a localised area usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its colour may differ from the surrounding area. The area may be painful, firm, soft, warmer or colder as compared to adjacent tissue. Category I may be difficult to detect in individuals with dark skin tones. May indicate &quot;at risk&quot; persons.</td>
</tr>
<tr>
<td>II: Partial thickness</td>
<td>Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serosanguinous-filled or serosanguinous-filled blister. Presents as a shiny or dry shallow ulcer without slough or bruising. This category should not be used to describe skin tears, tape burns, incontinence-associated dermatitis, maceration or excoriation.</td>
</tr>
<tr>
<td>III: Full thickness skin loss</td>
<td>Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling. The depth of a Category/Stage III pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have (adipose) subcutaneous tissue and Category/Stage III ulcers can be shallow. In contrast, areas of significant adiposity can develop extremely deep Category/Stage III pressure ulcers. Bone/tendon is not visible or directly palpable.</td>
</tr>
<tr>
<td>IV: Full thickness tissue loss</td>
<td>Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present. Often includes undermining and tunneling. The depth of a Category/Stage IV pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have (adipose) subcutaneous tissue and these ulcers can be shallow. Category/Stage IV ulcers can extend into muscle and/or supporting structures (e.g., fascia, tendon or joint capsule) making osteomyelitis or osteitis likely to occur. Exposed bone/muscle is visible or directly palpable.</td>
</tr>
</tbody>
</table>

Additional Categories/Stages for the USA

Unstageable/unclassified:

- Full thickness skin or tissue loss — depth unknown

- Suspected deep tissue injury — depth unknown

Evolution may be rapid exposing additional layers of tissue even with optimal treatment.
important is that the actual definition of pressure ulcer and the level of skin/tissue injury are the same, regardless of term used. For definitions of the categories/stages, refer to Table 6. Go to http://www.logicalimages.com/publicHealthResources/pressureUlcer.htm to view photos of pressure ulcers with illustrations of the depth of the wound; or to http://www.nursingquality.org and click on Pressure Ulcer Training to view Module One.

Prevention strategies

It is universally agreed that pressure ulcers are best prevented. Samuriwo (2010) suggests that nurses who place a high value on pressure ulcer prevention appear to be more proactive and determined to deliver care that protects their patients’ skin. Carson et al. (2012) describe the development and implementation of an evidence based pressure ulcer prevention initiative. An underlying focus of the framework for this initiative was to improve the knowledge of clinical staff and to strengthen the staff-nurse skin care champion model. Harrison et al. (2008) report on a proactive program to implement practice guideline recommendations on pressure ulcer prevention. This program also created unit-based skin care champions who use a peer to peer learning approach to enhance the knowledge of clinical staff and develop a unit based nurse resource model. Harrison et al. (2008) report on a proactive program to implement practice guideline recommendations on pressure ulcer prevention. This program also created unit-based skin care champions who use a peer to peer learning approach to enhance the knowledge of clinical staff and develop a unit based nurse resource model. Both programs demonstrated a decrease in pressure ulcer prevalence in their respective health care settings.

Pressure ulcers can develop at any time during hospitalisation. Prolonged periods in the supine position may contribute to the development of such an injury. Organisations should use some form of pressure relieving surface for high risk patients on nursing units, in the operating theatre, and in the emergency department (Beckett, 2010; Pham et al., 2011a; Pham et al., 2011b). Despite best efforts in some instances, pressure ulcer development is an unavoidable consequence of multiple organ failure or pre-admission circumstances, such as a patient who has fallen and was lying on a hard surface for many hours prior to hospital admission.

Nutritional status

Malnutrition is a common problem in hospital patients and often goes unrecognised (Somanchi et al., 2011). Older patients with hip fracture may have poor nutritional status. Patients who are malnourished on admission to the hospital are twice as likely as well-nourished patients to develop pressure ulcers (Thomas, 2006). However, it is possible to reduce the development of hospital-acquired pressure ulcers among elderly patients with a hip fracture even though they have poor pre-fracture nutritional status (Hommel et al., 2007b). Refer to the section on Nutrition/Malnutrition in this document for more information on nutritional assessment and intervention.

Skin care and treatment

Appropriate preventive care for skin may minimise progression to actual pressure ulcer. Normal age related changes result in older adults having dry skin. Use skin emollients for hydration as dry skin is a significant risk factor on its own. Protect skin from excessive moisture using a barrier product as needed. When deciding on treatment plans, distinguish skin excoriatio due to incontinence (incontinence associated dermatitis) from pressure ulcer. Photos that demonstrate skin excoriatio can be found at: http://www.tissueviabilityonline.com/pu. Click on Grading and Tools, then on Excoriatio Tool.

