Decision making in Elderly acetabular fractures

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what do we know?

- Elderly (65yo or over)- fastest growing segment of society- estimated 20% pop over 65yo by 2030
- Fastest growing subgroup of acetabular fractures

Hip fractures 1 year mortality 19-36% operative, 50% non operative

Geriatric Acetabular fractures 16% overall mortality

Geriatric Acetabular fractures

- To fix or not to fix- need to adhere to basic principles of acetabular surgery with a twist
- Basis ATLS protocols followed- increased bleeding risks even in benign appearing fractures
- Start of decision making process

Traction Pin?

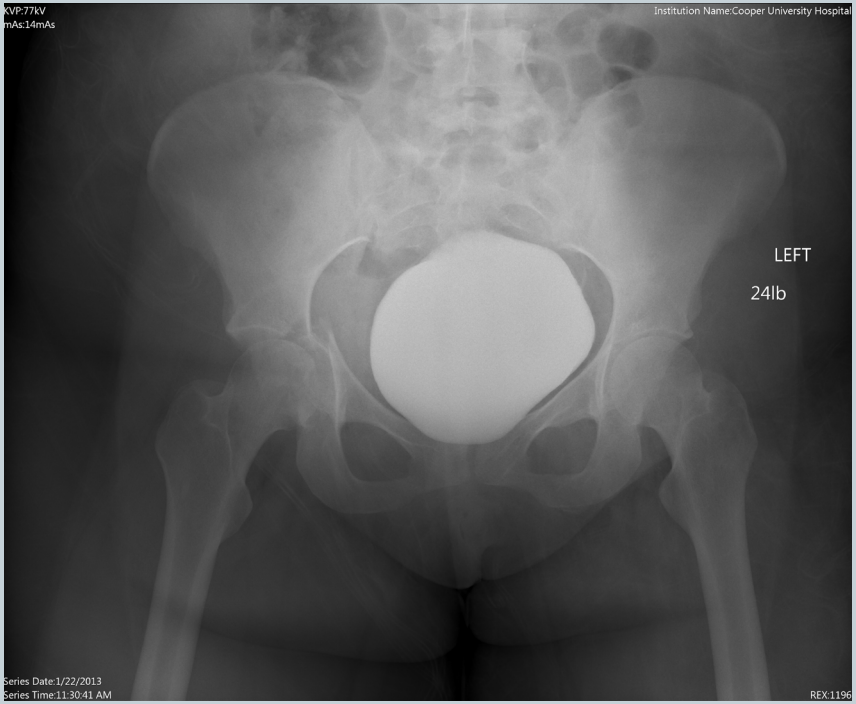
Indications for pin placement:

a. All posterior walls with dislocation
b. Displaced both column fractures
c. Displaced transverse fractures
d. Any fractures with ia loose bodies
e. Vertically unstable
f. Not indicated if op vs non op decision still to be made

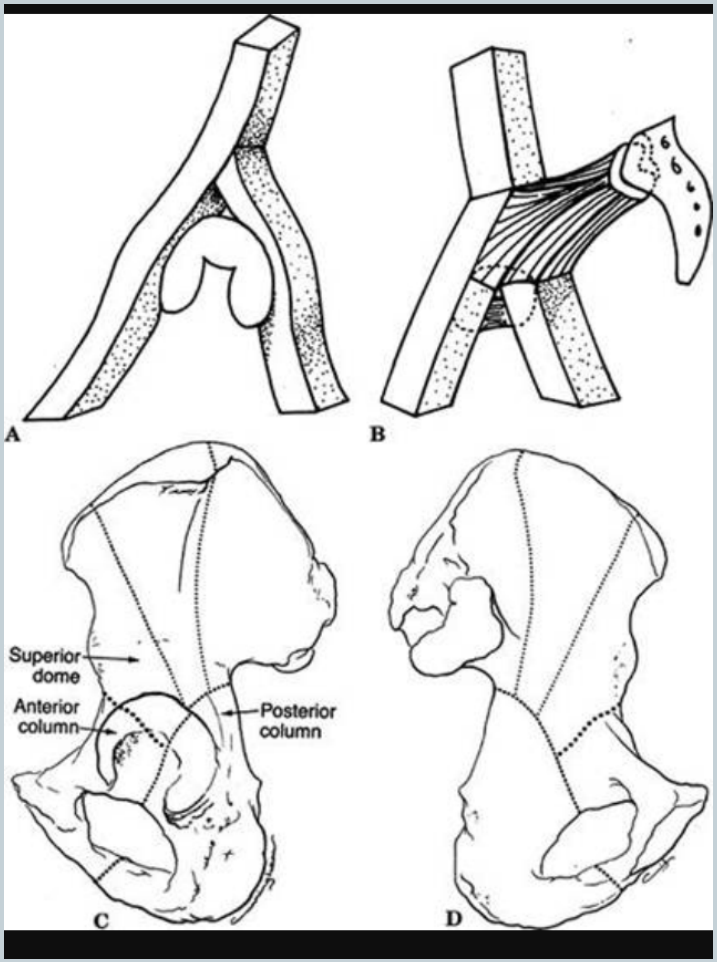
Traction

Pre traction

Post traction- indicated in select fractures in elderly- questionable utility in protrusio cases



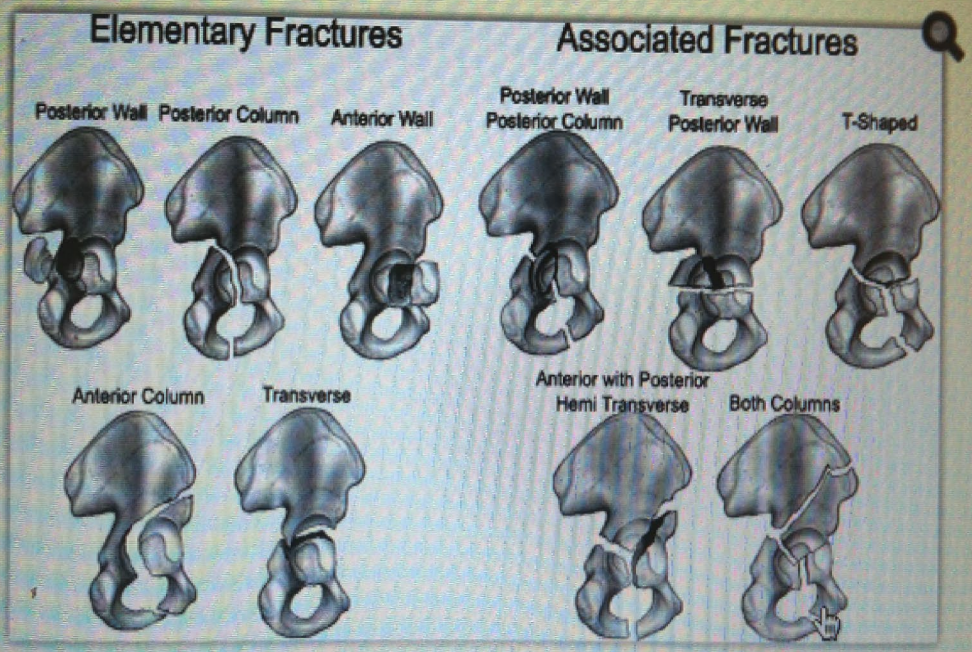
Acetabulum anatomy



Categorize Fracture

- Based on 5 view pelvis, CT and 3-D Recons
- Assist in surgical decision making

Fig. 1



The Judet and Letournel acetabular fracture classification system

Elementary

- Based on Letournel's classification
- 1. Posterior wall
- 2. posterior column
- 3. anterior wall
- 4. anterior column
- 5. transverse

