Approach to geriatric hip fractures

Dr. Moh’dkheir Aolymate

PLEASE CLICK ON THE FOLLOWING LINK TO WATCH THE LECTURE ONLINE:-

https://www.youtube.com/live/l022B7Y9ykI

Headlines

- Epidemiology
- Social and economic burden
- Preoperative evaluation
- Operative mangment and timing
- pain management
- Blood transfusion
- Anticoagulation
- Delerium
- Rehabilitation

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ORIGINAL RESEARCH

Characteristics of Elderly Hip Fracture Patients in Jordan: A Multicenter Epidemiological Study

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July 2024

Background: Elderly hip fractures represent a global health care burden. Several reports expected a massive increase in the incidence of hip fractures by the next few decades. Knowing the epidemiology of hip fractures is crucial for planning health care policies. The purpose of this study is to provide a nationwide epidemiological overview of hip fractures in Jordan and to report the perioperative outcomes that may help to improve the delivered healthcare. .

Methods: We conducted a retrospective study at 2 university hospitals and 2 major governmental hospitals in Jordan. We reviewed the records for all patients (age >55 years) who were diagnosed with hip fractures over a 3 years duration (2019–2021). We documented the patient's characteristics and the perioperative data (including preoperative, intraoperative, and postoperative details including the 1-year mortality).

Results: The total number of included patients was 1268; more than half (53.7%) were females. The mean age is 75 years (SD 9.7). The most common fracture type was trochanteric (66.2%). 7% of patients had a prior contralateral hip fracture. The average time from admission to surgery was 2.96 days (SD 2.63). The surgery was done within 48 hours for 56.7% of patients. Approximately, one-third of all patients (34.5%) received a blood transfusion. The average length of hospital stay is 7.44 days (SD 5). The overall rate of postoperative thromboembolic events, readmission within 1 month, and revision for the same surgery are 2.4%, 10.7%, and 3% respectively. The 1-month, 6-month, and 12-month mortality rates are 4.5%, 9.1%, and 12.8% respectively.

Conclusion: The annual incidence of elderly hip fractures in Jordan is approximately 96 per 100,000 individuals. The 1-year mortality rate of hip fractures in Jordan is 12.8%. Both findings are in the lower range of nearby Arab countries.

Mortality: 21% in the United States, 23% in Europe, 25% in Australia, 27% in South America, and 18% in Asia.[1]

Social and economic burden

- **European Union** report estimated that mortality related to low-impact trauma hip fracture is **greater than road traffic accidents** and equivalent to breast cancer.
- Mean duration of **hospitalization is highly variable** dependent on local healthcare systems and populations studied around 8.6 days.
  - Shorter stay may be associated with higher complications after discharge.
- Recent systematic review:
  - Costs during the first year after the hip fracture ($43,669) >> equivalent estimates for the acute coronary syndrome ($32,345) and ischemic stroke ($34,772).

Preoperative management

Standard preoperative evaluation

- The standard evaluation should follow a predefined and universally agreed-upon pathway
- It is important that **anesthesia, emergency medicine, and hospital internal medicine** teams are ALL part of this agreement

Preoperative evaluation and optimization

- Fast-track preoperative evaluation and optimization of the patient for surgery plays a vital role
- Requires a comanaged approach

“Fast track” preoperative evaluation

- The most appropriate way to achieve this is by **using protocols**
- Previous **agreement with the emergency department** to handle patients according to defined and standardized protocols
- A well-organized “fast track” should limit the time in the emergency department to a **maximum of 2 hours**
- In general, the time spent in the emergency department is a good **measure of how well the system works**

“Fast track” preoperative management

- Medical clearance
- Pain control
- Fluids and electrolyte management
- Coagulation management
- Timing of surgery

Fluid and electrolyte management

- **Preoperative evaluation:**
  - History:
    - Trauma mechanism
    - Physical function
    - Social history
    - Medical history
    - medications
  - Physical examination: dehydration? hypothermia?
  - Laboratory testing
- **Therapy:**
  - Infusion therapy
  - Substitution
  - Warming
- **Control parameters:**
  - Blood count, temperature, central venous catheter
  - Urine > 100 mL/h

Medical clearance

- The status of the patient should be optimized **only if the measure lowers the risk of surgery.**
- If the risk of surgery cannot be altered, surgery should be performed without further delay

- Delaying surgery, if risk cannot be altered, adds additional unnecessary risk

Situations that need action and may delay surgery

- In few clearly defined situations, the patient will need additional preoperative preparation and medical stabilization, but any **delay should not exceed 72 hours.**
- Any delay of surgery for more than 72 hours causes

Situations that need action and may delay surgery

- Heart failure
- Acute cardiac ischemia
- Unstable angina pectoris
- Severe hypotension
- Unclear systolic ejection heart murmur, with examination, which suggests aortic stenosis
- Acute stroke
- Acute infection, such as pneumonia or septicemia
- Severe chronic obstructive pulmonary disease

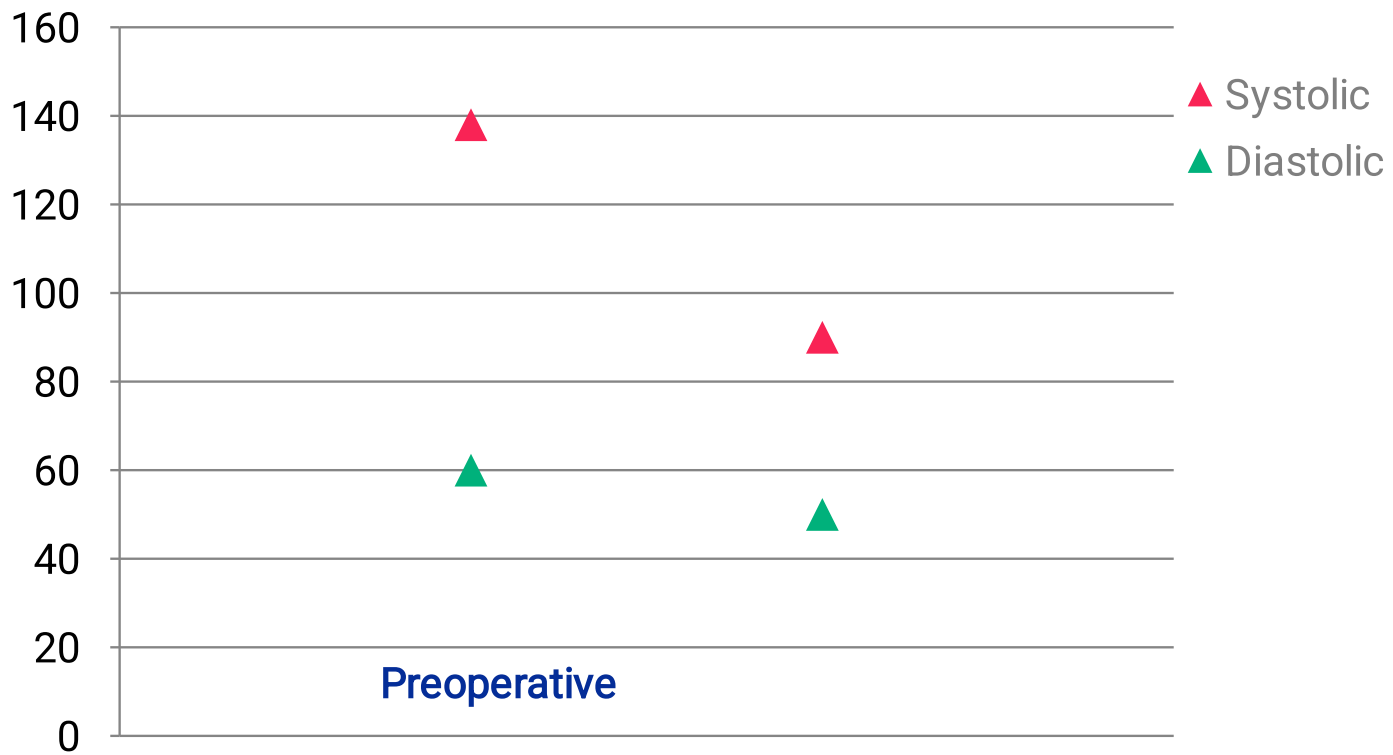
Situations that need action but should not delay surge

- **Hyperglycemia:**
  - Keep the serum glucose level between 80 and 180 mg/dL in the perioperative period to help reduce infections as well as reducing both hypoglycemic and hyperglycemic complications
- **Hypertension**
- **COPD**:
  - Avoidance of exacerbation with bronchodilators
- **Hypothermia**
  - Maintaining the patient's core body temperature between 36–37.5° C is associated with: Reduced infection rates and Fewer perioperative complications.

Situations that need action but should not delay surgery

- Dehydration
- Intravenous (IV) fluids to prevent cardiac dysfunction
- Fluid resuscitation is also necessary to prevent hypotension when anesthesia is given

Blood pressure drops in operating room



Basics

- Stop most blood pres
- Preoperative IV fluid h
- Avoid hypotension
- Consider low-dose be

Beta-Blocker Therapy Is Associated With Increased 1-Year Survival After Hip Fracture Surgery: A Retrospective Cohort Study

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Shahin Mohseni, MD, PhD†‖

BACKGROUND: The high mortality rates seen within the first postoperative year after hip fracture surgery have remained relatively unchanged in many countries for the past 15 years. Recent investigations have shown an association between beta-blocker (BB) therapy and a reduction in risk-adjusted mortality within the first 90 days after hip fracture surgery. We hypothesized that preoperative, and continuous postoperative, BB therapy may also be associated with a decrease in mortality within the first year after hip fracture surgery.

METHODS: In this retrospective cohort study, all adults who underwent primary emergency hip fracture surgery in Sweden, between January 1, 2008 and December 31, 2017, were included. Patients with pathological fractures and conservatively managed hip fractures were excluded. Patients who filled a prescription within the year before and after surgery were defined as having ongoing BB therapy. The primary outcome of interest was postoperative mortality within the first year. To reduce the effects of confounding from covariates due to nonrandomization in the current study, the inverse probability of treatment weighting (IPTW) method was used. Subsequently, Cox proportional hazards models were fitted to the weighted cohorts. These analyses were repeated while excluding patients who died within the first 30 days postoperatively. This reduces the effect of early deaths due to surgical and anesthesiologic complications as well as the higher degree of advanced directives present in the study population compared to the general population, which allowed for the evaluation of the long-term association between BB therapy and mortality in isolation. Results are reported as hazard ratios (HR) with 95% confidence intervals (CI). Statistical significance was defined as a 2-sided *P* value <.05.

RESULTS: A total of 134,915 cases were included in the study. After IPTW, BB therapy was associated with a 42% reduction the risk of mortality within the first postoperative year (adjusted HR = 0.58, 95% CI, 0.57–0.60; *P* < .001). After excluding patients who died within the first 30 days postoperatively, BB therapy was associated with a 27% reduction in the risk of mortality (adjusted HR = 0.73, 95% CI, 0.71–0.75; *P* < .001).