Pressure reducing support surfaces

Reducing the amount, duration and intensity of pressure exerted on the skin is the most effective strategy for pressure ulcer prevention (Sakai et al., 2009). Place individuals at high risk of developing pressure ulcers on pressure relieving surfaces rather than a standard hospital mattress. However, it is not clear if an alternating-pressure mattress or a constant low pressure mattress provides a superior benefit (McInnes et al., 2011). Medical grade sheepekins are associated with a decrease in pressure ulcer development (McInnes et al., 2011). EPUAP/NPUAP Consensus Guidelines (2009) recommend avoiding cutouts, rings or donut devices as these increase pressure.

Repositioning

Repositioning is an essential aspect of prevention. Repositioning encourages reperfusion to tissues and reduces the risk of developing pressure related ischemia. Repositioning schedules and technique incorporate the patient’s medical condition, functional ability and support surface used. The patient with a hip fracture may present unique repositioning challenges. Preoperatively, consider the fracture stabilisation technique being used and postoperatively consider fracture fixation technique and limitations on motion prescribed by the physician.
When repositioning a patient it is important to lift, not drag, the patient across the support surface. Transfer aids such as overhead lift equipment, if available, help reduce friction and shear forces. The use of these devices must be made with consideration of the type of fracture and postoperative limitations imposed. Repositioning a patient with a hip fracture may require more than one caregiver.

In general, do not turn a patient onto a body surface that remains reddened after previous repositioning as this indicates the skin on that surface has not recovered from pressure loading. Massaging or vigorously rubbing at-risk skin surfaces can be painful and may cause tissue damage. Maintain the patient’s heels off the bed surface by using heel-protection devices, e.g. a waffle boot or a pillow under the calf. Placing a pillow under the calves and keeping the knee in slight flexion may help to minimise risk of deep vein thrombosis.

When repositioning the patient on their side after surgery, consider any postoperative restrictions. Place a pillow or padding between the legs to prevent tissue trauma at the knees and ankles. When raising the head of the bed for patients who are allowed postoperative hip flexion, raise the knees first, then the head of the bed (no more than 30 degrees). Roll the patient slightly to one side to release shear, then settle back down so that the patient’s hips and knees are in alignment with the bends in the bed (Mimura et al., 2009) A 30-degree lateral position is often recommended. Even if the patient is lying on a pressure-reducing mattress, assisting the patient with scheduled repositioning decreases the risk of pressure ulcers (DeFloor et al., 2005). When the patient is able to sit in a chair, limit the time and use a pressure redistribution surface to avoid pressure ulcer development.

Self-management strategies

With your guidance, patients and their families can participate in preserving intact skin. Some guidelines recommended by Nurses Improving Care for Healthsystem Elders NICHE (2010) include:

1. Change position at least every 2 h to relieve pressure

PRESSURE ULCER - QUICK REFERENCE

SIGNIFICANCE/PREVALENCE
Following hip fracture, pressure injury resulting in skin breakdown is not only devastating for the patient but costly on human and material resources.

DETECTION/ASSESSMENT
As pressure ulcers can develop rapidly in vulnerable patients, a thorough risk assessment is required at admission and repeated according to institutional standards. Different risk assessment scales can be used together with clinical judgment. The following parameters are considered a minimum for a comprehensive skin assessment:

- Temperature
- Color
- Moisture level
- Turgor
- Skin integrity (skin intact or presence of open areas, rashes, etc.)

DEFINITION
A pressure ulcer is a localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure or pressure in combination with shear.

CLASSIFICATION SYSTEM
EPROMAP and NPUAP define pressure ulcer by category or grade or stage and has agreed upon four levels of injury. The terms, unclassified/unstageable and deep tissue injury are generally graded as “IV” in Europe, NPUAP has put them separately. This staging system can be found on www.epromap.org.

This difference must be considered when comparing cross-country data.