Associated- vast majority of geriatric fractures

- 1. T-type
- 2. Transverse with posterior wall
- 3. Posterior column with posterior wall
- 4. Anterior column posterior hemi transverse
- 5. Both column

Roof Arcs

- 1. anterior column- 25 degrees
- 2.posterior column- 70 degrees
- 3.medial – 45 degrees

- Based on 204 fx reviewed by joel matta(1986) – 4year f/u. less predictive for two column or posterior wall fractures

Operative Indications

- “All fractures of the acetabulum with displacement seen within the first 3 wks after injury should be operated on except:
- Medical contraindications
- Non displaced
- Low column
- Secondary congruency
- Arthrosis not contraindication

Treatment Goals with ORIF

- 1. Multiple studies confirm best predictor of successful treatment of acetabular fractures is obtaining and maintaining a quality reduction
- <2mm= 13% post traumatic arthrosis
- >2mm= 43% post traumatic arthrosis
- Results worse >65

Decide on approach-generally determined by side of max displacement one approach chosen in elderly

- A. Kocher Langenbach-posterior
- B. ilioinguinal/ stoppa approach- anterior
- C. combined
- D. extended iliofemoral
- Either A or B used in elderly

Mortality: what do we know?

- Level I literature sparse
- **Effect of surgical treatment on mortality after acetabular fracture in elderly: a multicenter study of 454 patients.** Gary JL, et al JOT 2015
- Found overall one year mortality 16%. Overall higher 1 year mortality in non op (21% vs 13%). No difference when risk factors accounted for.
- No difference in mortality rates ORIF vs Perc fixation vs THA

- **One year mortality after acetabular fracture in elderly patients presenting at a level 1 trauma center.** Bible, JE, et al JOT 2014
- Isolated geriatric acetabular fracture mortality 8.1%
- Geriatric acetabular fracture associated with poly trauma: same mortality as isolated if makes it out of hospital. 23% overall one year

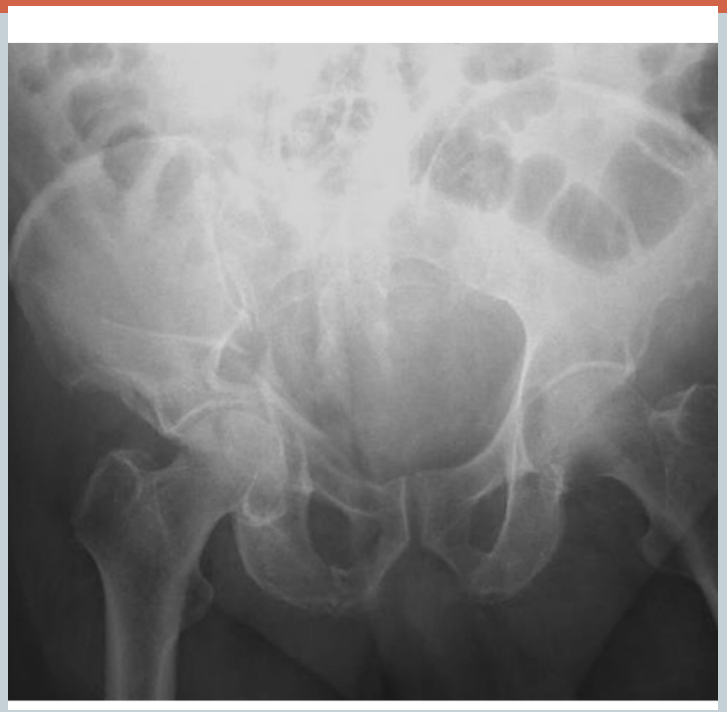
Geriatric Acetabular fracture protocol

- Decision must be made for one of four treatment options:
- 1. Conservative treatment
- 2. Acute ORIF
- 3. Acute ORIF and THA
- 4. Percutaneous screw fixation with limited incisions

algorithm

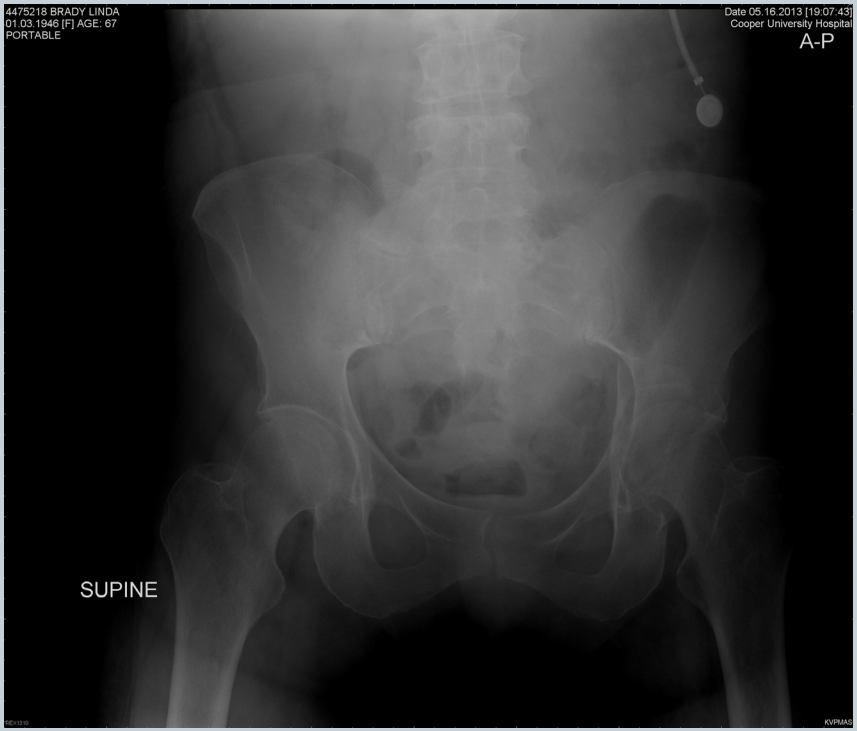
Secondary congruence

- Conservative treatment:
- a. Non displaced out of traction
- b. Both column with secondary congruence out of traction
- c. Excessive medical risk factors
- d. Limited preinjury function
- e. poor results expected with incongruity
- f. Traction/bedrest=4 times increased mortality- **must mobilize**