CONCLUSIONS: A significant reduction in the risk of mortality in the first year following hip fracture surgery was observed in patients with ongoing BB therapy. Further investigations into this finding are warranted. (Anesth Analg 2021;133:1225–34)

Functional ability

- A description of an individual's functional ability adds to an understanding of **the impact and severity of comorbidities**, particularly with regard to cardiac and respiratory disease
- Often described **in metabolic equivalents (METS)**
- **1 MET is the amount of oxygen consumed while sitting at rest** and is equal to 3.5 mL O2/kg/min

Functional ability

- Patients able to undertake activity ≥ 4 METS (such as easily managing a flight of stairs) are unlikely to have significant cardiorespiratory disease and have low car

Physical activity	METs
Sitting reading/watching television	1.0
Washing and dressing independently	2.1
Walking slowly on flat	2.3
Gentle household activity, e.g., cooking / cleaning	2.5
Walking a small dog (3 km/h)	2.7
Light static cycling / bowling	3.0
Gardening or outdoor activity	3.6
Walking quickly (5 Km/h)	3.6
Climb flight of stairs without stopping	4.0
Dancing	4.5
Playing tennis / racqut sports	8.5

Medications to stop preoperatively

- ACE inhibitors
- BP medications (non-rate controlling)
- NSAIDs
- Clopidogrel, aspirin, warfarin

ACE, Angiotensin-converting enzyme; NSAID, Nonsteroidal antiinflammatory medications

Cardiac evaluation

- Preoperative cardiac testing is unlikely to improve outcomes or change management
- Preoperative subspecialty consultation (eg, cardiology, pulmonology) is rarely indicated
- **Timely surgery and avoidance of complications** should be primary goals

Echocardiography

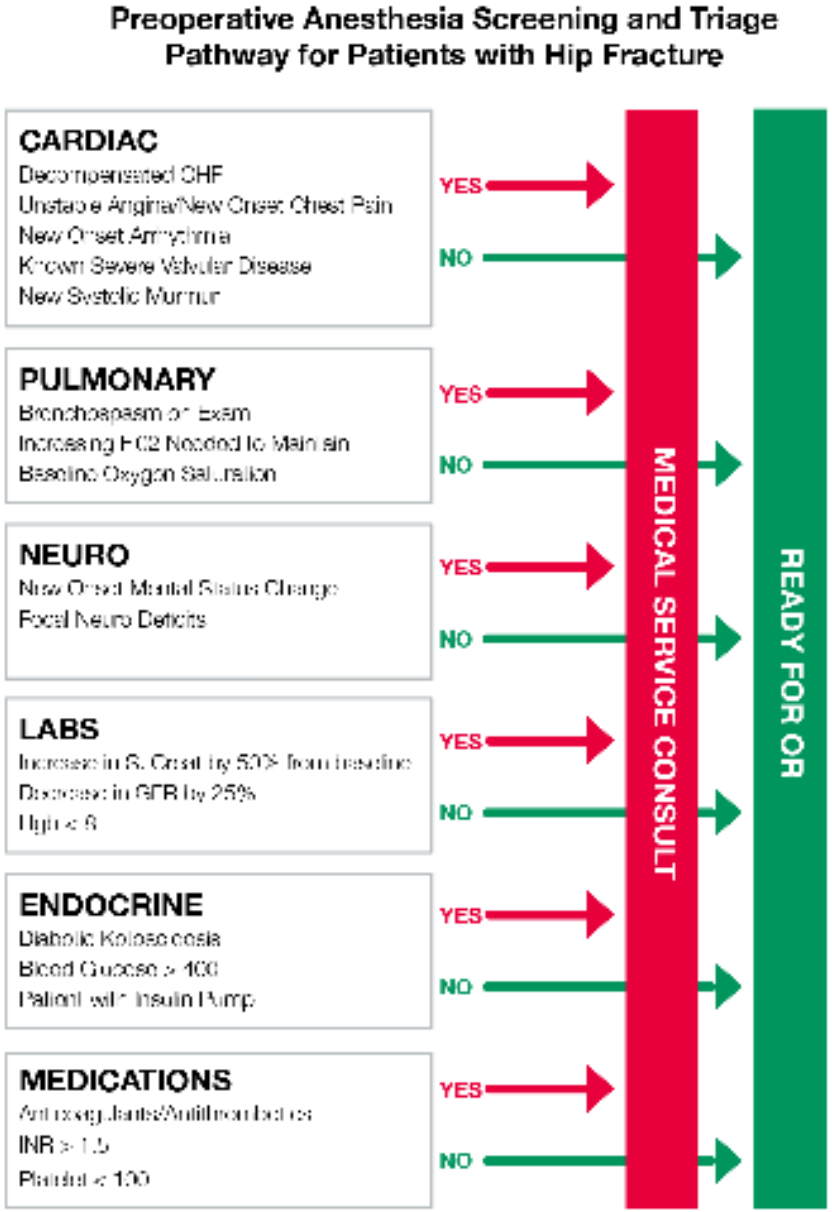
- Preoperative echocardiography is **NOT required in most patients**
- Echo **may be** appropriate in some of the following:
  - To assess left ventricular (LV) function in patient with **increasing** or **unexplained dyspnea** and known or suspected heart failure or heart disease
  - Significant **valvular stenosis or regurgitation and no echo in the last 12 months, especially if symptoms have increased**
  - Significant **murmur** without prior echo
  - Known **cardiomyopathy**, significant **valvular lesion or significant pulmonary hypertension** and last echo > 12 months ago with clinical suspicion of interval disease progression.

LV, left ventricular

UCSF University of California San Francisco

UCSF Hip Fracture Protocol

Welcome to UCSF Hip Fracture Protocol



UCSF University of California San Francisco

UCSF Hip Fracture Protocol

Welcome to UCSF Hip Fracture Protocol

Emergency Department Care

1. In your note use dot phrase: .hipfracture

2. Radiographs

- Low AP pelvis, AP of affected hip, AP and lateral of affected femur

MRI indicated if high suspicion but no clear fracture on x-ray (CT scan if MRI not available)

3. Labs

- CBC, Chem 10, Coags, Vitamin D
- Type and Cross for 2 units pRBCs
- Type and cross for 2 units FFP if patient on warfarin

4. Chest Xray indicated if history of heart or lung problems or new symptoms

5. EKG indicated if history of heart or lung problems or new symptoms

6. Pain Control: All patient should be considered for iliaca fascial block

7. Anticoagulation Management

8. Consults:

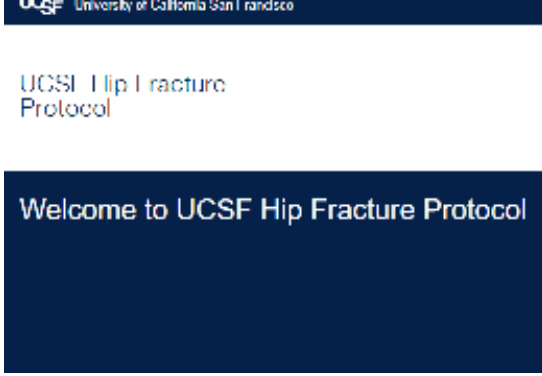
- All patients: orthopedics
- 65+: Geriatrics (9am-5pm only) 443-8532
- If after 5pm (or geriatrics unavailable) with acute medical needs: Medicine consult

9. Admit patient to Orthopedics or Medicine and request 7L bed if available

- Patient admitted to Orthopedics unless age > 90, multiple medical co-morbidities requiring active management, or significant active medical issue
- Geriatrics comanges/consults on all patients 70 and older admitted to Parnassus and is available for e-consults for patients admitted to Mount Zion

10. Delirium/agitation Management

Pre-operative anticoagulation management



1. **Aspirin:** Continue at all doses
2. **Warfarin**

•Hold Warfarin, give Vitamin K 5mg PO x 1 ASAP
•Type and cross for 2 units FFP
•Goal INR for OR is 1.5 or less for surgery, Goal INR for neuraxial block anesthesia is 1.3 or less
•Re-check INR 12 hours after vitamin K dose
•Can proceed with surgery if INR 1.8 or less and patient can get FFP on the way to the OR (patient will receive GETA)

3. **Clopidogrel, prasugrel, ticagrelor, cilostazol**

•Continue any Acute Coronary Syndrome (treated medically or with stent) within last 12 months
•Continue if drug-eluding stent in last 6 months (in non-ACS)
•Continue if bare metal stent within last 1 month (in non-ACS)
•No need to delay surgery (patient will receive GETA)

4. **Lovenox :** Hold before surgery
5. **NOACs** (dibigatran, rivaroxaban, apixiban, edoxaban)

•Hold, record time of last dose taken clearly. Clearance dependent **on renal function**.
•Generally **hip fracture surgery with general anesthesia only can be undertaken 24 hours after last dose** for all medications and normal renal function (**48 hours for Dabigatran and Apixiban and high risk of bleeding**). Risks and benefits should be weighed by teams (ortho, medicine, geriatrics, and anesthesia) for delaying surgery more than 24 hours.

Timing of surgery

- Medically stable patient:
- Delay of > 48 hours for hip fracture surgery significantly increases short-term and 1-year mortality
- Delay of > 48 hours for hip fracture surgery increases 30-day all-cause mortality by 41% and 1-year all-cause mortality by 32%
- Frail elderly should be treated as a priority and have surgery within 24–48 hours

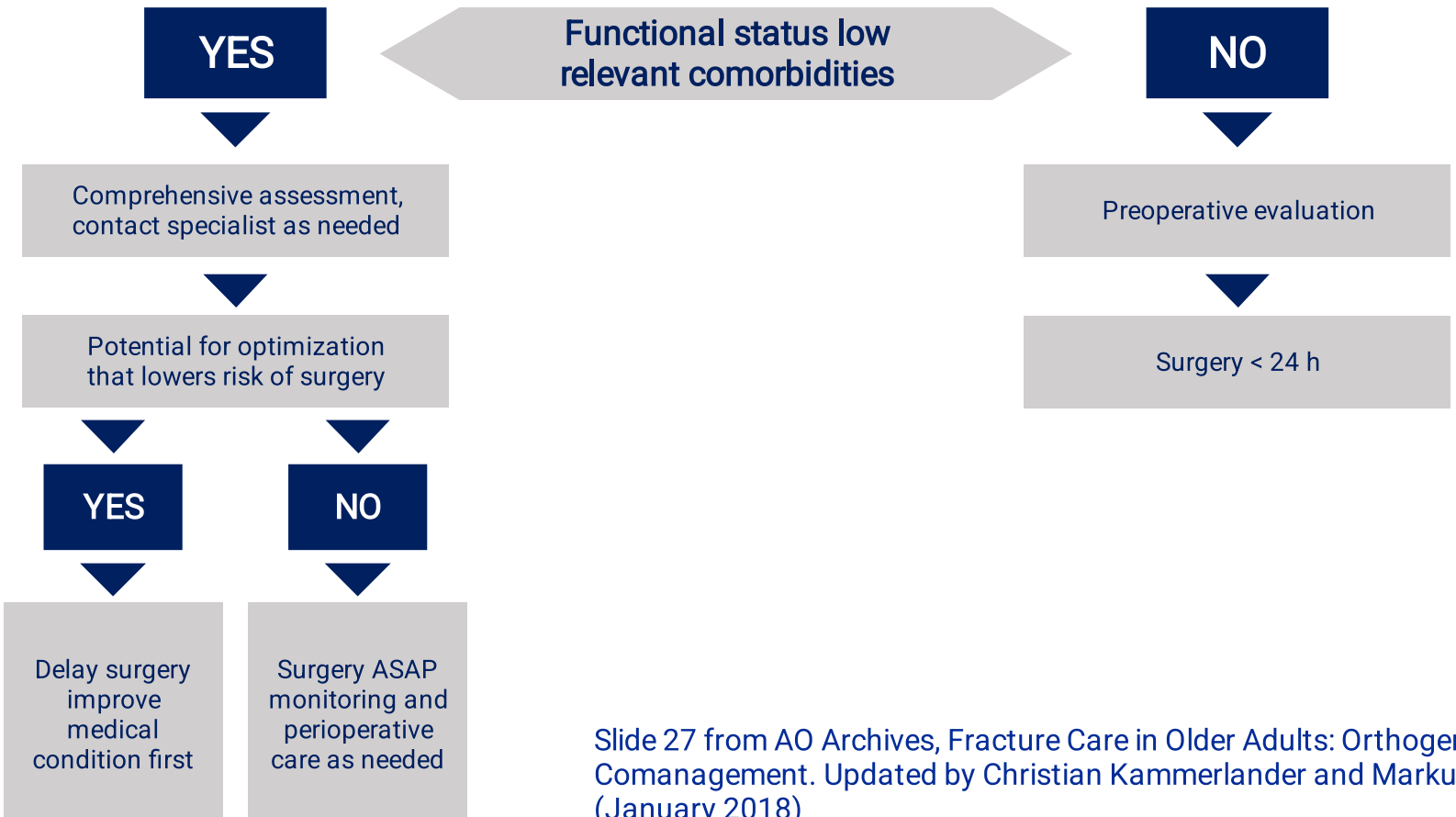
Moran et al (*J Bone Joint Surg Am*. 2005 Mar;87(3):483–489)
Novack et al (*Int J Qual Health Care*. 2007 Jun;19(3):170–176)
Shiga et al (*Can J Anaesth*. 2008 Mar;55(3):146–154)
Orosz et al (*Jama*. 2004 Apr 14;291(14):1738–1743)