- Category I Non-blancheable erythema
- Category II Partial thickness skin loss
- Category III Full thickness skin loss (non-surgical)
- Category IV Full thickness skin loss (surgical)

SELF RECOMMENDATIONS
- Change position at least every two hours
- Inspect the skin every day
- Moisturize dry skin
- Tell your nurse if you develop reddened, purple, painful or sore areas
- Don’t rub or massage over-reddened or sore areas
- Tell your nurse if you have leaking urine or stool
- Clean skin immediately if soiled with urine or stool
- Use pillows to pad between knees and ankles
- Do not lie directly on hips/one
- Do not use ring shaped cushions (they add pressure)
- Talk to health care provider about getting a special mattress
- Enrich nutritional state

EVIDENCE BASED PREVENTION
The major steps of pressure ulcer prevention are:

- Assessment of development risk
- Skin care and initial treatment
- Use of pressure-reducing support surfaces
- Education
- Reducing the pressure, intensity and duration of the pressure exerted on the skin
- Repositioning the patient

Prevention in individuals at risk should be provided on a continuous basis during the time that they are at risk.
2. If you cannot move yourself, ask for help changing your position
3. Moisturise dry skin
4. Tell your nurse if you develop reddened, purple, or sore areas
5. Tell your nurse if you have a problem with leaking urine or stool
6. Clean your skin immediately if you get urine or stool on it
7. Use pillows to pad areas between knees and ankles. Elevate heels off the bed or foot rest on chairs
8. Do not lie directly on your hip bone
9. Eat a well-balanced diet

For the complete list, you can view the entire brochure at http://nicheprogram.org/need_to_know. Click on Skin Care: Pressure Ulcers.

**Fluid balance and nutrition and elimination**

**Significance of the problem**

When older adults present with an acute hip fracture they do so in the context of frailty, often with pre-existing medical co-morbidity and other functional and psychological issues. Older adults following hip fracture repair may experience one or more common post-operative complications including delirium, CCF, pneumonia, DVT, PE, pressure ulcer, arrhythmia, myocardial infarct, anaemia and mortality’ (Agency for Clinical Innovation, 2010). These ‘common’ complications can impact the fluid balance, nutrition and elimination status of the older adult with hip fracture and rarely occur in isolation. This section addresses those aspects of care that benefit most from nurse-initiated intervention: dehydration, malnutrition, constipation and catheter associated urinary tract infections.

**Fluid balance**

**Scope of the problem**

Age related changes in homeostatic mechanisms and underlying co-morbidities increase the vulnerability of older people to the physiological stresses associated with the hip fracture and surgery. White et al. (2009) found renal dysfunction in 36% of patients admitted with hip fracture and Carbone et al. (2010) reported the incidence of heart failure as 21% in this population. Frail older hospitalised patients are at risk for iatrogenic dehydration, fluid overload, heart failure, and electrolyte disturbances. Pre-existing heart failure or renal conditions are likely to worsen with the stress of surgery and the hospital experience. These are serious conditions that may lead to organ damage, delirium, functional decline and mortality. Fluid balance monitoring and optimisation is a clinical imperative for this population.

**Dehydration**

Dehydration is highly prevalent among the hospitalised older adult with significant adverse consequences. Institutionalised older adults admitted to acute care from residential facilities tend to present with dehydration due to pre-existing restricted fluid intakes. It is highly probable the older adult is dehydrated on presentation to hospital with hip fracture (Hodgkinson et al., 2001). Hospitalisation may compound pre-existing dehydration or increase the risk of dehydration. Dehydration decreases circulatory volume resulting in diminished perfusion to organs and tissues and is implicated in the development of delirium, renal failure, pressure ulcers, falls, venous thromboembolism, impaired mobility, catheter associated urinary tract infection (CAUTI) and cystitis.

Dementia, delirium and decreased manual dexterity and immobility as well as communication and sensory impairments may all contribute to dehydration, particularly if a delay to hospital presentation has occurred. The hip fracture and surgery may result in significant blood loss. Normal age related changes result in a diminished thirst reflex and subsequent diminished fluid intake. Those patients who suffer from incontinence may limit fluid intake as a measure to reduce the risk of incontinence due to perceived lack of timely access to toileting. Limited mobility, unfamiliar environment, concerns that requests for assistance will not be prompt enough to meet their need and the desire to preserve dignity are factors that may influence this decision. Since hip fracture occurs in an emergency context, delay to surgery with an extended period of pre-operative fasting is also a risk factor.

**Assessment/detection**

Evidence supports taking a thorough clinical history that includes identifying the patient’s average daily fluid intake. The following signs and symptoms may indicate dehydration:

- Diminished urine output
- Hypotension, tachycardia
- Dry lips, mucous membranes, diminished skin turgor
- Muscle weakness, dizziness, restlessness, headache
• Delirium which may be hypoactive

Upon presentation there are a range of strategies the nurse can employ including clinical and biochemical analysis (urine and blood markers) to assist in assessment of dehydration.