Non-operative

Family elects for non operative: Initial ap



6 weeks out: pts should be counseled that leg WILL shorten

Geriatric Acetabular fracture protocol

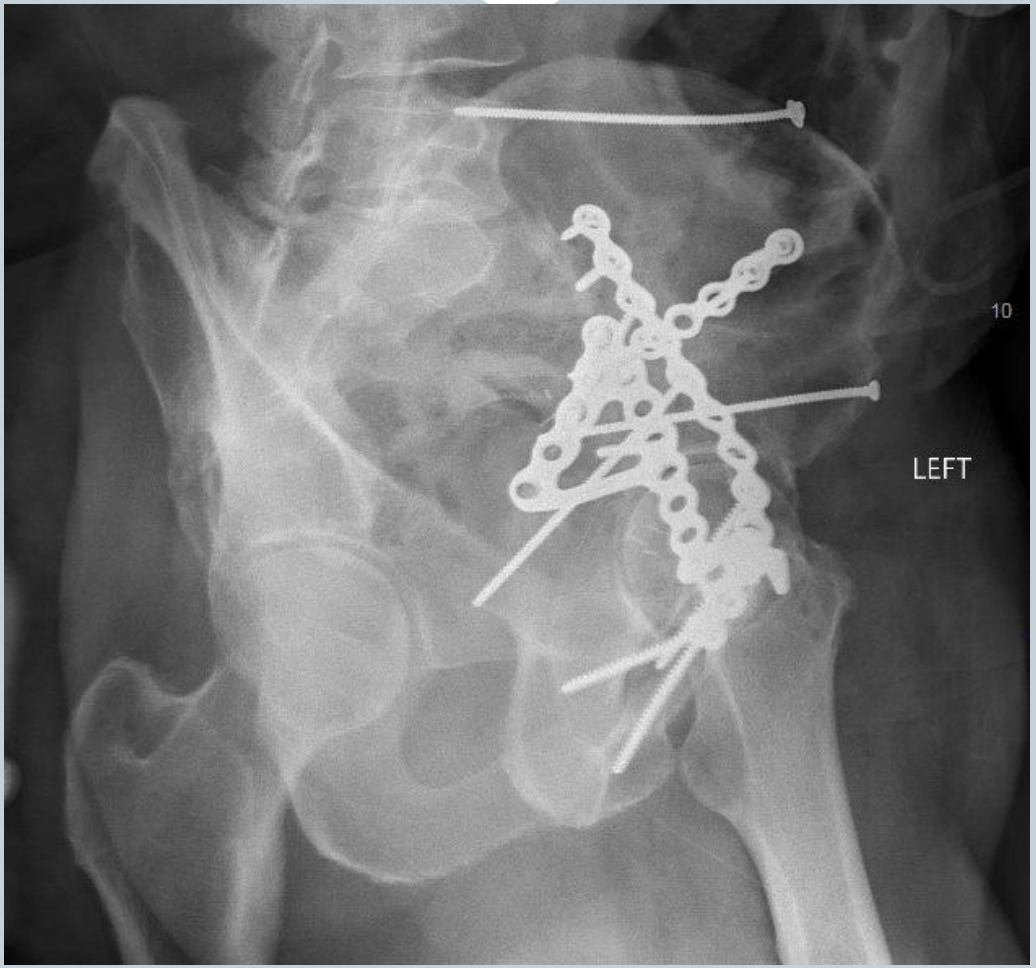
- Acute ORIF

- a. Displaced fracture which is deemed suitable for anatomic reconstruction and maintainence of reduction through healing
- b. No injury to femoral head identified
- c. medically fit for surgical event
- d. evaluate risk for fixation failure given- age, bone quality, mechanism, size of dome impaction segment
- e. one approach
- Preop mobility confers better outcome

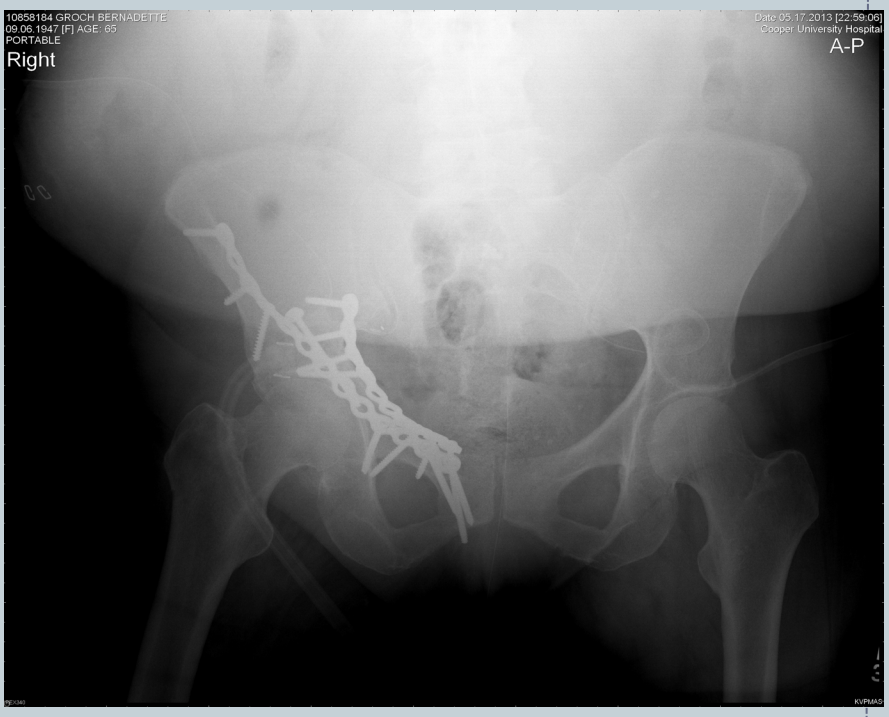
Gull sign

- Anglen, et al “Gull sign harbinger of failure for internal fixation of geriatric acetabular fractures” JOT 2003
- “gull” connotes superomedial dome impaction

Technologic advances allowing for safer, more stable fixation options



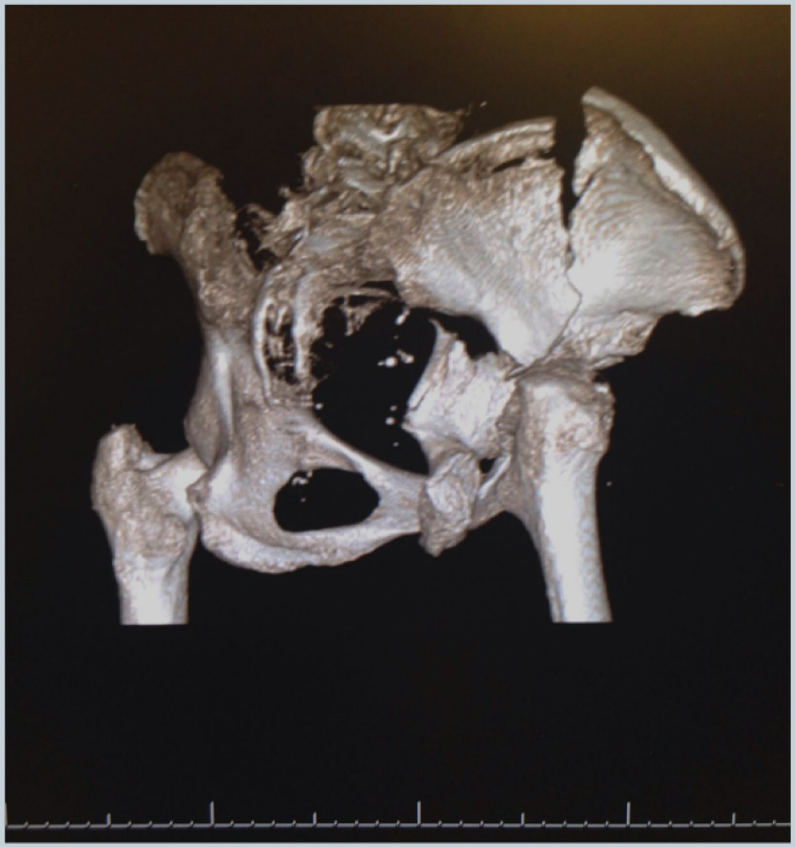
Associated Anterior column post hemitransverse