Timing of surgery

Medically unstable patient:

- Timing of surgery in the medically unstable patient is **controversial**
- Medically unstable conditions that have to be improved first include:
  - Acute renal insufficiency
  - Acute cardiac decompensation, especially aortic stenosis
  - Pneumonia, severe asthma
- Stabilization of patients, surgery when medically optimized, or palliative care if appropriate

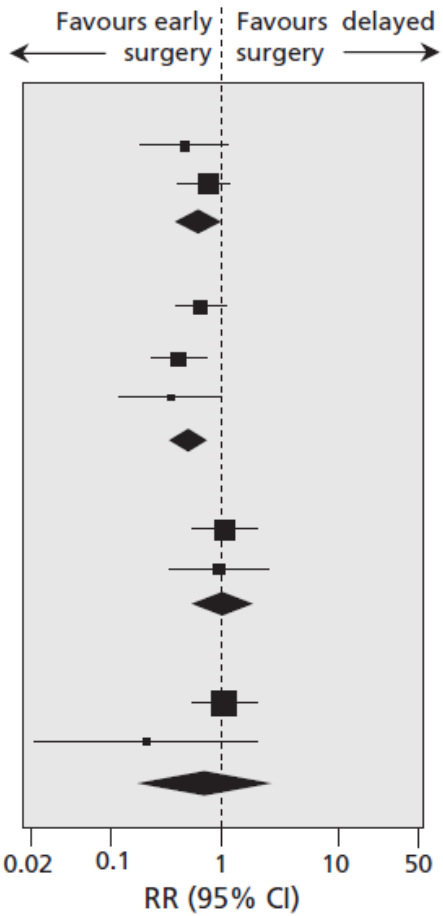
Timing of surgery



Slide 27 from AO Archives, Fracture Care in Older Adults: Orthogeriatric Comanagement. Updated by Christian Kammerlander and Markus Gosch (January 2018)

Time to surgery—complications

Complication and study	Early surgery, *n/N*	Delayed surgery, *n/N*	RR (95% CI)
Pneumonia			
Parker et al.[25]*	8/290	11/178	0.45 (0.18–1.09)
Smektala et al.[33]	16/631	66/1694	0.65 (0.38–1.12)
Overall	24/921	77/1872	0.59 (0.37–0.93)
Pressure sores			
Davis et al.[29]*	12/45	80/185	0.62 (0.37–1.03)
Parker et al.[25]*	18/290	28/178	0.39 (0.22–0.69)
Smektala et al.[33]	4/631	32/1694	0.34 (0.12–0.95)
Overall	34/966	140/2057	0.48 (0.34–0.69)
Deep vein thrombosis			
Moran et al.[31]*	15/982	21/1372	1.00 (0.52–1.93)
Smektala et al.[33]	5/631	15/1694	0.89 (0.33–2.45)
Overall	20/1613	36/3066	0.97 (0.56–1.68)
Pulmonary embolism			
Moran et al.[31]*	15/982	21/1372	1.00 (0.52–1.93)
Parker et al.[25]*	1/290	3/178	0.20 (0.02–1.95)
Overall	16/1272	24/1550	0.66 (0.17–2.58)



Simunovic et al (*Cmaj*. 2010 Oct 19;182(15):1609–1616)

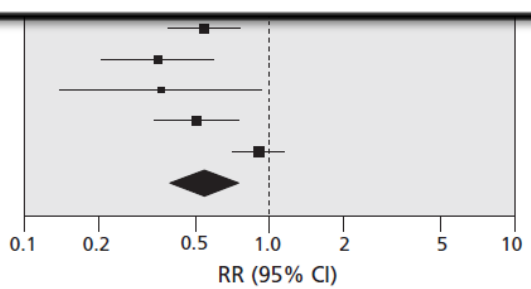
CMAJ RESEARCH

Effect of early surger
and complications: sy

Interpretation: Earlier surgery was associated with a lower risk of death and lower rates of postoperative pneumonia and pressure sores among elderly patients with hip fracture. These results suggest that reducing delays may reduce mortality and complications.

Nicole Simunovic MSc, P.J. Devereaux MD, Sheila Sprague MSc, Gordon H. Guyatt MSc MD, Emil Schemitsch MD, Justin DeBeer MD, Mohit Bhandari PhD MD

Beringer et al.[27]	133	70	0.54 (0.39–0.75)
Elliott et al.[15]	169	1611	0.35 (0.21–0.59)
Doruk et al.[26]§	38	27	0.36 (0.14–0.92)
Siegmeth et al.[24]*	3454	174	0.50 (0.34–0.74)
Smektala et al.[33]	609	1629	0.90 (0.71–1.15)
Overall	4670	3673	0.55 (0.40–0.75)



Simunovic et al (*Cmaj*. 2010 Oct 19;182(15):1609–1616)

Anesthesia

- Spinal anesthetic Provides reduced risk of:
  - Delirium
  - Thromboembolic events
  - Pneumonia
  - Bleeding complications
- Anticoagulation history may preclude safe use of spinal anesthetic

General anesthesia provides:

- Better control of hemodynamics
- Technically easier
- Does not require patient cooperation

Tranexemic Acid and Antibiotics

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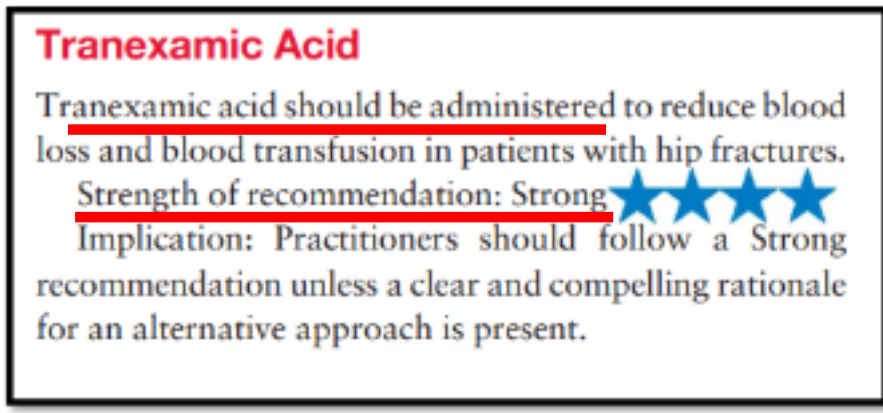
- Tranexemic Acid 10mg/kg IV at the beginning and end of the case
- Any specific concerns for contraindications to be discussed between attendings.



Tranexamic Acid

Tranexamic acid should be administered to reduce blood loss and blood transfusion in patients with hip fractures.

Strength of recommendation: Strong ★★★★

Implication: Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.

- Standard Preoperative antibiotics as a weight-based dose of Cefazolin
- Vancomycin for Cephalosporin allergic patients
- Vancomycin for penicillin allergic patients if the allergy was anaphylaxis.

Surgical intervention

- As early as possible
- Adapted anesthesia
- Adapted surgical procedures:
  - “Single-shot surgery”
  - Minimally invasive surgery
  - Optimal implants for osteoporotic bone and immediate weight bearing

Intertrochanteric fractures Classification

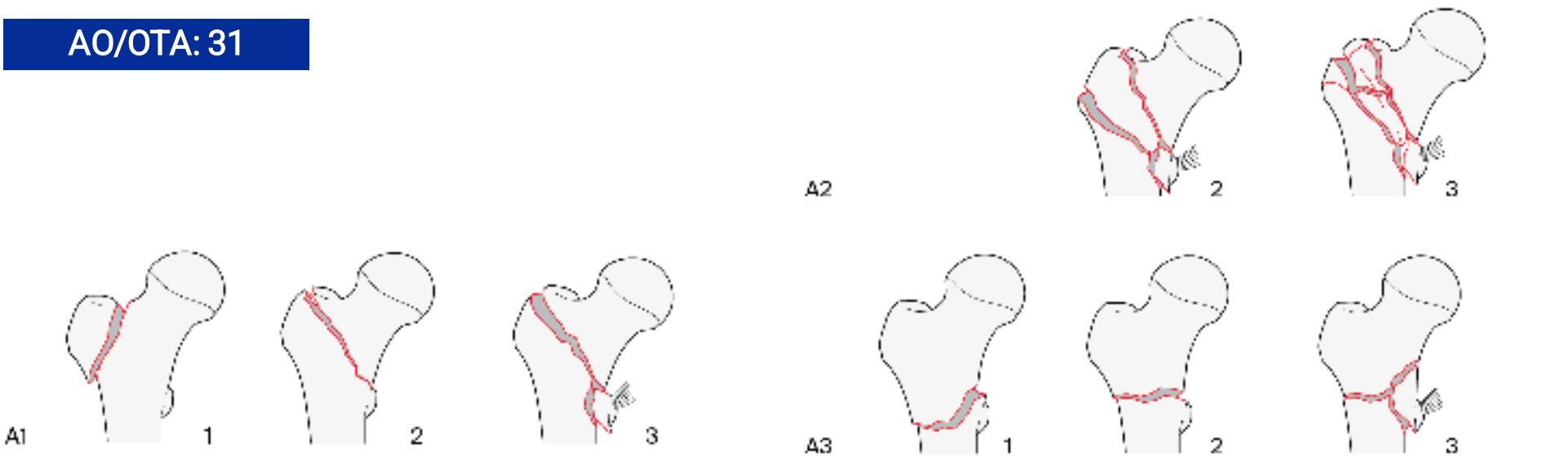
- Stable versus unstable
- Helps determine best implant

Stability of fracture

- Evaluate the bone remaining in the lateral and medial femur
- Comminution of the greater trochanter
- Direction of the fracture

Pertrochanteric fractures
AO Classification

AO/OTA: 31



Stable

Unstable

Stable intertrochanteric hip fractures
Sliding hip screw (SHS) vs intramedullary (IM) implant

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Cephalomedullary Device—Stable Intertrochanteric Fractures

In patients with stable intertrochanteric fractures, the use of either a sliding hip screw or a cephalomedullary device is recommended.

Strength of recommendation: Strong ★★★★

Implication: Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.