Prevention and management strategies
Fluid and electrolyte management begins in the Emergency Department with an accurate assessment and formal recording of the patient’s fluid status including documentation of the time (approximate) the fracture occurred. Once a review of the patient’s coexisting medical problems is correlated against their likely fluid balance, patients should have clinical and laboratory assessment for possible hypo or hypervolaemia, electrolyte balance and any identified deficiencies appropriately and promptly corrected (Scottish Intercollegiate Guidelines Network, 2009).

Where delay to surgery occurs and extended periods of fasting ensue, nursing staff must ensure the patient receives adequate hydration. Wherever possible, attempts must be made to minimise periods of fasting from oral food and fluids in accordance with local guidelines and policies that reflect best evidence. Mouth care is important at all times but it is especially important when oral fluids are restricted.

Nursing staff must continually assess the patient for signs and symptoms of dehydration and fluid overload as clinically indicated and in response to the patient’s condition. Strategies include: ensuring regular vital sign observations, maintaining accurate documentation of fluid balance and prompt reporting of alterations to the patient’s status. A nursing assessment of swallow and/or referral for formal swallow screen should occur where there is concern about the safety of the patient’s ability to swallow. Early resumption of oral intake in the post-operative period is preferable, with intravenous or subcutaneous supplementation secondary.

Patients’ access to fluids in the hospital setting is often limited. Drinking containers should be ergonomically suited to be manipulated by older patients and placement of the container made in consideration of any visual limitations. Nurses should proactively offer fluids with each visit rather than inquiring about the patient’s desire for a drink. Intentional hourly nursing rounds (‘rounding’) should include hydration needs. The following link to the Hartford Institute for Geriatric Nursing’s ‘Try This’ series provides added recommendations for hydration management. http://www.consultgerirn.org/topics/hydration_management/want_to_know_more.

Fluid overload/heart failure

Certain populations of older adults with hip fracture require more careful monitoring for fluid overload/heart failure. Diminished cardiac and renal function renders the frail older adult susceptible to fluid overload i.e. more fluid than the heart can effectively pump. (See Scottish Intercollegiate Guidelines Network SIGN 95, 2007 http://www.sign.ac.uk/guidelines/fulltext/95/index.html & National Heart Foundation of Australia, Cardiac Society of Australia and New Zealand, Chronic Heart Failure Guidelines Expert Writing Panel. Guidelines for the prevention, detection and management of chronic heart failure in Australia, 2006).

Assessment/detection
Risk factors include cardiac or renal disease, large or rapid infusions of fluids and intravenous infusion with sodium solution. Heart failure manifests with pulmonary and peripheral oedema (Hartree, 2010).

The stress of surgery leads to an increased secretion of the antidiuretic hormone (ADH) which impairs the ability to excrete sodium and water. Symptoms to monitor include:

• urinary output less than 30 cc per hour
• increasing blood pressure
• shortness of breath
• moist breath sounds
• dependent edema

Prevention and management strategies
Carefully monitor fluid intake and output. Titrate fluids, administer diuretics and/or restrict sodium in consultation with physician or advanced practice nurse.

Electrolyte disturbances

Scope of the problem
Renal and cardiac decline, dehydration and fluid administration and fluid losses during surgery increase the risk of electrolyte disturbances. Hyponatremia is the most common electrolyte imbalance in the older population and is associated with delirium and falls (Gankam Kengne et al., 2008). Elevated serum urea nitrogen and hyper or hyponatremia are associated with significantly
higher mortality rates when left untreated (Lewis et al., 2006).

Assessment/detection
Risk factors include cardiac or renal dysfunction, dehydration or fluid overload and the use of diuretics. Consult with the physician or advanced practice nurse to ensure that lab tests are ordered for appropriate patients. Blood electrolytes and renal function should be regularly monitored until returned to baseline (Agency for Clinical Innovation, 2010).

Prevention and management strategies
- Monitor and manage fluid balance as described above.
- Consult with physician or advanced practice nurse for clinical interventions to address imbalances. For example, an accurate haemoglobin assessment is needed to prevent impaired functional ability, dizziness, delirium and risk of fall. In that case the nurse consults with the physician to ensure iron supplementation and blood transfusion is ordered if indicated.