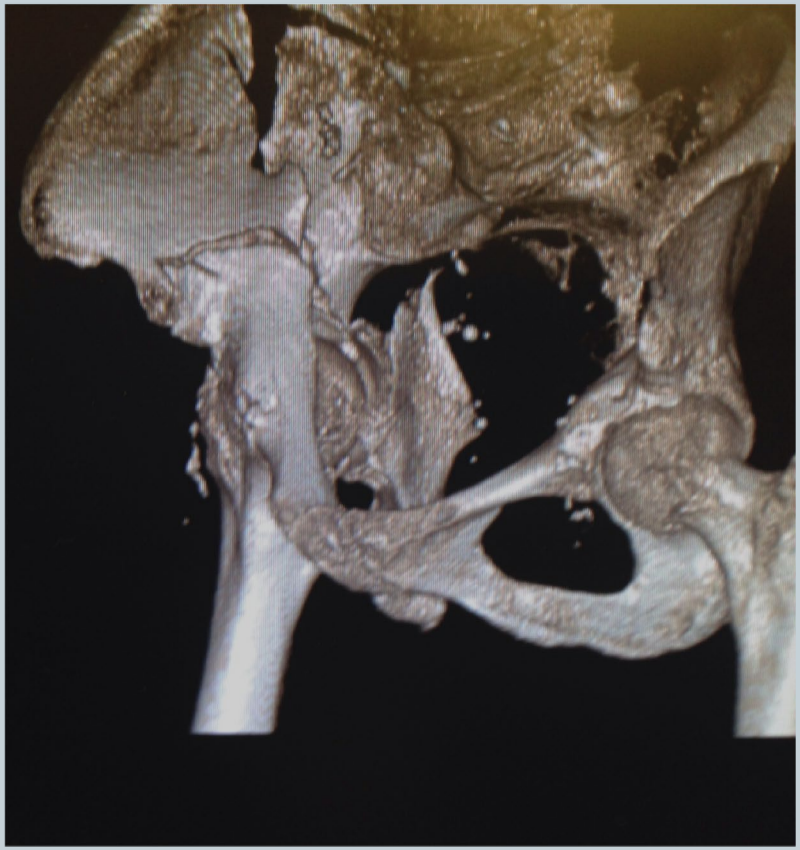


- Common in the elderly
- Pt Treated with definitive fixation from anterior approach with intrapelvic plate and pevic brim plate
- 19% THA rate with this technique in elderly acetabulum fx (>70 yo) with this technique: Archdeacon, JOT 2013

Acute ORIF- 85 yo fall down stairs-Both Column

Elderly Acetabulum Acute ORIF Both Column





Infrapectineal plating system

ORIF

- 70 yo hanging sign boasting 180 days workplace “injury free”
- Fell 5 feet off ladder
- Full time security guard
- Osteoporosis- 2yr out form im nail left femur

- Decision made for orif

Return to work. No residual pain. Osteoporosis treatment initiated 2 months-forteo

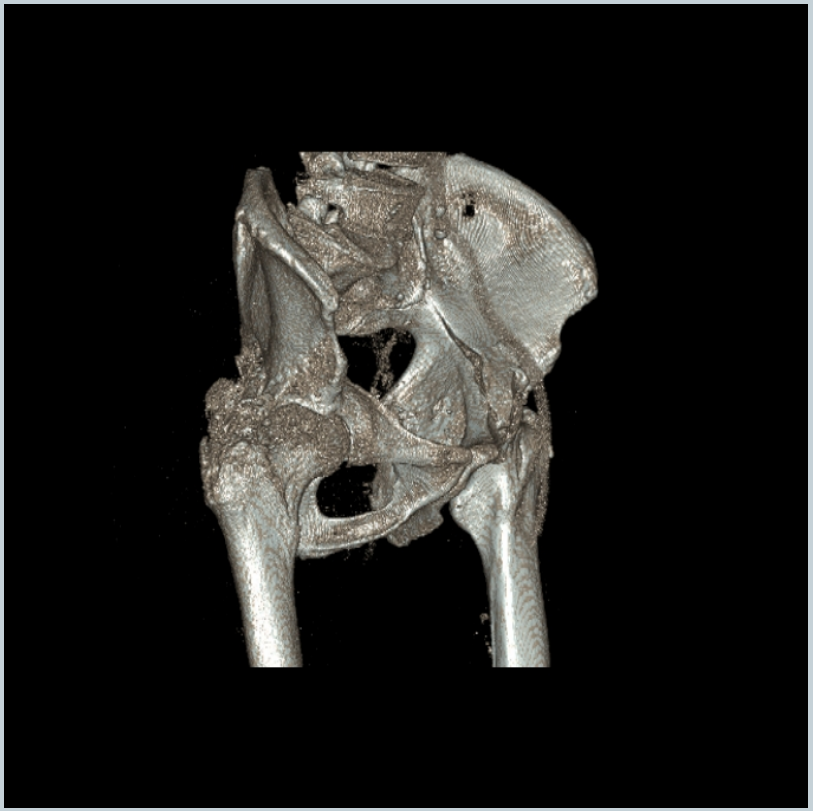
Geriatric Acetabular fracture protocol

- Reduction with percutaneous screw fixation
- Minimally displaced, minimal quadrilateral plate involvement
- Amenable to congruent reduction with ligamentotaxis/ limited clamp placement
- Medically unfit for more physiologically taxing reduction
- 30 % total hip conversion rate with percutaneous technique: **Gary, etal JOT 2012**
- Outcomes for delayed arthroplasty same as for orif

