PROVINCIAL HIP FRACTURE REDESIGN

Rationale Document for the Hip Fracture Physicians Template Orders
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Introduction

The number of adults over age 65 is projected to double within the next twenty years. Hip fracture is a devastating injury, commonly affecting older people and their families and often resulting in impaired mobility, increased reliance on others, diminished health and sometimes death. In BC around 3,500 adults will sustain a hip fracture this year and that number will rise exponentially as the population ages. The rising rates of hip fractures and the associated health care costs are a concern for nations worldwide. Health care leaders and governments in many countries have invested in registries, research and quality improvement initiatives to improve outcomes and reduce costs, most notably in Great Britain, Scotland and Sweden. A Bone and Joint Canada working group collaborated with expert clinicians across Canada to develop an evidence based Hip Fracture Tool Kit published in 2012.

An evidence-based provincial hip fracture order set and rationale document has been developed by an interdisciplinary team of health authority representatives from Vancouver Coastal, Interior Health, Northern Health, Fraser Health and Vancouver Island Health Authorities. These documents are informed by provincial, national and international standards.

Enhanced Recovery After Surgery (ERAS) is a multimodal approach to surgical care to reduce perioperative stress and optimize care and outcomes for surgical patients. ERAS has been embraced by most health authorities in BC and while its target is elective patients, the core concepts of ERAS apply to the hip fracture population, therefore most ERAS elements are explicitly addressed in these orders (e.g. periop nutrition, early mobility, timely removal of tubes, multi-modal pain management etc.) The order set aligns with provincial patient safety initiatives/and protocols that address the risk for VTE prophylaxis and surgical site infection. As the protocols are region specific and apply to all surgical patients (not just orthopaedics) the protocols are referenced but not explicitly addressed in the order sets. A significant subset of the hip fracture population is taking anticoagulants for a pre-existing cardiac condition. Standards on reversal agents and requisite delays to surgery have been addressed by a provincial team of anaesthesiologists, pharmacists and surgeons. A related order set on anticoagulation reversal is in the final stages of development and will complement this work.

The working team recognized that certain orders could be a significant change from current practices and would require a persuasive argument to support their adoption. To this end, the document provides a succinct statement of the evidence/ rationale for selected orders (those likely to require practice changes) and provides further references. The research is thin in some areas as the frail older population with high rates of cognitive impairment and co-morbidity is frequently excluded from studies. However, we were able to draw from a wealth of expert wisdom, experience and consensus opinion to inform practice.

These order sets are templates that can be customized to suit the site context. They are intended to expedite the adoption of best practice standards around the province. We thank all participants for their contribution in leading and adopting this work to benefit patients and families around BC.
Rationale and Recommendations for Selected Orders

**Activity**
Up to dangle stand or walk on postop 0 (day of surgery). Up to stand/walk x 2 and up in chair for at least two meals beginning postop Day 1. Full weight bearing is strongly recommended.

Early mobilization is associated with reduced complication risk, shorter length of stays and earlier return to function (Pashikanti). People with hip fractures lose greater than 50% of lower extremity strength within a short period after hip fracture surgery, and the longer it takes to mobilize, the longer to recover post-fracture deficits (Overgaard 2013). Older patients are highly susceptible to the hazards of immobility and do not tolerate extended periods of restricted weight bearing (Wasdell 2011). Weight bearing exercises are generally superior to non weight bearing exercises to improve balance and function (Sherrington, 2004). Early post-operative mobility should focus on functional ability 1) getting in and out of bed. 2) sit to stand from a chair and 3) walking ability. (Kristensen, 2009; Handoll, 2011)

Bone & Joint Canada Hip Fracture Tool Kit 2011 Wasdell ed.


**Laboratory**
*CBC, Serum Creatinine, eGFR, Random glucose, Lytes, albumin, phosphate, Magnesium, INR, PTT – if not already done.*

Monitoring Albumin, phosphate, glucose and magnesium will help identify those patients who are malnourished and also at risk for the serious adverse consequences associated with refeeding syndrome. Patients who were kept NPO for many hours prior to surgery or had previous limited intake are more at risk of these neurologic, pulmonary, cardiac, neuromuscular, and hematologic complications.


Portsmouth Hospital NHS Trust. Guidelines for the management of patients at risk for refeeding syndrome.

**Diet Type**

*Preoperative:* Clear fluids up to 4 hours. Full meal if no surgery within 8 hrs.

*Postoperative:* Regular administration of nutritional supplements.