Self-management strategies
Engage patient and family in learning about the:
- Importance of hydration and how dehydration and overhydration adversely affects health and personal goals (e.g. decreased energy, falls etc.).
- Strategies for facilitating hydration e.g. readily available water — hot or cold, flavoured or not, decaffeinated drinks, in easily manipulated containers, drink offered with each interaction, written and verbal reminders.
- Strategies to mitigate incontinence e.g. timing of fluids earlier in the day, limiting of fluids throughout the day as appropriate, regularly scheduled toileting.
- Chronic illness/Medications and their impact on fluid balance. Importance of adhering to dietary and fluid restrictions/guidelines.
- Warning signs of dehydration, overload and what to do.

Malnutrition
Scope of problem
Malnutrition is often associated with ageing and is characterised by "diminished hunger & thirst, chronic illness patterns, dentition issues and social isolation" (MacDonald, 2011). Studies show that 30–50% of patients admitted to an orthopaedic unit suffer from malnutrition (Ponzer et al., 1999; Eneroth et al., 2005). Fry et al. (2010) reported that patients with pre-existing malnutrition have a 2.5 times greater risk of developing a surgical site infection, a 5.1 times greater risk of developing a catheter associated urinary tract infection and are 3.8 times more likely to develop a pressure ulcer than those without malnutrition. Koren-Hakim et al. (2012) found that poor nutritional status was associated with "higher co-morbidity indices, mortality and readmissions".

While hospitalised, it is estimated that hip fracture patients consume only half their recommended daily energy, protein and other nutritional requirements (British Orthopaedic Association, 2007) and despite the development of fasting guidelines patients continue to be kept without food or water for too long prior to surgery.

Assessment/detection
The nurse is best placed to assess and monitor a patient’s nutritional status particularly when the need for nutrition support in an acute care setting often exceeds the dietetic resources available. The nurse can play a critical role in identifying the ‘at risk’ patient, assess nutritional status and initiate nutritional care that will aid recovery and prevent functional decline, including an assessment of mental capacity to consent (Jackson et al., 2011). Nutrition for this patient population is an inter-disciplinary concern (British Orthopaedic Association, 2007) requiring constant vigilance and liaison. Examples of nursing interventions to ensure timely nutrition support include:
- Nutrition history.
- Weigh on admission; weight history (recent loss/gain) and observe for lack of body fat, dry skin & skin turgor.
- Nutrition Assessment & Screening (such as MUST by BAPEN (2003) (British Association of Parenteral Nutrition see http://www.bapen.org.uk/musttoolkit.html).
- Speech pathology review/consult for swallow evaluation, when symptoms present and as appropriate.
- Minimise the period of preoperative fasting, in accordance with policies and anesthesia protocols.
- Where concern exists document food & fluid intake (Food Diary).
• Encourage early resumption of oral intake particularly oral protein and energy supplementation as a strategy to minimise postoperative complication rate.
• Initiate appropriate multi-nutrient supplements that are high energy and high protein containing appropriate levels of vitamins and minerals at the earliest convenience in the pre-operative period where possible; Dietician review/consult for additional nutrition support.
• Initiate nourishing fluids/mid-meal snacks.
• Optimise oral intake at meals: dentures, positioning for meals, assisting feeding as necessary.

Where extended periods of inadequate oral intake occur, consideration must be given to avoid 're-feeding syndrome'. This is a condition of metabolic and electrolyte disturbance which occurs when nutrients are replaced too quickly following a period of inadequate nutritional intake for 5 days or more (National Institute for Health and Clinical Excellence, 2006). Every effort should be made to avoid this syndrome through appropriate and timely renourishment as potentially fatal shifts in fluids and electrolytes can occur (Mehanna et al., 2008). A systematic review by Skipper (2012) noted that although "there is no widely accepted or uniformly applied set of defining characteristics for diagnosing refeeding syndrome, hypophosphatemia was a consistent finding".

For those patients where a high index of suspicion exists for poor nutrition, consider early dietary consult with the goal of optimizing nutritional status. A number of studies demonstrate positive benefits of early nutritional supplementation (Volkert et al., 2006 & Milne et al., 2006). In the event of an inability of the patient to take food orally, consideration should be given to temporary naso-gastric feeding. This decision should be made in full consultation with the patient and family and with full consideration of mental capacity, the prognosis, advanced care planning and end-of-life decision making. The issue of supplementary feeding, treatment escalation and palliation and the timing of such may need to be explored.