Percutaneous fixation elderly

70 yo male with multiple medical comorbities- unable to mobilize

3D

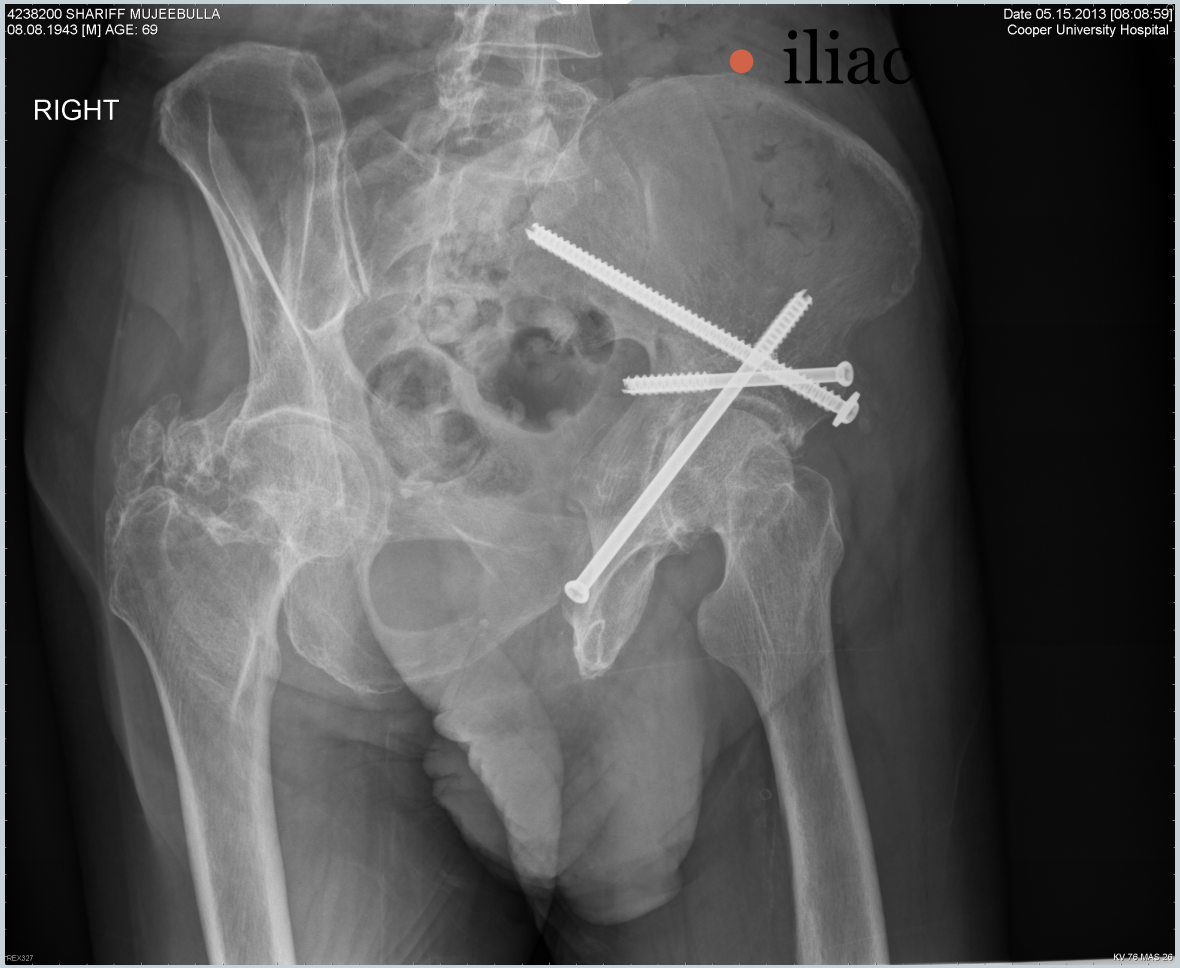


Percutaneous fixation elderly

Obturator

AP post op pt mobilized rapidly

Percutaneous fixation elderly WBAT



Limited incision reduction/fixation

- 80yo low energy fall on hip at class reunion
- History of prostate cancer with open prostetectomy
- Beware elderly male with prostate issues/ASA

Lateral window

CT classification

Lateral window

Unable to perform medial stoppa window secondary to previous surgery

Lateral window AVN

- Patient with late avn, and residual protrusion- unable to maintain initial reduction
- Elects for conversion to THA

Lateral window with delayed THA

- Conversion to tha
- Largest risk is acetabular component
- May need cement for osteopenia
- Cementless acetabulum strongly preferred!
- MDM
- 80-90 percent good or excellent outcomes.

Geriatric Acetabular fracture protocol

- Acute ORIF with THA

- a. patients in whom anatomic reduction and reduction maintenance unlikely

- Large impaction “gull sign” unlikely to be held reduced through healing

- Femoral head involvement

- Medically suitable

ORIF with Acute THA

- ORIF with Acute THA technique:

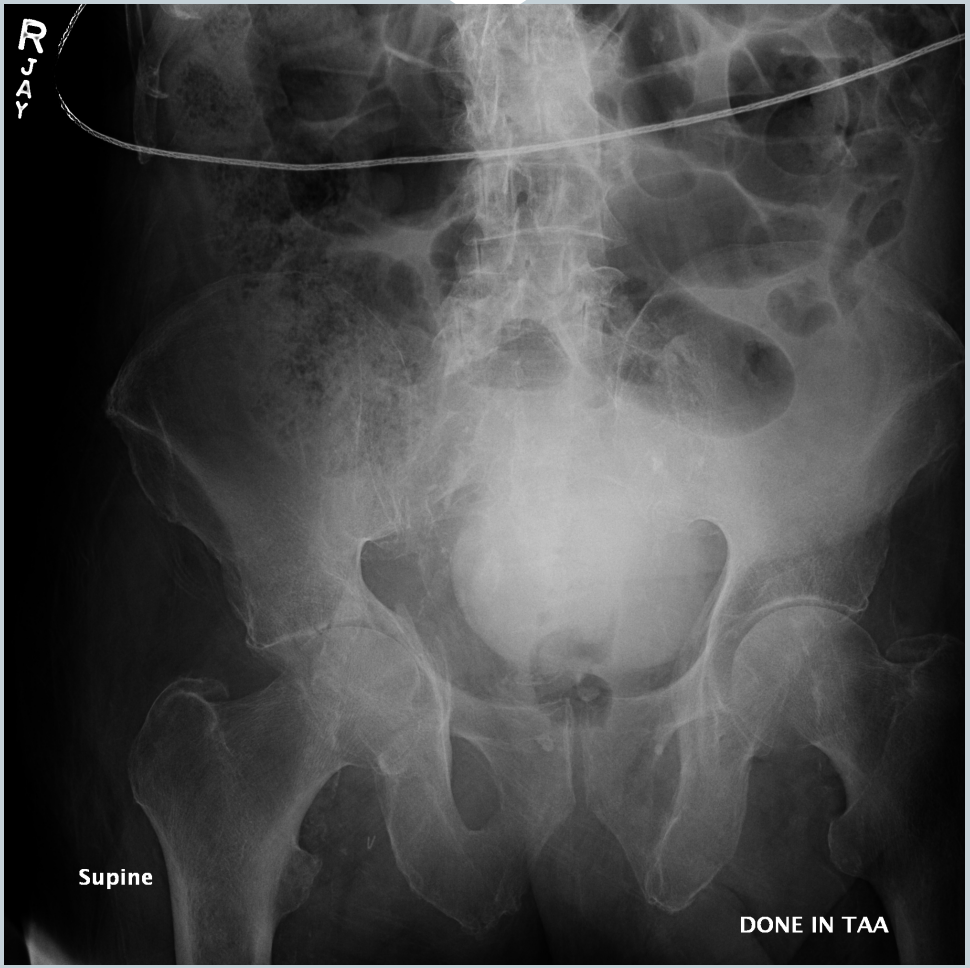
- Restore columns with orif
- Femoral head autograft
- Cementless fixation after column restoration
- Revision hip principles
- Better results with one approach
- Earlier weight bearing- no implant migration

