A. Vascular Disruption depends upon:
   – Displacement,
   – Fracture pattern,
     • Revascularization depends upon:
       – Maintaining uninjured arteries,
       – Avoiding further kinking and minimizing intracapsular pressures,
       – Achieving a prompt and stable reduction,……

Main advantages of prompt reduction of a displaced femoral neck fracture are
unlinking of the vessels and performance of an intracapsular decompression to
remove the hematoma that increases intracapsular pressures.

Previous recommendations have suggested early surgery within 6 hrs of
injury…can decrease the rate of femoral head osteonecrosis.

B. Timing
   – AVN related to degree of displacement and capsular hematoma,
   – Irreversible cell death after 6-12 hours,
   – Therefore, most treat these fractures emergently or as an emergency with ORIF and
capsular release,…DEPENDING ON TIME FROM INJURY AND ARRIVAL
TIME TO YOUR INSTITUTION

What is considered emergent timing???early fixation???

C. Complications
   – AVN – 20 to 90 %,
   – Nonunion – 0 to 62%
     •best results with early treatment, anatomic reduction, and multiple screw
fixation,
   – Post-traumatic osteoarthritis,
   – Infection
   – DVT / PE

D. Outcomes

Nikolopoulos KE, etal.
• Relatively high rate of avascular necrosis after delayed internal fixation of
femoral neck fractures,
• Only a few of these patients (20%) required further surgical treatment in the follow-up period of this study.

Butt MF, et al
• Good to excellent functional outcome achieved in 45 cases.
• Delayed closed reduction and internal fixation of displaced fractures in young adults
• High rate of fracture union and good functional outcome.
• The rate of AVN, however, may be a concern if the patients are followed for a longer period.

Dedrick DK, et al.
• Femoral neck/subcapital fractures in young patients
• Nonunion (20%); avascular necrosis (36%).
• Subcapital fracture 83% developed nonunion or avascular necrosis
• 21% with true femoral neck fracture (p = 0.05).
• There was no difference in cause of injury, overall injury severity, degree of comminution, displacement, method of treatment, or prior health status between those with and without complications.
• High rates of nonunion and avascular necrosis were seen after all types of femoral neck fracture in young adults, but most often associated with subcapital fracture.
• These complications of hip fracture appeared to be independent of health status, method of treatment, or mechanism or severity of injury.

Karaeminogullari O et al.
• Avascular necrosis 12.5% and nonunion 25%, for patients who underwent surgery under 12 hours.
• Avascular necrosis 14% and nonunion 27% for patients who underwent surgery after 12 hrs….NOT SIG.
• Avascular necrosis 6% and 18%, respectively, among patients with undisplaced (Garden stages 1 and 2)
• 23% and 38% among those with displaced (Garden stages 3 and 4) fractures.
• Outcomes consistent with degree of initial displacement…not timing to surgery

Upadhyay A. et al.
• There was no significant difference between the groups in terms of union (p = 0.93) and AVN at two years (p = 0.85).
• Posterior comminution, poor reduction and improper placement of the screws were the major factors contributing to nonunion.
• The overall incidence of AVN was 16.3% (15 of 92 patients) and it was not influenced by these factors.
• A delay of more than 48 hours before surgery did not influence the rate of union or the development of AVN when compared with operation within 48 hours of injury
Incidence of NU was 50/564 (8.9%) and AVN was 130/564 (23.0%).
There was a higher incidence of NU and AVN following displaced than undisplaced fractures.
NU occurred more frequently after open reduction than closed reduction (10/89 [11.2%] versus 13/275 [4.7%]).
There was an increased incidence of AVN after closed than open reduction but this was no longer statistically significant when one study with a markedly higher reported incidence of AVN was excluded.
The difference in the incidence of NU and AVN following early (<12h) or late (>12 h) surgery was not significant for either NU or AVN.
CONCLUSION: Early or open reduction of these fractures may not reduce the risk of NU or AVN.

The ten-year survival rate of the native femoral head free of conversion to total hip arthroplasty was 85%.
Osteonecrosis was the main reason for conversion to total hip arthroplasty, but not all patients with osteonecrosis required further surgery.
25% AVN in pts treated within 24hrs of fx
20% AVN in pts treated over 24hrs from fx
The results of treatment were influenced by fracture displacement and the quality of reduction......surgical timing independent....