Self-management strategies
Self-care strategies address both in-hospital and out-of-hospital care and may include: the social aspects of eating and drinking in hospital in which elderly patients can benefit from eating together with other persons in a dining room setting in the hospital (Gordge et al., 2009), strategies to establish a normal routine, supporting people with dementia, help with opening containers and packets, use of strategies such as red trays and other methods to prioritise high risk patients and inclusion of informal carers appropriately in supporting good nutrition in hospital as an adjunct to professional nursing care. Engage patient and family in learning about the:

• Importance of nutrition in preserving health and personal goals e.g. preventing hospitalisation, re-hospitalisation, falls, post-operative infection etc.
• Consult with dietician to develop specialised menus and meal planning strategies at home.
• Need for families to monitor: ability to obtain food, prepare meals and the tendency to regularly skip meals, especially if living alone.
• Community resources for meals and dietary assessment/services.
• Strategies to mitigate incontinence e.g. timing of fluids earlier in the day, regularly scheduled toileting.
• Chronic illness/Medications and their impact on fluid balance. Importance of adhering to dietary and fluid restrictions/guidelines.
• Warning signs of dehydration, overload and what to do.
Continence

An assessment of continence should be made on admission as part of the comprehensive assessment. Early resumption of baseline bowel & bladder habits must remain the priority for the older adult hospitalised with hip fracture. This section addresses two common complications related to elimination: constipation and catheter-associated urinary tract infection (CAUTI).

Constipation

Risk factors
Prevention of constipation should be considered in the early management of hip fracture patients. Constipation is made worse by dehydration, immobility, poor fluid intake, decreased dietary fibre and general changes to normal dietary routines. Opioid analgesics, even in low doses also cause constipation (Scottish Intercollegiate Guidelines Network, 2009). Constipation is an under-appreciated cause of delirium in the older patient.

Assessment/detection
Constipation can manifest at any point along a continuum that ranges from general gut discomfort, nausea and vomiting, abdominal or rectal pain to abdominal distension and bowel obstruction. Agitation and delirium may accompany any or all of these symptoms The Joanna Briggs Institute (JBI) (2008) best practice guidelines suggest the following:

- Document baseline [on admission to hospital] and usual bowel patterns.
- Evaluate and document severity of constipation.
- Document improvements or progression of constipation &/or response to management of constipation.

Prevention and management strategies
An emphasis on privacy, dignity, good accessibility to toilet facilities (especially for people with dementia/delirium), orientation and signage are strategies the nurse can initiate to minimise constipation. Wherever possible the impact of constipation should be minimised and at best avoided altogether through the implementation of an evidence based bowel protocol that incorporates pre-emptive aperients/laxatives, a high fibre diet and fluids as recommended in the British National Formulary for drug-induced constipation (Scottish Intercollegiate Guidelines Network, 2009) or consideration given to using a standardised grading tool such as the Bristol Stool Scale (Lewis and Heaton, 1997). Conversely, overuse of laxatives or inadequate drinking should not be underestimated as a problem surrounding the management of constipation.

Some recommendations for practice include:

- Delay to surgery and extended periods of fasting for surgery can affect bowel function and should be avoided wherever possible or proactively managed as appropriate.
- Unless otherwise restricted, fluids should be encouraged to a minimum of 1500 mL of oral fluid daily.
- A regular toileting regime (every 2 h) that encourages ambulation and discourages the use of bedpans should be adopted.
- Close monitoring of bowel habit should be recorded including description of, frequency and amount of bowel movement daily (SIGN 2009).
- Aim for a bowel movement by post op day 2 then 48 hourly thereafter (Auron-Gomez and Michota, 2008).
- Efforts should be made using the above strategies to prevent secondary fecal impaction (Western Australian Department of Health, 2008).

Catheter associated urinary tract infection (CAUTI)

Scope of problem
Reportedly 40% of all nosocomial infections are attributed to infections of the urinary tract (UTI) and 80% of these infections are associated with the use of an indwelling urinary catheter (IUC) (Joanna Briggs Institute, 2010; Centre for Disease Control, 2009). Asymptomatic bacteriuria is a common occurrence in older adults with hip fracture (SIGN, 2009) and the use of an indwelling urinary catheter (IUC) increases the risk for CAUTI. Care providers may see indwelling urinary catheters as beneficial, helping to prevent falls and to address urinary incontinence and patients will sometimes request them or refuse discontinuation. It is important to remember that IUC’s are not innocuous devices. In addition to increasing the risk for CAUTI, indwelling catheters are associated with local trauma to the urinary meatus, restriction of mobility, pain, encrustation, delirium and increased risk for mortality. A high index of suspicion for urinary tract infection (UTI) should be ever present in the older adult with hip fracture.
Assessment and risk factors
The most significant risk factors for the development of catheter associated urinary tract infections include; insertion technique, inadequate cleansing with soap and water, prolonged ‘dwell time’ and failure to maintain a ‘closed’ system of drainage (Centre for Disease Control, 2009). Admission assessment should include information regarding the nature of the patient’s usual bladder function. Ongoing vigilance for and documentation of the signs and symptoms of UTI must continue throughout hospitalisation. An indwelling urinary catheter should be used in operative patients as an exception rather than as a routine.