ORIF vs ORIF and acute THA

- Systematic review: Daurka, et al
- 22.4% conversion to THA in ORIF group at 2yr mark
- No difference in mortality
- Harris hip scores higher in orif group
- Short form 36 higher in ORIF with THA group

- Randomized prospective underway trend in favor of orif with acute tha

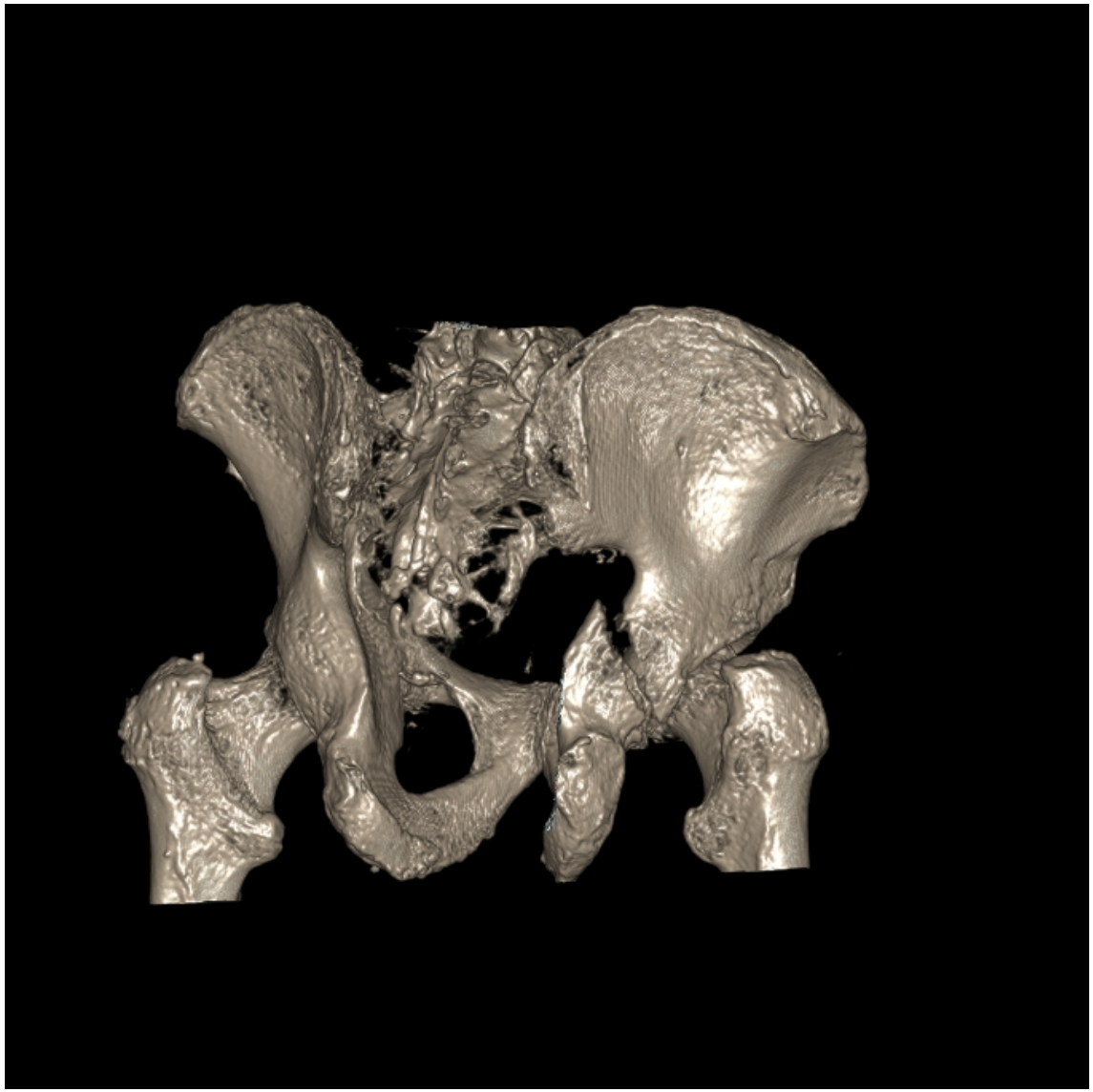
ORIF with Acute THA



ORIF with Acute THA

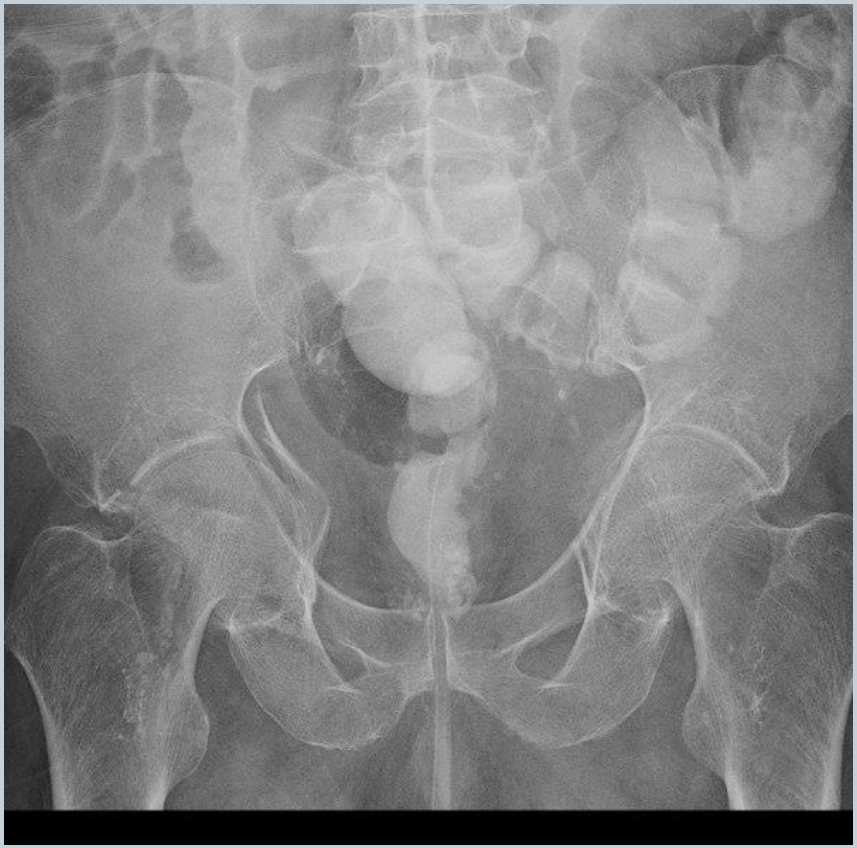
78 yo with comminuted anterior column posterior hemitransverse /protrused acetabular fracture