NICE National Institute for Health and Care Excellence

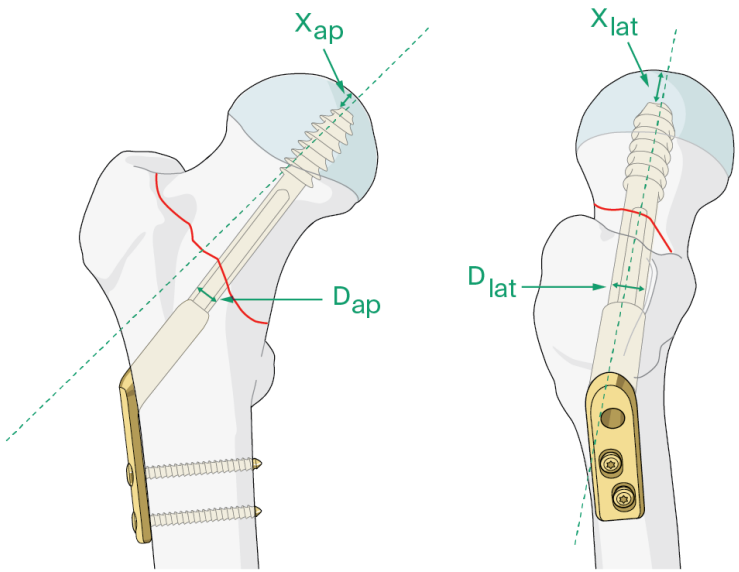
NICE guideline

"Use extramedullary implants such as a sliding hip screw in preference to an intramedullary nail in people with trochanteric fractures above and including the lesser trochanter (except reverse oblique).

Stable fracture

- SHS and side plate
- Reliable
- Inexpensive
- Widely available

Hip screw placement



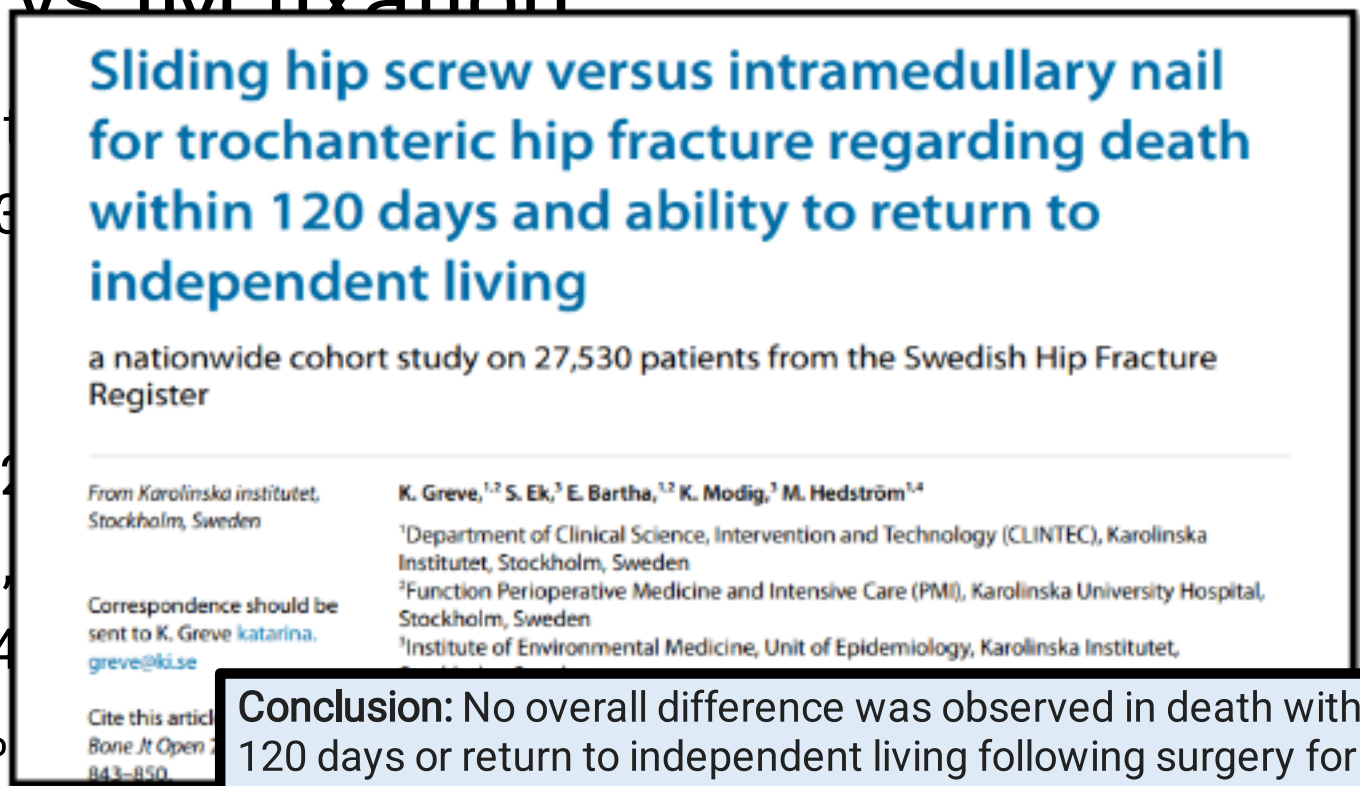
- Tip-apex distance
- Sum of the distance on AP and lateral views of tip of screw to the apex of the femoral head
- < 25 mm

Baumgaertner et al, JBJSA, 1995, 77:1058-64.

Extramedullary vs IM fixation

- Randomized controlled
- 1000 patients, A1, A2, A3
- No differences between
  - Operative time: 44 vs
  - Length of stay: 21 vs 2
  - Cut out: 1.5% vs 0.6%,
  - Nonunion: 0.8% vs 0.4
  - All complications: 3%

Parker et al. Injury 2017.10.029



Sliding hip screw versus intramedullary nail for trochanteric hip fracture regarding death within 120 days and ability to return to independent living

a nationwide cohort study on 27,530 patients from the Swedish Hip Fracture Register

From Karolinska institutet, Stockholm, Sweden

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Cite this artic
Bone Jt Open
843–850

Conclusion: No overall difference was observed in death within 120 days or return to independent living following surgery for trochanteric hip fracture, depending on surgical method (SHS vs IMN) in this recent Swedish cohort, but there was a suggested benefit for SHS in subgroups of patients.

Unstable intertrochanteric hip fractures
SHS vs IM implant

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Cephalomedullary Device—Unstable Intertrochanteric Fractures

Patients with unstable intertrochanteric fractures should be treated with a cephalomedullary device.

Strength of recommendation: Strong ★★★★

Implication: Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.

NICE National Institute for Health and Care Excellence

NICE guideline

"Use extramedullary implants such as a SHS in preference to an IM nail in patients with trochanteric fractures above and including the lesser trochanter

(AO classification types A1 and A2).

Extramedullary vs IM fixation

- Randomized controlled trial
- 206 Stable and unstable intertrochanteric fractures
- SHS vs cephalomedullary nail in both Stable A1 vs Unstable A2
- No difference in reoperation: 7% vs 11%, p=0.3
- **More fracture shortening** with SHS: 24% vs 5%, p < 0.001
- **Active functional patients have an improved outcome when an intramedullary nail** is used to treat their unstable intertrochanteric fracture

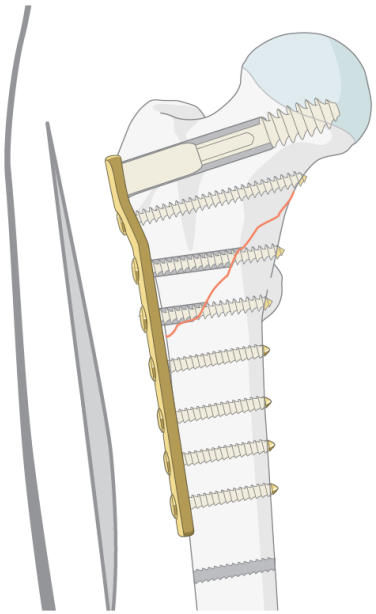
- Sanders et al. *J Orthop Trauma*. 2017;31(1):1-8.

Extramedullary vs IM fixation

- Metaanalysis of 18 RCT, 2400 patients, unstable fractures
- **No difference in:**
  - Cut-out or nonunion
  - Mortality
  - Reoperations/complications
  - Blood loss
- **Cephalomedullary nail**
  - **Lower implant failure** (relative risk, 0.43, CI, 0.2–0.8)

.Sun et al. *Medicine (Baltimore)*. 2019;98(37):e17010.

Reverse oblique intertrochanteric hip fractures



- Unstable fractures
- Very important to recognize
- SHS frequently fail
- Should be treated with cephalomedullary implant

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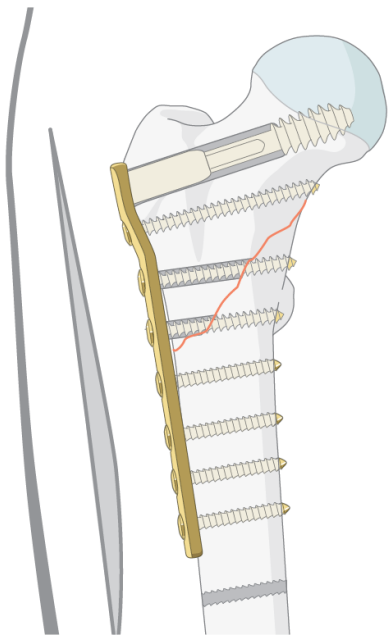
Cephalomedullary Device—Subtrochanteric/Reverse Obliquity Fractures

In patients with subtrochanteric or reverse obliquity fractures, a cephalomedullary device is recommended.

Strength of recommendation: Strong ★★★★

Implication: Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.

Reverse oblique intertrochanteric hip fractures Extramedullary vs IM fixation



- 47 reverse obliquity fractures
- 32% (15) failed or did not heal
- 56% (9/16) failure of sliding hip screws
- 17% (1/6) failure of cephalomedullary nail

Haidukewych et al. *Bone Joint Surg Am*. 2001

Subtrochanteric hip fractures
IM vs extramedullary implant

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OrthoGuidelines
The Standard for Orthopaedic Clinical Practice Guidelines

"Strong evidence supports using a cephalomedullary device for the treatment of patients with subtrochanteric fractures."

NICE National Institute for Health and Care Excellence

NICE guideline

"Use an IM nail to treat patients with a subtrochanteric fracture."

Subtrochanteric femoral fractures Extramedullary vs IM fixation

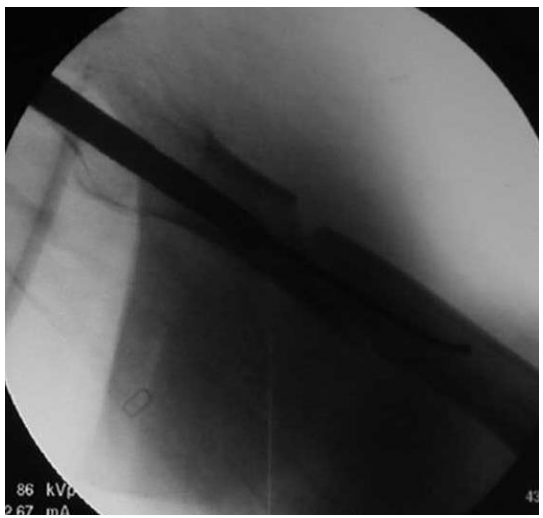
- Metaanalysis of 6 randomized controlled trials
- Cephalomedullary nail had fewer:
  - Revisions
  - Fixation failures
  - Nonunions

Liu P et al. *Clin Interv Aging*. 2015;10:803-811.