The Centre for Disease Control (2009) supports the following indications for indwelling urinary catheter use:

- Urinary retention or obstruction unrelied by straight catheterisation.
- Stage 3 or 4 pressure ulcer in perineal area, sacrum or ischial tuberosity.
- Close monitoring of cardiac or renal function in critically ill patients.
- Comfort care measure in terminal illness.
- Prolonged surgical intervention or surgery requiring decompression of the bladder.

Prevention and management strategies
The presence of a catheter predisposes the patient to acquiring a urinary tract infection. When an indwelling urinary catheter is deemed necessary, incorporate maintaining adequate fluid balance with accurate recording of input and output, effective analgesia and routine catheter care into daily nursing care. There is unanimous support for the removal of the catheter at the earliest convenience, preferably within the first 24 h, to minimise infection, (CDC, 2009; Wald et al., 2005; Lo et al., 2008). If there is a need to retain the catheter after 24 h, the clinical indication should be documented and continual monitoring for removal when clinically appropriate. After removal, monitoring the

FLUID BALANCE/NUTRITION/CONTINENCE MANAGEMENT - QUICK REFERENCE

FLUID BALANCE
The frail older adult admitted with hip fracture is at risk of dehydration, fluid overload, heart failure and electrolyte disturbance. Patients with pre-existing medical co-morbidities, functional and/or psychological issues are extremely vulnerable.

DEHYDRATION
Decreased circulating volume results in diminished perfusion to organs & tissues.

Signs and Symptoms
- Diminished urine output
- Hypotension, tachycardia
- Dry lips, mucous membranes, diminished skin turgor
- Muscle weakness, dizziness, restlessness, headache

Prevention/Management
- Earliest fluid & electrolyte management
- Clinical & biochemical markers (urine & blood)
- Accurate fluid balance
- Adequate hydration
- Minimise extended periods of fasting
- Early resumption of oral intake postop
- Offer regular fluids

FLUID OVERLOAD/HEART FAILURE
Risk Factors
- Cardiac or renal disease
- Large or rapid infusion of fluids
- Intravenous infusion with sodium solution
- Close monitoring of cardiac or renal function in critically ill patients.
- Comfort care measure in terminal illness.
- Prolonged surgical intervention or surgery requiring decompression of the bladder.

Prevention and management strategies
The presence of a catheter predisposes the patient to acquiring a urinary tract infection. When an indwelling urinary catheter is deemed necessary, incorporate maintaining adequate fluid balance with accurate recording of input and output, effective analgesia and routine catheter care into daily nursing care. There is unanimous support for the removal of the catheter at the earliest convenience, preferably within the first 24 h, to minimise infection, (CDC, 2009; Wald et al., 2005; Lo et al., 2008). If there is a need to retain the catheter after 24 h, the clinical indication should be documented and continual monitoring for removal when clinically appropriate. After removal, monitoring the

FLUID BALANCE/NUTRITION/CONTINENCE MANAGEMENT - QUICK REFERENCE

FLUID BALANCE
The frail older adult admitted with hip fracture is at risk of dehydration, fluid overload, heart failure and electrolyte disturbance. Patients with pre-existing medical co-morbidities, functional and/or psychological issues are extremely vulnerable.

DEHYDRATION
Decreased circulating volume results in diminished perfusion to organs & tissues.

Signs and Symptoms
- Diminished urine output
- Hypotension, tachycardia
- Dry lips, mucous membranes, diminished skin turgor
- Muscle weakness, dizziness, restlessness, headache

Prevention/Management
- Earliest fluid & electrolyte management
- Clinical & biochemical markers (urine & blood)
- Accurate fluid balance
- Adequate hydration
- Minimise extended periods of fasting
- Early resumption of oral intake postop
- Offer regular fluids

FLUID OVERLOAD/HEART FAILURE
Risk Factors
- Cardiac or renal disease
- Large or rapid infusion of fluids
- Intravenous infusion with sodium solution
- Close monitoring of cardiac or renal function in critically ill patients.
- Comfort care measure in terminal illness.
- Prolonged surgical intervention or surgery requiring decompression of the bladder.