Fall from standing height



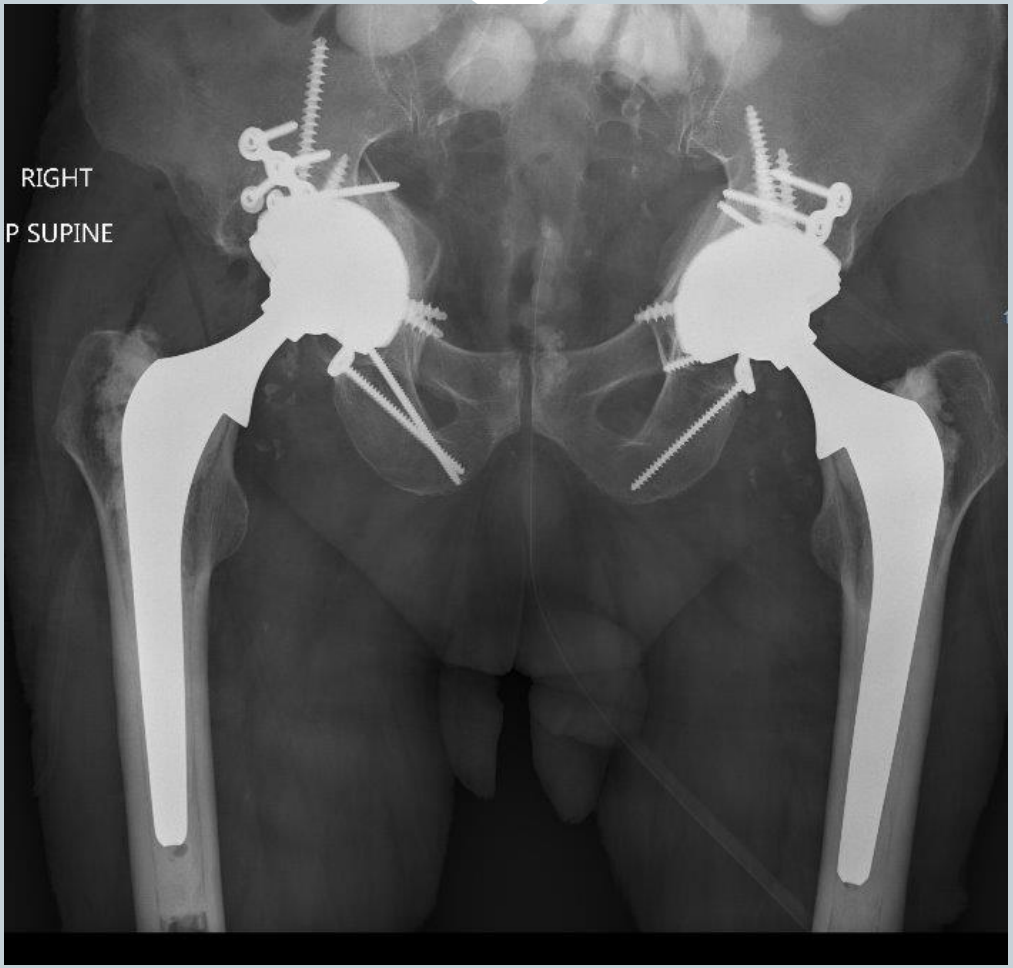
ORIF with Acute THA

Bilateral, minimal mechanism



- 75 yo minimal pmhx
- Felt to sustain breaks with kicking of lounge chair

Bilateral acute ORIF with hybrid THA



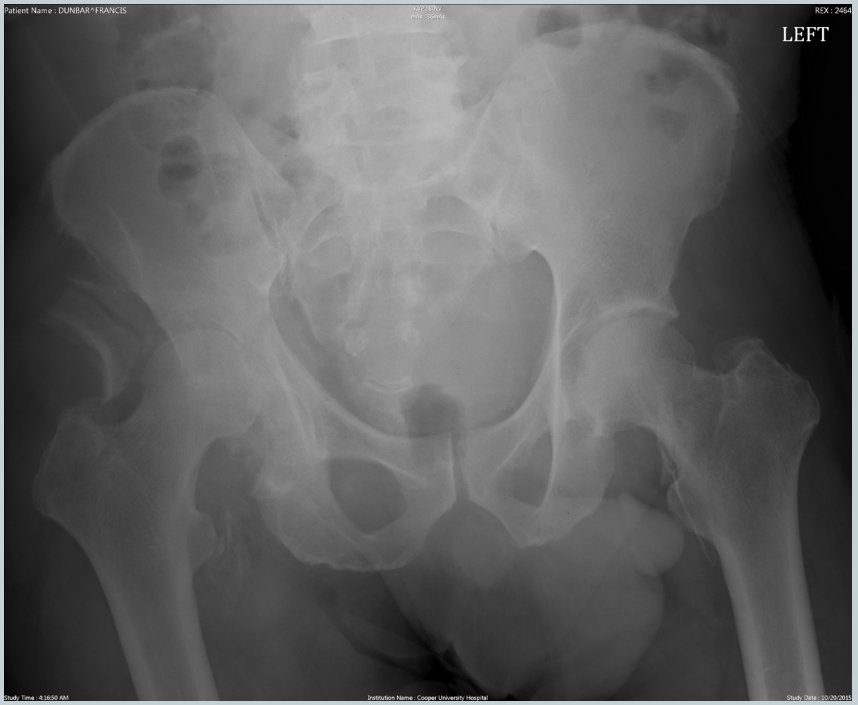
Geriatric Acetabular fracture protocol

- Delayed THA- failed orif salvage or non op patients

- A. preferred after restoration of anatomy
- Can consider after non op treatment- more difficult with more guarded results
- Cementless cups preferred- more anatomy restored better results
- Improved bone stock vs acute tha

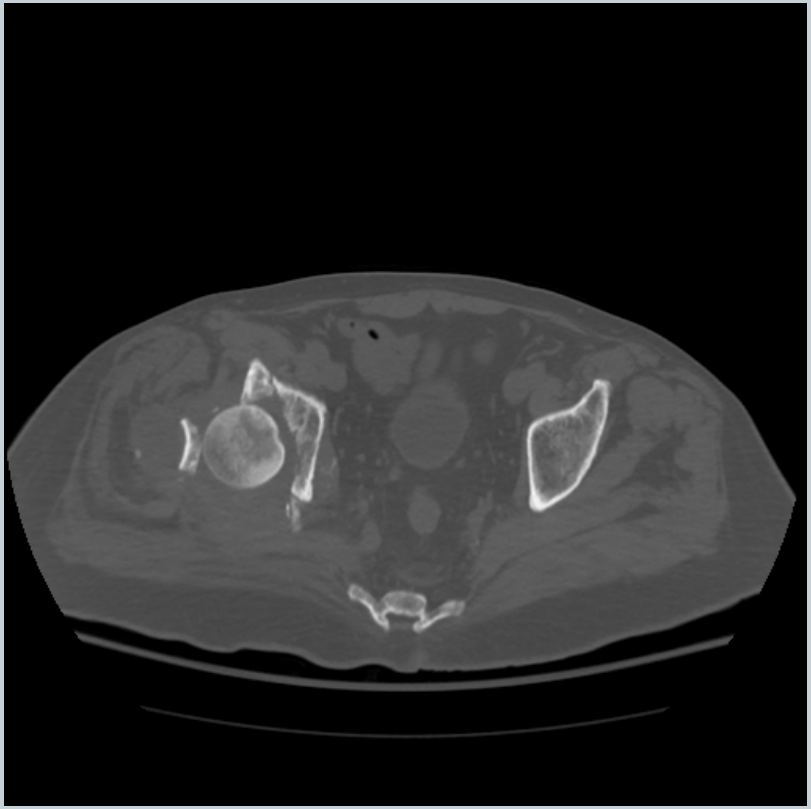
Neglected Acetabular fractures

- 62 yo male, pedestrian struck
- Seen in ER 8 weeks out from injury which occurred in Liberia



Neglected Acetabular fractures

Classification?