Prolonged fasting and poor perioperative nutritional intake lead to debility, increased susceptibility to complications and mortality. One third of hip fracture patients are malnourished prior to injury, placing them at added risk for complications, prolonged stays and mortality (Enroth. 2005). Malnutrition and prolonged fasting combined with the catabolic response to surgery leads to weakness, impaired mobility, and an increased risk of delirium. (Radtke et al, 2010; Fossi et al 2007) Fasting for longer than 12 hours results in higher mortality four months post hip fracture (Bjorkelund et al, 2011). Malnourished patients kept NPO for many hours prior to surgery are more at risk for refeeding syndrome including neurologic, pulmonary, cardiac, neuromuscular, and hematologic complications (Hearing, 2004; Flesher, 2005).

In Great Britain, Sweden and Denmark, nutrition is emphasized and the standard of care is clear fluids with carbohydrate loading up to two hours prior to surgery (Bjorkelund 2011; Hommel 2014). No increased risk of aspiration is noted. A study of 262 consecutive hip fracture patients in Denmark refers to this standard practice and emphasizes the importance of perioperative nutrition. (Fossi et al 2007). Coordination and communication among Emergency, Operating Room and Inpatient units is necessary to ensure safe timing of preop intake within the recommended time frame.
Nutritional supplementation improves postoperative nutritional intake and is associated with improved strength and walking ability (Volkert, 2004; Eneroth 2005).

Björkelund, K., Hommel, A., Thorngren K.G. Lundberg, D., Larsson, S. The Influence of Perioperative Care and Treatment on the 4-Month Outcome in Elderly Patients With Hip Fracture AANA Journal 8, February 2011, 8 Vol. 79, No. 1

Hearing, S. D. Refeeding syndrome is underdiagnosed and undertreated, but treatable BMJ. 2004 April 17; 328(7445): 908–909. doi: 10.1136/bmj.328.7445.908


Assessments & Treatments

**Use of Urinary Catheters:** The routine use of an indwelling urinary catheter is not recommended as it poses a barrier to mobility and function and can cause urinary tract infection. In Sweden and Denmark, less than 20% of patients have a catheter inserted (Hommel 2014). Getting up to the toilet or a commode helps empty the bladder and restores regular voiding. If urinary retention persists, an in and out catheter should be tried at least twice prior to inserting an indwelling catheter.

**Consults: Interdisciplinary Approach**
Consider referring to a geriatric specialist physician or nurse practitioner for ongoing medical management (BOA, 2007). A dietary consult is recommended as is malnutrition is common. Home Health and or social work should be consulted for timely resolution of barriers to discharge.


**Analgesics**
Acetaminophen is to be administered regularly. Hydromorphone is preferred as the first line analgesic over morphine. A low dose of opioid is to be administered regularly versus as needed (prn) postoperatively. The routine use of non steroidal anti-inflammatory drugs (NSAIDs) is not recommended.

Many older patients have: 1) poor or delayed renal clearance that may be related to chronic conditions, advance age or dehydration. 2) a high risk for delirium. The rule with analgesics is to start with a low dose. Analgesics orders should allow for titration and breakthrough dosing.

Hydromorphone is the first choice as it has no active glucuronide metabolites and is better tolerated by patients with poor renal function (Feldn, et al., 2011).

Morphine is not the first line analgesic choice. Morphine 6 glucoranide (M-6-G) is an active metabolite poorly excreted in patients with impaired renal function leading to increased duration of action and CNS side effects. A systematic review on the impact of analgesia on cognitive impairment post arthroplasty concluded that morphine should be avoided (Zywil et al 2013; Meinke 2002).

**Regular administration of low dose opioid** titrated to effect with break through doses is the recommended standard of care (Maher et al 2012). Relying on frail older patients, many with cognitive impairment, to request pain medication results in under treatment and poor pain management. Poor pain management is a serious stressor leading to immobility, delirium and long term functional impairment (Morrison, 2003). NSAIDS are not appropriate to use with frail older adults due to their associated cardiovascular risks, GI bleed and interference with platelets. Naproxen is the least harmful of the NSAIDS and could be considered for younger healthier patients (Trelle et al, 2011).


**Antiemetic**

**Ondasetron is recommended as the first line antiemetic** as it is well tolerated and efficacious. Dimenhydrinate or prochlorperazine are not recommended as these drugs are highly anticholinergic and increase the risk of delirium and sedation in older adults. Antiemetics should be used with a low dose and only when significant nausea or vomiting presents (Kloth 2009: AGS 2012)


**Delirium**
If delirium presents, a prompt medical assessment and monitoring is required to identify and address the underlying causes. Medications to manage delirium related agitation should only be used when the behaviours pose a risk of injury as they can have significant neuro muscular, and CNS side effects. For these reasons, the 24 hour maximum dose is limited.