Prevention and management strategies
The presence of a catheter predisposes the patient to acquiring a urinary tract infection. When an indwelling urinary catheter is deemed necessary, incorporate maintaining adequate fluid balance with accurate recording of input and output, effective analgesia and routine catheter care into daily nursing care. There is unanimous support for the removal of the catheter at the earliest convenience, preferably within the first 24 h, to minimise infection, (CDC, 2009; Wald et al., 2005; Lo et al., 2008). If there is a need to retain the catheter after 24 h, the clinical indication should be documented and continual monitoring for removal when clinically appropriate. After removal, monitoring the
patient for retention/incontinence is required (Auron-Gomez and Michota, 2008).

Further research is recommended regarding the benefits of antimicrobial (silver and antibiotic impregnated) catheters to reduce CAUTI (Schumm and Lam, 2008; CDC, 2009). Inserting the smallest lumen catheter possible (CDC, 2009:12) and instilling 5 mL in the balloon minimises bladder irritation and trauma to bladder neck and urethra. It is important to secure the catheter, avoid dependent loops in the drainage tube and position the collection bag below the level of the bladder (CDC, 2009). Nurses play a significant role in reducing the incidence of CAUTI by advocating for use only when clinically necessary and discontinuing as soon as possible.

Self-management strategies
Engage patient and family in learning about:

- Risk factors, prevention and management of constipation (e.g. high fibre diet, fluids, mobility).
- Risks for and strategies to prevent urinary tract infection.
- Perineal hygiene, adequate hydration, avoid indwelling catheter use/alternative strategies to manage urinary incontinence. http://consultgerim.org/topics/urinary_incontinence/want_to_know_more

Disclaimer
This article was developed using a range of literature which included evidence-based research, consensus documents, guideline statements, systematic reviews and peer reviewed publications and also was informed by best practice and content expert commentary. The information presented in this article is to educate and inform the reader about common complications of fragility hip fracture in older adults. The decision to use specific assessment methods and interventions must be made by the individual practitioner/health care organisation relative to the individual patient, available resources and other relevant factors.

Conflict of interest statement
There are no conflicts of interest for the authors of this manuscript.

Role of funding source
No funding was obtained for this study.

Acknowledgements
We would like to acknowledge the support of ICON constituents during the development of this paper, particularly Joyce Lai of AADO, Hong Kong, and Reggie Aquilina of AMON, Malta.

We are grateful to the nurse experts whose input guided and strengthened the paper. Those who reviewed the entire document were Marie Boltz, PhD, RN, GNP-BC (USA), Peter Davis MBE (UK), Sue Baird Holmes, MS RN (USA).

Pain section reviewers were: Donna Sipos Cox, MSN, RN, ONC, CCRC (USA) Keela Herr, PhD, RN, AGSF, FAAN (USA), Alan Pearson AM (Australia), Brenda Poulton, RN, MN, NP (Canada).

Delirium section reviewers were Marcia Carr, RN, BN, MS, GNC(C) (Canada), Donna Fick, PhD, RN, FGSA, FAAN (USA), Lorraine Mion, PhD, RN, FAAN (USA), Manuela Pretto, MNS, RN (Switzerland).

Pressure Ulcer section reviewers were Joyce M. Black, PhD, RN, CSPN, CWCN, FAAN (USA), Christina Lindholm, PhD, RN (Sweden), Zena Moore, PhD, MSc, PG Dip, FFNMRCSI (Ireland).

Fluid Balance/Nutrition/Elimination reviewers were Joanne Alderman, APRN-CNS, RN-BC, FNNGNA (USA), Merete Gregersen, MHS (Denmark), Nicky Hayes, RGN, BA(Hons), MSc, PGCert (HE) (UK), Alan Pearson AM (Australia).

We thank Jennifer Gibson for her editorial expertise and meticulous attention to detail and Judy Knight MLS, AHIP, coordinator, library services for her valuable assistance.

References
Agency for Clinical Innovation (ACI), The orthogeriatric model of care: summary of Evidence 2010 New South Wales agency for clinical innovation, NSW.


Acute nursing care of the older adult with fragility hip fracture: An international perspective (Part 2) 17


infections in acute care hospitals. Infection Control and Hospital Epidemiology 29 (1), 541–550.


NICHE, Nurses Improving Care for Healthsystem Elders, 2010. Need To Know Skin Care: Pressure Ulcers. Hartford Institute for Geriatric Nursing, Division of Nursing, New York University.