IM fixation: unstable fractures

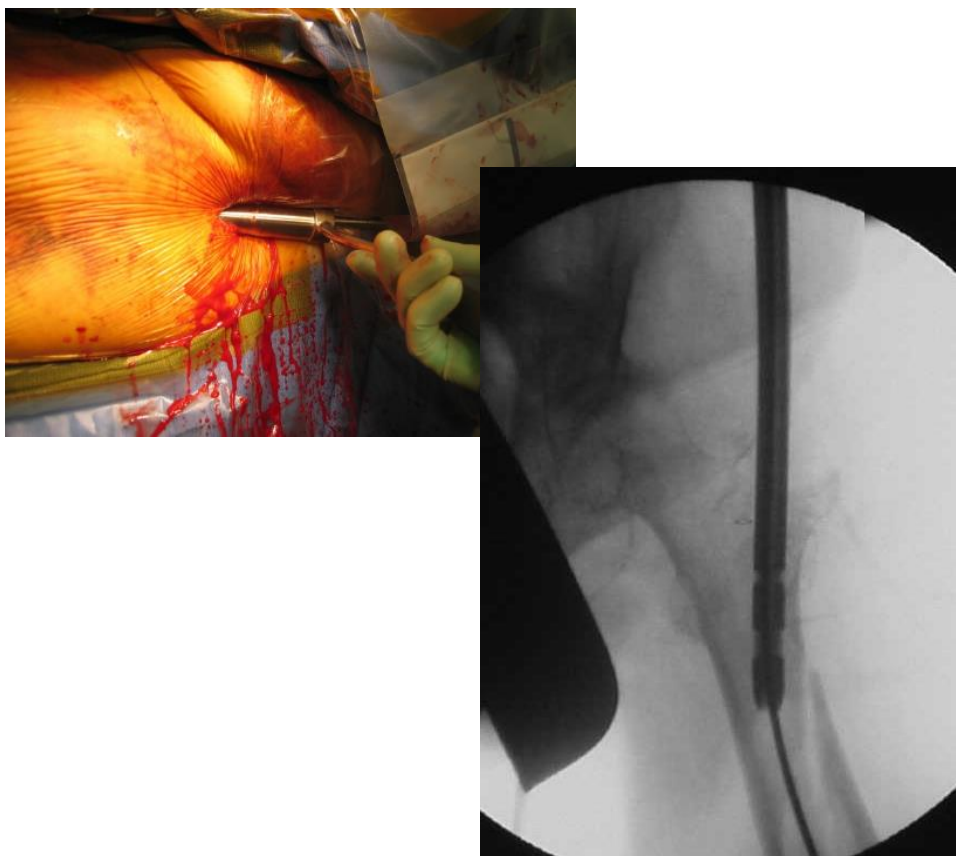
- Reverse oblique fracture pattern
- Subtrochanteric fractures
- Comminuted fractures with loss of medial or lateral buttress

Tips for cephalomedullary nailing



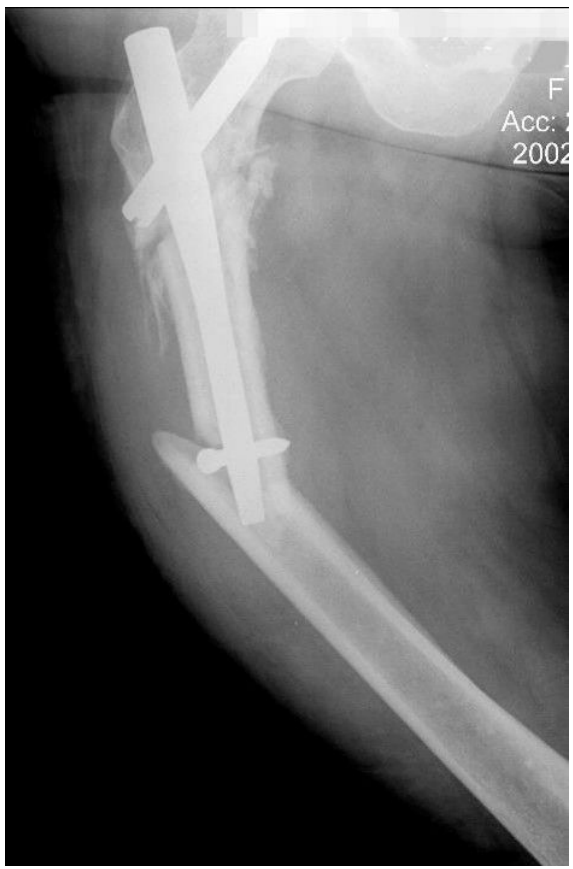
- Reduce the fracture first!
- Open if necessary

Tips for cephalomedullary nailing



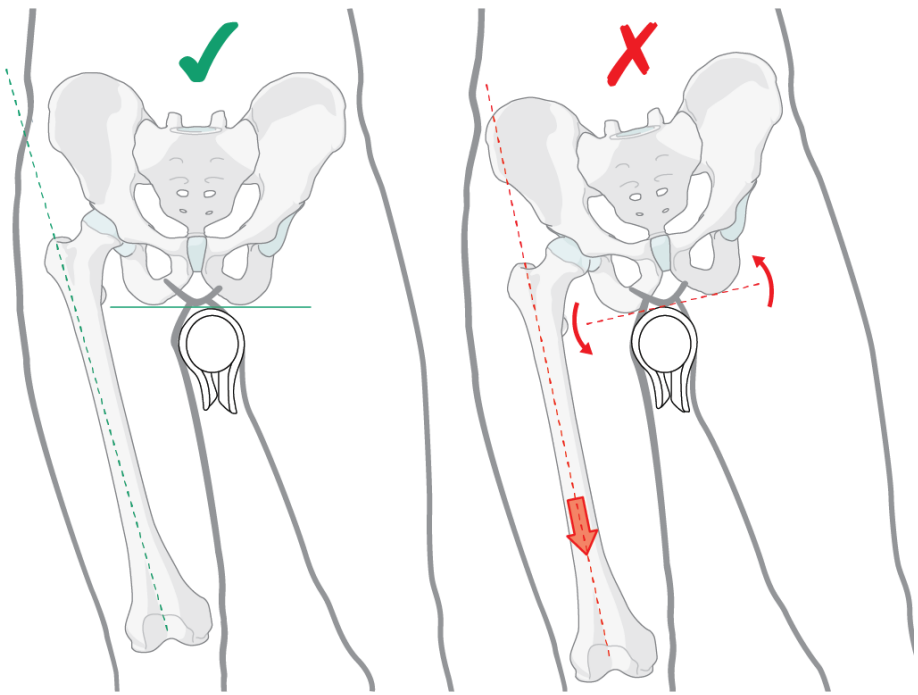
- Do not ream away the trochanter.
- Medialize during reaming.

Cephalomedullary nailing
Long vs short nails



- Early nail designs led to a large stress riser at the short-nail distal screw.
- Long nails protect the bone.
- Mismatch radius of curvature can lead to distal anterior cortical perforation.
- Fractures occur with long rods too, just at a different location.

When using traction, have well leg secured also



- When the well leg is not secured and traction is applied, the pelvis can rotate blocking the nail entry path

Reduction of unstable intertrochanteric fractures

- In almost all cases:
- Anterior cortex fails in tension, producing a clean fracture line along the intertrochanteric line
- The distal femoral shaft piece shortens and falls into external rotation
- The head and neck piece displaces into varus and commonly translates posteriorly into the comminuted intertrochanteric region
- Lateral displacement of the shaft is required to disimpact the overlap of the head and neck fragment from the shaft
- This is difficult to achieve with a fracture table