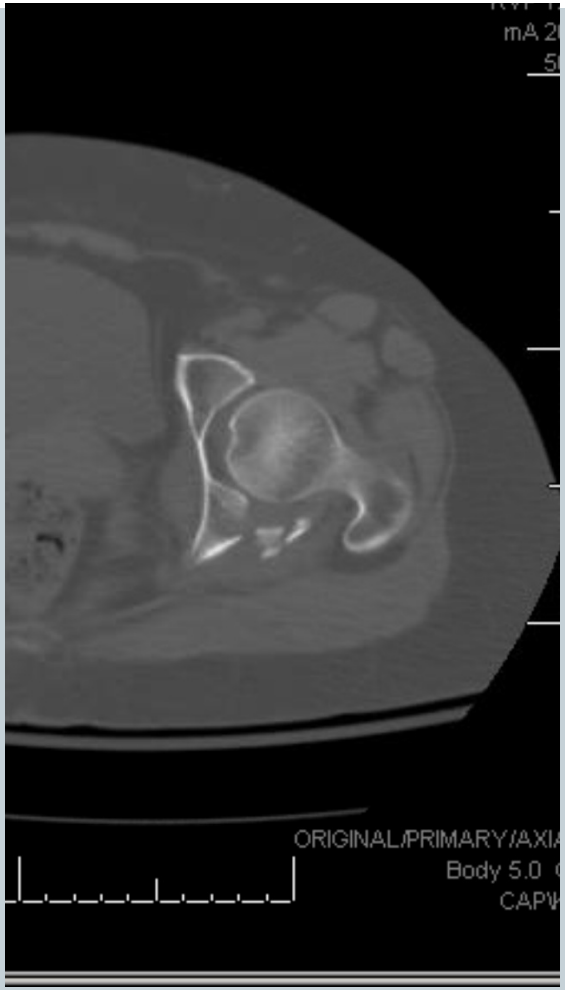
Treatment options?

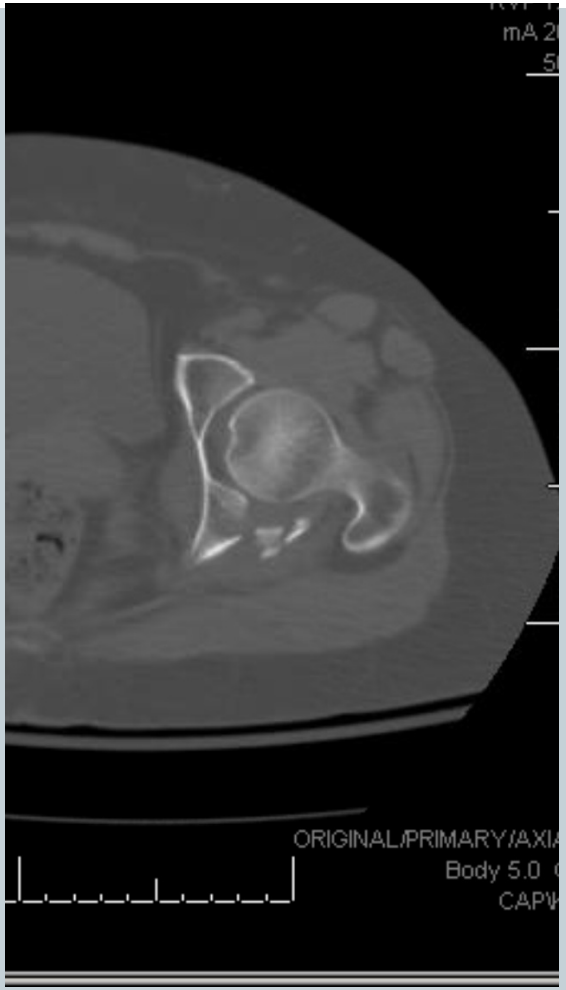
Neglected Acetabular fractures

Late conversion to THA

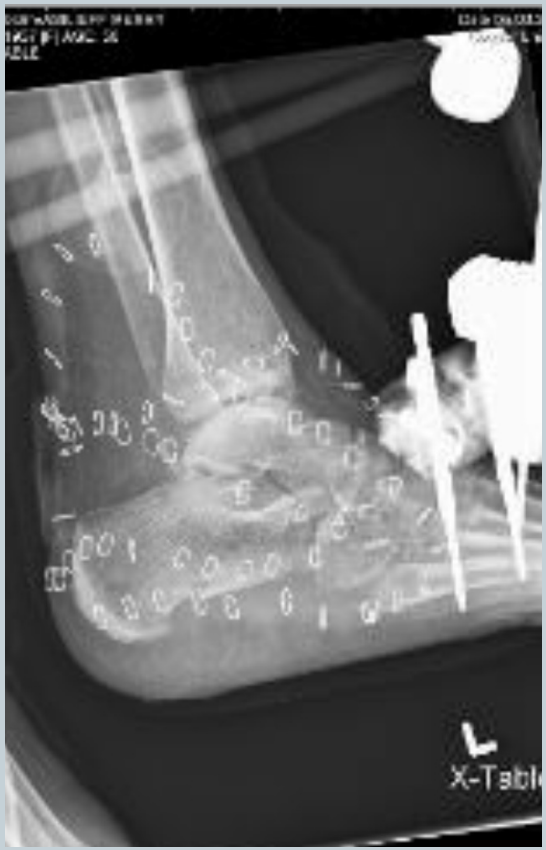
- 62 yo female in mvc
- Hx of esrd, on peritoneal dialysis
- Mangled left le, right bimal ankle fx, left transverse pw acet fx

Late conversion to THA





Late conversion to THA



- Decision made for orif without acute tha secondary to wound/infection concerns

Late conversion to THA

- Avn developed 2 years out from orif
- Pt symptomatic, on transplant list
- Decision made for tha prior to possible transplant

Late conversion to THA

- Patient currently doing well back to preop function
- Unknown cost: time, function

summary

- 1. if not operative candidate- Non op with early mobilization
- 2. percutaneous treatment for minimally displaced amenable fractures. Patients not optimized for larger surgery with difficulty mobilizing
- 3. ORIF- adequate bone stock/fracture pattern to obtain/maintain anatomic reduction
- 4.Orif with tha- unable to obtain/maintain anatomic reduction
- 5. delayed tha- one approach initially. Better bone stock similar results. Had time to recover/experience arthritis pain

Thank You