Delirium is a complex syndrome often indicative of serious underlying medical concerns.

The published evidence on recommended antipsychotic agents is largely inconclusive. We have relied on the expert opinion of geriatricians to help inform this section.

Quetiapine is a new generation antipsychotic and is the first line medication as it has a lower side effect profile than traditional antipsychotics. Quetiapine is dopamine sparing and therefore a better choice for patients with Lewy Body Dementia and Parkinsons. It can only be administered orally. Loxapine subcutaneously (currently unavailable at some sites) is an alternate if unable to administer via the oral route. Haldol is the acceptable subcutaneous alternate if Loxapine is not in stock. To address sleep disturbances, Loxapine may be a good choice.


Clinical Practice Guidelines for the Management of Delirium in Older People Clinical Epidemiology and Health Service Evaluation Unit, Melbourne Health in collaboration with the Delirium Clinical Guidelines Expert Working Group. Commissioned on behalf of the Australian Health Ministers’ Advisory Council (AHMAC), by the AHMAC Health Care of Older Australians Standing Committee (HCOASC). 2011

**Sedation**
The routine use of HS sedation is not recommended. If the patient was regularly taking a benzodiazepine for sleep prior to this fracture, it may be necessary to continue it in hospital to avoid withdrawal. Sedation is a leading cause of falls. The patient should be weaned from this medication as soon as possible.


**Pneumonia prevention**
Hip fracture patients are at risk for bacterial and aspiration pneumonia. Avoiding sedation and promoting hourly deep breathing and coughing exercises help prevent the pooling of secretions. Screening for dysphagia, modifying the nutritional care plan accordingly and keeping the head of the bed at 30 degrees, helps prevent aspiration.
Attention to oral care can reduce the incidence of infectious pneumonia by decreasing the bacterial load in the oral secretions.


**Skin Preparation**

*Preoperative Chlorhexidine wash* is recommended by Safer Health Care Now as it has been shown to reduce the incidence of surgical site infection.


**Bone Health**

Patients with fractures have double the risk of future fractures and require individualized risk assessment with strategies to improve bone health and reduce injuries from falls. In general, elemental calcium 500 mg daily (calcium carbonate 1250 mg) and vitamin D 1000-2000 IU are recommended for all patients beginning on postop Day 2 (Bischoff-Ferrari 2012). Patients will require individualized assessment for osteoporosis and should be referred to a clinic or their physician to ensure this risk is addressed. (BOA, 2007).

All patients are at risk for falls and require individualized risk assessment with patient and family education. Home environment assessment with a Home OT/PT should be considered. A physiotherapist could prescribe and teach home exercises to improve strength and balance as well as identifying an appropriate community based fall prevention and or exercise program.

Certain hip protectors have been shown to reduce the risk of hip fractures for institutionalized patients (Parker, 2006) and should be worn by the patient in hospital when the staples have been removed.


Stone, K.L., Seeley, G., Lui L., Cauley, J., Ensrud, K., Browner, W. Nevitt, M. Cummings, S. BMD at Multiple Sites and Risk of Fracture of Multiple Types: Long-Term Results From
VTE

Hip Fracture patients are high risk for VTE and will require VTE prophylaxis as per high risk orders on the regional protocols.


**Antibiotic Prophylaxis**

**PRE-OP:** Cefazolin 2000 mg IV Administer 20 to 60 minutes or **CLINDAMYCIN** 600 mg IV. Administer 20 to 60 minutes or **VANCOMYCIN** 1000 mg IV. Infuse over 1 hour

**POSTOP:** None required or Cefazolin 2000 mg IV Q 8H x 2 doses or **For allergies:** Clindamycin 600 mg IV for allergies. or **VANCOMYCIN** 1000 mg IV to be given 12 hrs after pre-op dose, infused over 1 hour

The newest best practice standards reflect higher doses preop and fewer doses postop than previously recommended. Adherence to the precise timing of antibiotic administration as outlined above, has been shown to have a positive impact on infection rates.


**Bowel Care**

**Proactive bowel management is recommended** to prevent constipation as the patient is at high risk due to opioids, dehydration and immobility. There are multiple laxative options that could be appropriate. Those listed on this order set have been recommended by geriatric experts. The combination of a bulking agent (lactulose), a bowel stimulant (senna) and an evacuation assist (glycerine suppositories) have been found to be effective in preventing or relieving constipation.