Reduction technique

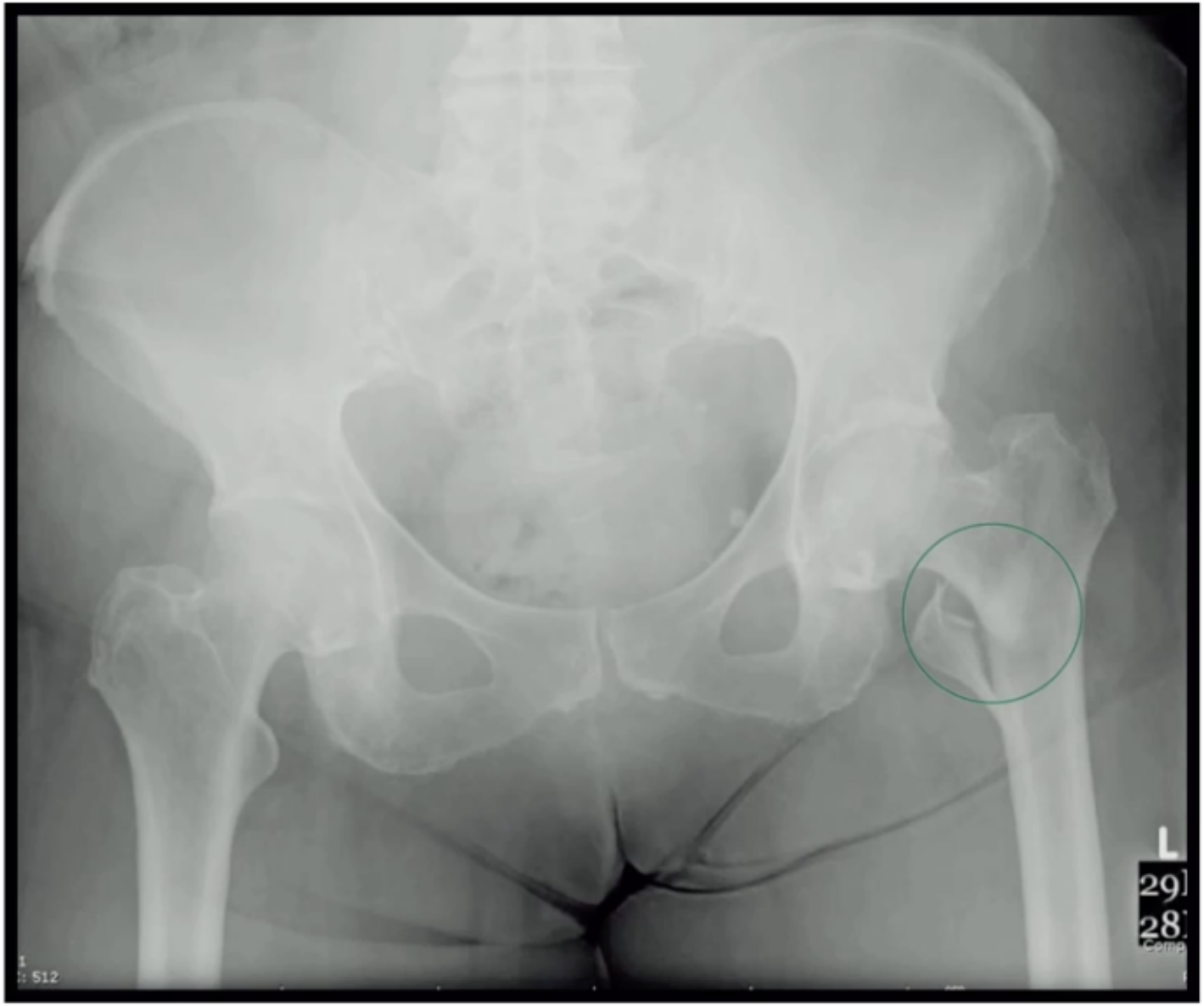
TECHNICAL TRICK

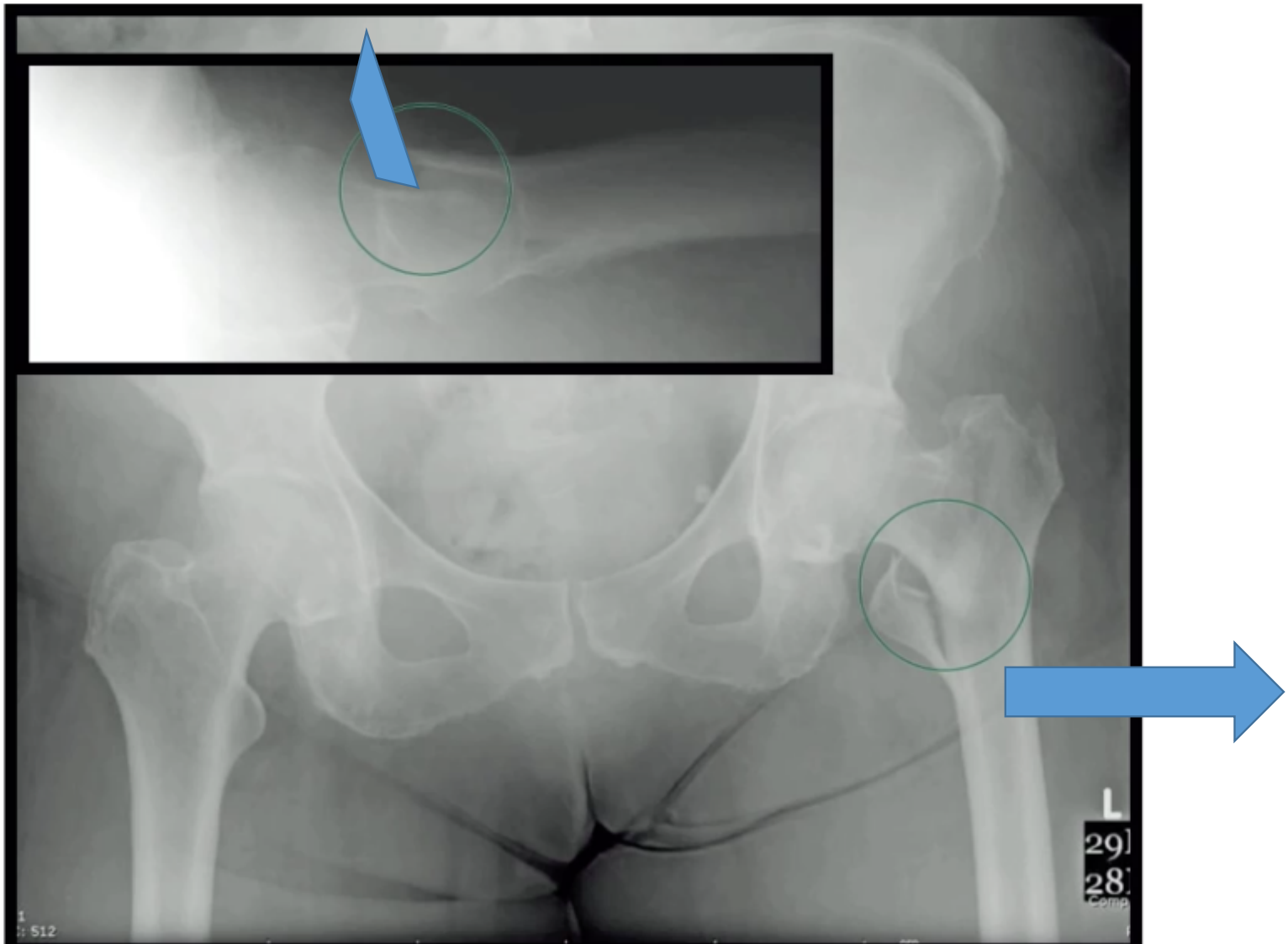
J Orthop Trauma • Volume 21, Number 7, August 2007

JOT JOURNAL OF ORTHOPAEDIC TRAUMA

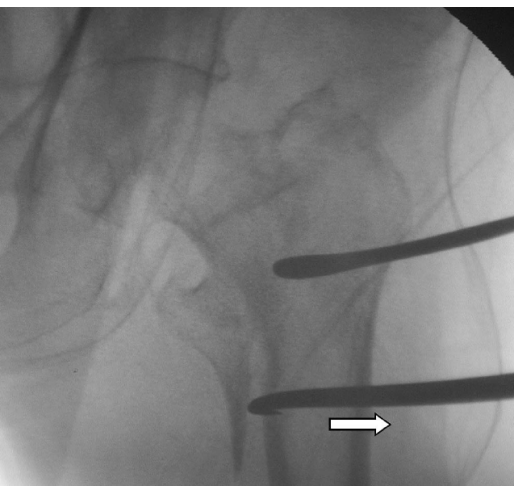
The Anterior and Medial Reduction of Intertrochanteric Fractures: A Simple Method to Obtain a Stable Reduction

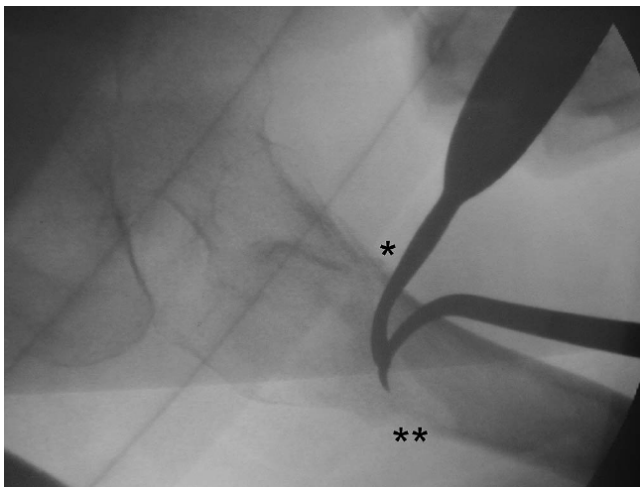
James B. Carr, MD


L


L

Bone hook is used to pull femoral shaft lateral
Narrow elevator used to translate proximal segment anteriorly





* Reduced anterior cortex
** Gap due to posteromedial comminution

Role for calcium phosphate augmentation?

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OrthoGuidelines
The Standard for Orthopaedic Clinical Practice Guidelines

NICE National Institute for Health and Care Excellence

No specific comments

Augmentation outcomes

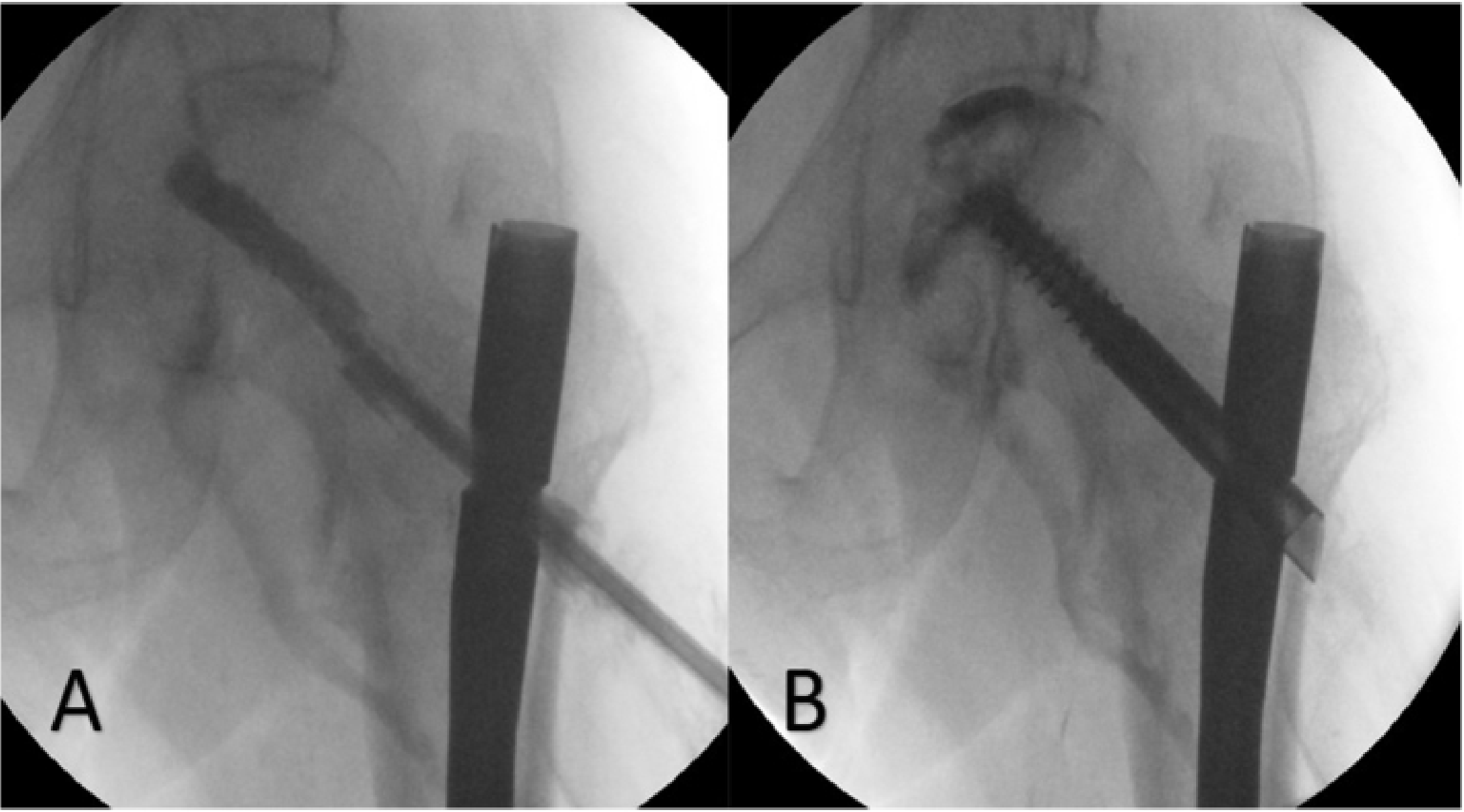
- RCT of 253 patients
- **No difference in mean walking speed**
  at 3 to
- No sta
  reope
  - 0 with augmentation
  - **6 without augmentation**

Insufficient evidence for routine use of cement augmentation

- RCT of osteoporotic intertrochanteric hip fractures
  - 40 patients with and 40
    nt augmentation
    Harris hip score
    s
    n of cement
    extrusion in experimental group

Kammerlander C et al. Injury. 2018 Aug;49(8):1436-1444.

Dall'Oca C, et al. *Injury*. 2010; 41(11):1150-5.


A
B

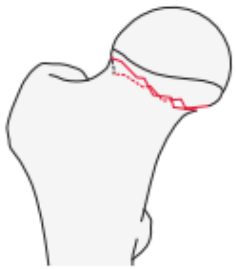
31B

Type: Femur, proximal end segment, **femoral neck fracture** 31B

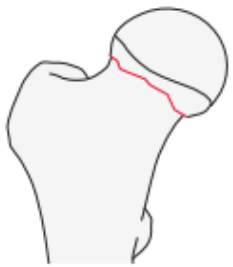
Group: Femur, proximal end segment, femoral neck, **subcapital fracture** 31B1

Subgroups:

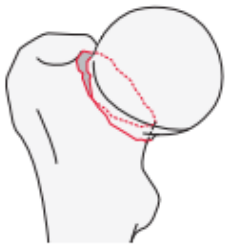
Valgus impacted fracture
31B1.1



Nondisplaced fracture
31B1.2



Displaced fracture
31B1.3



Group: Femur, proximal end segment, femoral neck, **basicervical fracture** 31B3

Group: Femur, proximal end segment, femoral neck, **transcervical fracture** 31B2

Subgroups:

Simple fracture
31B2.1*

Multifragmentary fracture
31B2.2*

*Qualifications:
p Pauwels 1 (<30°)
q Pauwels 2 (30–70°)
r Pauwels 3 (>70°)

Pain management
Consequences of untreated pain

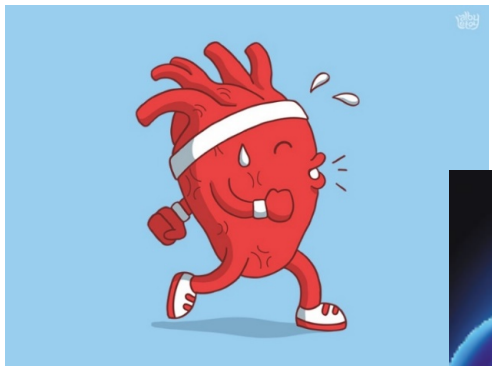
- Pain following hip fracture has been associated with:
  - Disturbances of Sleep
  - Delirium
  - Depression
  - Difference in response to treatment for comorbidities
- Inadequately managed pain is associated with:
  - Delayed **Ambulation**
  - Cardiovascular and pulmonary **complications**
  - Delayed transition to **less-intensive care** settings
  - Aggravation of **comorbidities and mortality** risk

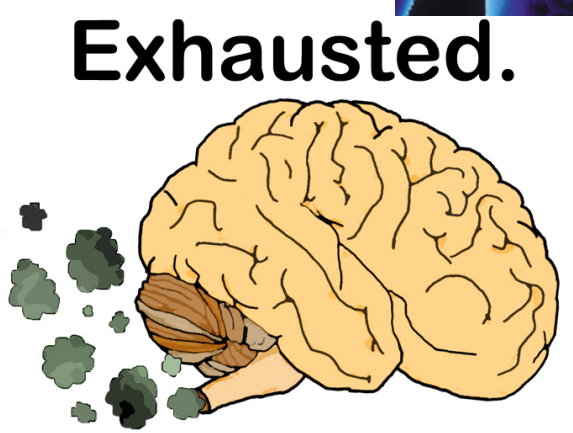
Pain management

- **Timing**
  (Preoperative, intraoperative, and postoperative)
- **Types**
  May be pharmacological or nonpharmacological
- "**Multimodal**" pain management:
  combine approaches that disrupt pain in more than one component of pain pathways

Pain as a medical problem

- Increases adrenergic drive
  - ↑ HR, ↑ BP, ↑ Myocardial oxygen demand
- Pulmonary compromise
  - ↑ RR, ↓ Vt, ↑ Atelectasis
- Decreases mental status
  - Most likely via acetylcholine mechanism
- Exacerbates other conditions





Excellent pain control response

- Improved cardiopulmonary **physiology**
- Proper **nursing** care
- Improved physiotherapy / **rehabilitation** / earlier mobilization
- Less loss of **muscle** strength
- ↓ deep vein **thrombosis** risk
- ↓ Decubitus **ulcer** risk
- Shorter length of **stay**

Opioid therapy

Intravenous

- **Morphine**
  - Gold Standard
- **Hydromorphone**
  - Cleaner, less metabolites
  - 2-8 times morphine potency
  - 7 mg morphine = 1 mg hydromorphone
  - **Renal Disease best to avoid !!!**

Oral

- **Oxycodone**
  - Limited to no metabolites
  - Inexpensive
  - Familiar
  - Readily available
  - Many preparations to choose from
  - Addiction

Opioids to avoid

- **Meperidine (Pethidine)**
  - Active metabolite causes delirium
- **Propoxyphene**
  - No more effective than acetaminophen
- **Codeine**
  - Must be metabolized and some people can’t
  - More nausea and constipation than others
- **Tramadol**
  - Seizures
  - Can’t use combined with true opioids

Pain control strategy
Opioid naive patient

- **Acetaminophen** around the clock
  - **Absolute maximum 4 gm daily**
  - **Relative maximum 2–3 gm daily**
- **Morphine 2–4 mg IV every 1–2 hours prn**
- **Oxycodone 2.5–5 mg postoperatively every 2–3 hours**
- No combination drugs, weak opioids, partial agonists
- Avoid multiple complicated regimens

IV, intravenous; prn, as needed

Patient with chronic opioid use:

- Usual dose + 30–50 %
- Rescue dose = 10–30 % of daily dose
- Recalculate doses every 24 hours
  - Total daily dose of opioid divided by 2–4
- BID to QID plus new rescue dose

BID, twice a day; QID, four times a day

Nerve blocks

- Blockade of nerve impulses from a region of the body
- Peripheral nerve blocks
- Neuraxial nerve block
  - Spinal anesthetic
  - Epidural anesthetic

Advantages of regional anesthesia

- Vastly **superior** pain control
- **Eliminate opioid use** first 24 hours postoperatively
- **Preemptive** analgesia
- ↓ Nausea and vomiting
- Minimal central nervous system effects
- ↓ **Postoperative delirium**
- Earlier and better physical therapy
- Patient satisfaction
- ↓ Length of stay

Regional anesthesia

- Hip fracture
  - Femoral 3 in 1 / lumbar plexus, neuraxial
- Lower extremity
  - Femoral 3 in 1, neuraxial, popliteal, sciatic, saphenous, others
- Can be done preoperatively / in emergency department

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Multimodal Analgesia

Multimodal analgesia incorporating a preoperative nerve block is recommended to treat pain after hip fracture.

Strength of recommendation: Strong ★★★★

Implication: Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.

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NICE guideline

- *Offer paracetamol every 6 hours **pre and post**operatively unless contraindicated*
- *Offer additional opioids if paracetamol alone does not provide sufficient postoperative pain relief*
- *Nonsteroidal antiinflammatory drugs (NSAIDs) are not recommended*

Acetaminophen after major surgery

- Seven RCTs including 265 patients
- Morphine PCA +/- acetaminophen
- Acetaminophen
  - Did not decrease morphine-related adverse effects or increase patient satisfaction.
  - Did have a **morphine-sparing effect of 20%** (mean, -9 mg; CI -15 to -3 mg; P=.003) over the first postoperative 24 hours

•Remy C. Br J Anaesth. 2005 Apr;94(4):505–513.

RCT, randomized controlled trial; PCA, patient-controlled analgesia

Multimodal pain regimen after major surgery

- Meta-analysis of 52 randomized placebo-controlled trials (4,893 adults)
- Acetaminophen, nonsteroidal anti-inflammatory drugs, or COX-2 inhibitors given with morphine after surgery
- **Morphine consumption decreased 15% to 55%**
- Only NSAIDS decreased pain (10 points)
- **NSAIDs also reduced nausea/vomiting and sedation but increased risk of severe bleeding.**

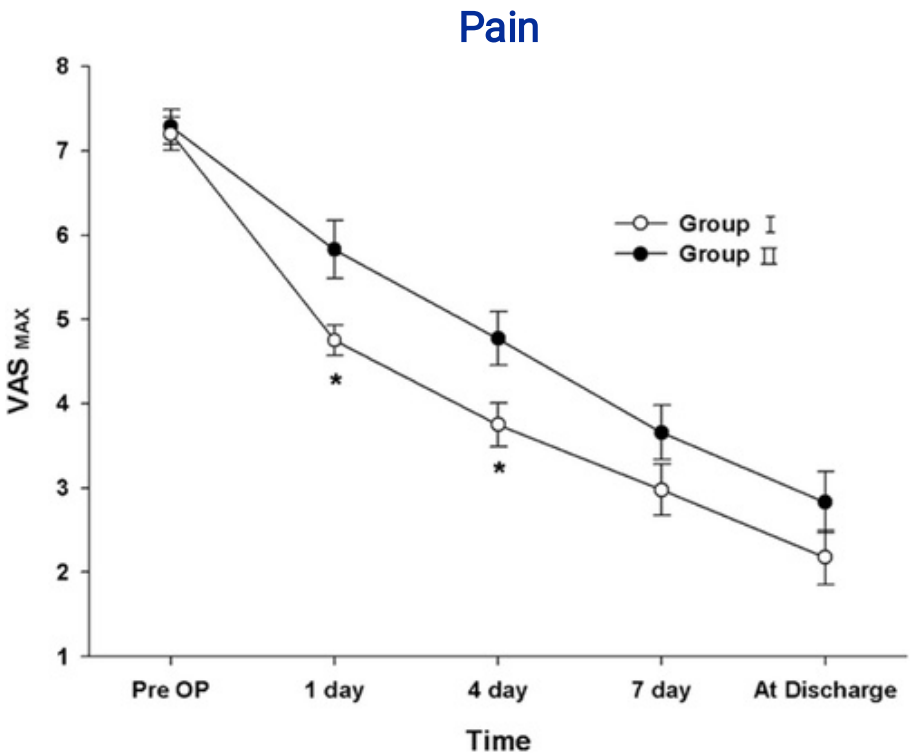
•Elia N, et al. Anesthesiology 2005 Dec;103(6):1296–1304.

Perioperative gabapentin / pregabalin.

- RCT of 120 patients undergoing hip arthroplasty
- Pregabalin versus placebo
- **Pregabalin**
  - **50% reduction in 24 hour postoperative morphine requirement**
  - Increased sedation scores
  - No difference in nausea, vomiting, pain control

•Mathiesen O, et al. Br J Anaesth. 2008 Oct;101(4):535–534.

Periarticular injections



- Level 1 Evidence
- RCT of 83 hemiarthroplasties
- Periarticular injection group:
- Less pain at day 1, 4
- Fentanyl use lower at all time points.
- Differences were small

Kang H. J Bone Joint Surg Am. 2013;95(4):291–296.

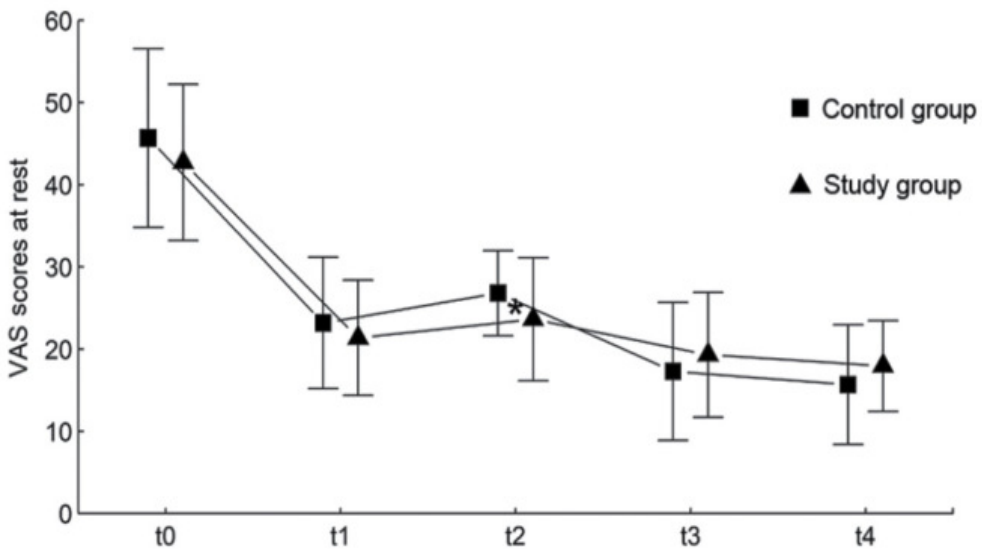
Peripheral nerve blocks

- **Cochrane review:**
  - "There is high-quality evidence that regional blockade **reduces pain on movement within 30 minutes after block placement.**
  - There is **moderate quality of evidence for a decreased risk of pneumonia, reduced time to first mobilization, and reduced cost of analgesic** regimen (single-shot blocks).."
- Based on a small difference in VAS:
  - -1.4 (95% CI -2 to -0.6)

- Guay J, Anesth Analg. 2018;126(5):1695-1704.

VAS, Visual analog scale for pain

Fascia iliac block



- RCT of 88 geriatric hip fractures
- Tramadol and paracetamol with/without block
- Significant but small difference in VAS

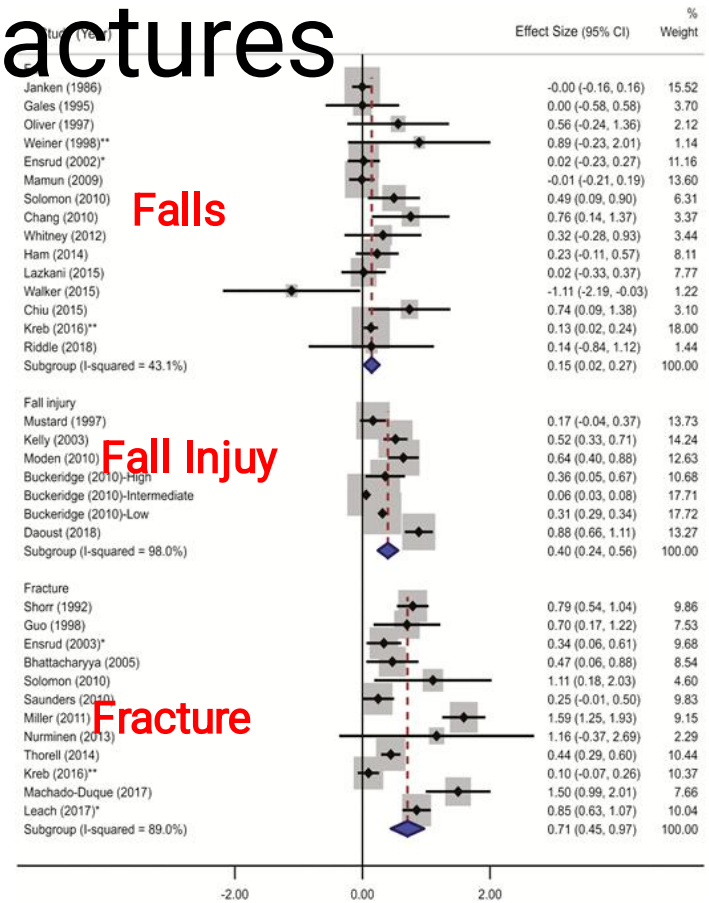
Ma Y, Exp Ther Med. 2018;16(3):1944-1952.

Baseline opioid use and fracture risk

- Metaanalysis of 8 cohort studies, 4 involving hip fractures, 500K patients
- **Use of opioids increased risk of fracture**
  - RR 1.88, 95% CI 1.51–2.34
- **Even greater risk for hip fracture**
  - RR 2.00, 95% CI 1.84–2.19

- Teng Z. PLoS One. 2015;10(6):e0128232.

Opioid use and risk of falls, fall injury, and fractures



- Metaanalysis of 30 studies looking at falls, fall injury, and fracture risk.
- Opioid use increased across the board.

Yoshikawa. J Gerontol A Biol Sci Med Sci. 2020 Sep 25;75(10):1989-1995.

Pain management discussion

- Limited evidence but scheduled paracetamol, with or without periarticular/regional blocks should be considered to reduce opioid consumption in this population
- Chronic opioid use should be discouraged

What is delirium?

- Delirium is an **acute confusional state** that is extremely common among hospitalized elders and is strongly associated with **poor short-term and long-term outcomes**
- Delirium can be thought of as acute brain failure and is the final common pathway of multiple mechanisms
- Delirium is frequently **not recognized**, **evaluated, or managed** appropriately

Delirium

- **Onset is acute** and condition lasts hours to days.
- Reduced clarity in the **patient's awareness** of the environment, with **impaired ability to focus, sustain, or shift attention**. The patient may be agitated, irritable, and emotionally labile or drowsy, quiet, and withdrawn.
- **Consciousness level fluctuates** over the course of the day.
- Delirium **cannot be explained by a patient's preexisting, established, or evolving dementia**

Delirium

- Delirium begins with a baseline vulnerability (eg,dementia, older age, polypharmacy)

MOTOR SUBTYPES

Hyperactive restless, agitated

Hypoactive somnolent

Mixed combination in fluctuating course

75% of patients recover over days to weeks

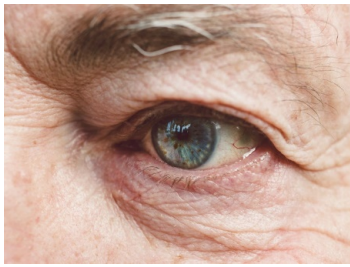
25% of patients have persistent delirium

Precipitating event (eg, hospitalization, hip fracture)

Vulnerability to delirium (eg, dementia, older age, polypharmacy)

Delirium causes

- **D:** Drugs (opioids, anticholinergics, sedatives, steroids, benzodiazepines, chemotherapy and immunotherapies, some antibiotic
- **E:** Eyes and ears (poor vision and hearing, isolation)
- **L:** Low flow states (hypoxia, MI, HF, COPD, shock)
- **I:** Infections
- **R:** Retention (urine/stool), restraints
- **I:** Intracranial (CNS metastases, seizures, subdural, CVA, hypertensive encephalopathy)
- **U:** Underhydration, undernutrition, under sleep
- **M:** Metabolic disorders (sodium, glucose, thyroid, hepatic, deficiencies of vitamin B12, folate, niacin, and thiamine) and toxic (lead, manganese, mercury, alcohol)



MI, myocardial infarction; HF, heart failure; COPD, chronic obstructive pulmonary disease; CVA, cerebral vascular accident

Delirium vs Dementia

Features	Delirium	Dementia
Onset	Acute	Insidious
Course	Fluctuating	Progressive
Duration	Days to weeks	Months to years
Consciousness	Altered	Clear
Attention	Impaired	Normal (unless severe)
Psychomotor changes	Increased or decreased	Often normal
Reversibility	Usually	Rarely

NICE National Institute for Health and Care Excellence

NICE guideline

Minimize risk of delirium and maximize independence by:

- *Actively looking for cognitive impairment when patients first present with hip fracture*
- *Reassessing patients to identify delirium that may arise during their admission*
- *Offering individualized care in line with **NICE's guideline on delirium***

Eyes don't see what the mind doesn't know !!

NICE National Institute for Health and Care Excellence

NICE guideline

- Delirium guidelines
- Within 24 hours of admission, assess people at risk for clinical factors contributing to delirium
  - Cognitive impairment/disorientation
  - Dehydration/constipation
  - Hypoxia
  - Infection (UTI)
  - Immobility
  - Pain
  - Medication review
  - Poor nutrition
  - Sensory impairment

Managing delirium

- Primary prevention
  - **Avoid benzodiazepines**
- Nonpharmacologic treatment
  - Sensory inputs:
    - Reorientation
    - Eyeglasses and hearing aids
  - Provide cognitively stimulating activities
  - Timely removal of catheters and restraints
  - Early mobilization
- Pharmacologic treatment
  - Stop any offending medications
  - Consider antipsychotics: **haloperidol 0.5–1 mg**

Causes of delirium after hip fracture

- Prospective study of 571 patients
- Patients interviewed or assessed on daily basis
- **Delirium occurred in 10%**
  - 7% on admission
  - 30% before surgery
  - 54% after surgery
- Most frequent causes:
  - **Sensory/environmental**
  - **Infection**
  - **Drug use**
  - **Fluid/electrolyte imbalance**

- Brauer Arch Intern Med. 2000;160(12):1856–1860.

Intraoperative sedation and delirium

- RCT of 200 hip fracture patients
- Spinal anesthesia with light vs heavy sedation

- **Limiting intraoperative sedation did not appear to decrease delirium.**
- Delirium occurred in 39% vs 34% (P=.46)

- Patients with Charlson comorbidity index of 0 (healthy) had doubled risk of delirium with heavy sedation (HR 2.3, 95% CI 1.1-4.9)

Avoiding delirium

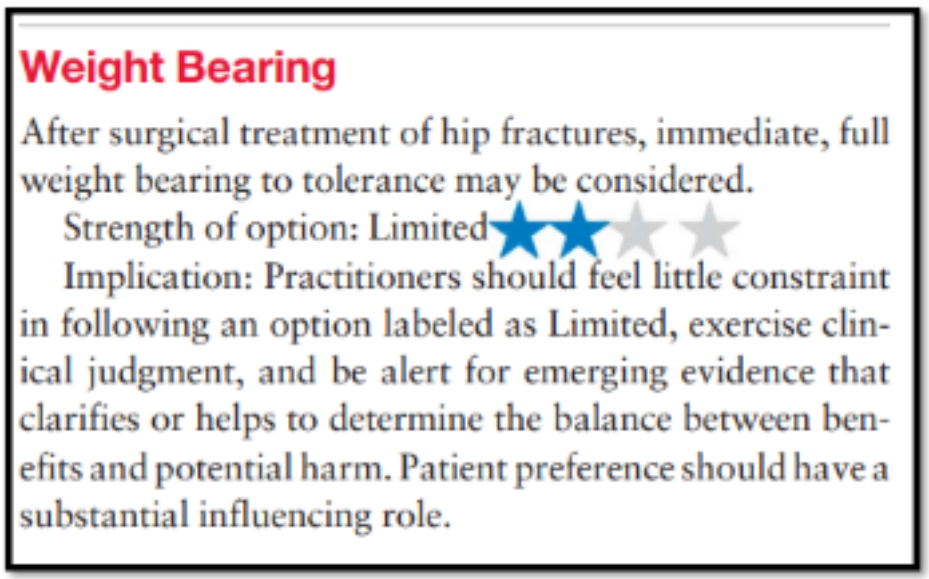
- RCT of 126 geriatric hip fractures
- **Geriatric consult service versus "usual care"**
- **Less delirium in patients with geriatric consult,** 32% vs 52% (p<.04)

- **Geriatrics consult service:**
  - **Made an average 10 recommendations per patient**
  - **Transfusion for Hct <30% in 92%**
  - **D/C benzodiazepines and anticholinergics in 68%**
  - **Bowel regimen in 68%**
  - **D/C urinary catheter in 71%**
  - **Treat fluid overload or dehydration in 48%**

- Marcantonio J Am Geriatr Soc. 2001;49(5):516-522.

Rehabilitation

- **Swedish National Patient data :**
  - **quality of rehabilitation in the early postoperative period might have influenced the outcome (**length of stay and complications).
- Progressive resistance training
- Progressive balance and gait training
- Supported treadmill gait re-training
- Dual task training and activities of daily living training



Weight Bearing

After surgical treatment of hip fractures, immediate, full weight bearing to tolerance may be considered.

Strength of option: Limited

Implication: Practitioners should feel little constraint in following an option labeled as Limited, exercise clinical judgment, and be alert for emerging evidence that clarifies or helps to determine the balance between benefits and potential harm. Patient preference should have a substantial influencing role.

Post operative Antibiotics

- **Peri-operative antibiotic treatment of bacteriuria reduces early deep surgical site infections in geriatric patients with proximal femur fracture (for 5 days).**

Prophylactic Antibiotics in Hip Fracture Surgery:

A R

Syed Ka

1. Orthop

Corresponding author: Tauqeer Khan, tauqeer_khan001@yahoo.com

Conclusion

There was no statistical relationship between surgical site infections with a single dose versus three doses of antibiotics in patients undergoing hip surgery.

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No specific comments

Post-op management and DVT prophylaxis

- DVT prophylaxis: start POD 1 for 4 weeks
- Delirium prevention
- Osteoporosis Management
- Pain Control
- Foley out POD 1, bladder scan straight catheter if retention

References

- AAOS Clinical Practice Guideline Summary: Management of Hip Fractures in Older Adults
- NICE Hip fracture: management Clinical guideline Published: 22 June 2011 Last updated: 6 January 2023 www.nice.org.uk/guidance/cg124
- AO in hospital course for mangment of geriatric hip fractures
- Downey C, Kelly M, Quinlan JF. Changing trends in the mortality rate at 1-year post hip fracture—a systematic review. *World J Orthop.* 2019;10(3):166–175. doi:10.5312/wjo.v10.i3.166
- **Orthogeriatrics: The Management of Older Patients with Fragility Fractures** Epidemiology of Fragility Fractures and Social Impact , Nicola Veronese, Helgi Kolk, and Stefania Maggi.
- UCSF Hip fracture protocol
- Rockwoods and green's Fractures in adults.