SUBJECT: Long Bone Fractures in Polytraumatized Patients **PAGE:** 1 of 2
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PURPOSE:
To provide guidelines for Orthopaedic Trauma management of patients with long bone fractures.

DEFINITIONS:
Long Bones: femur, tibia, humerus, radius/ulna

POLICY:

Initial management (Emergency Department)
Open fractures will be irrigated and possibly closed at the bedside. Scheduled intravenous antibiotics will be started as soon as possible, per the UAMS Open Fracture Antibiotic Guideline.[1] Tibia shaft fractures should be placed into long leg splints, while most femur fractures benefit from traction pin placement. If the patient's condition allows, this procedure will be performed preferentially in the trauma bay or operating room rather than an ICU room or floor bed.

Timing of operative management
Long bones of the lower extremities are ideally treated within 24 hours of injury. The orthopedic and trauma surgery attendings should coordinate care to facilitate the timely management of these injuries. If the patients are not cleared for surgery, there should be frequent reevaluations by the SICU team. The orthopedic team should be informed when the patient is cleared for surgery. Reasons for delays include ongoing resuscitation or injuries that take precedence, such as bleeding, bowel injuries, hypoxia, hypotension, spinal cord injury, or severe intra-cranial injuries requiring intracranial pressure monitoring and treatment assessment from neurosurgical colleagues should also be considered, and efforts will be made to adhere to ICP goals. It should also be noted that patient positioning/turn schedules per ICU best practices may cause ICP spikes in patients with non-fixed long bone fractures.

The optimal treatment of most long bone fractures of lower extremity injuries is intramedullary nailing. External fixator placement can be considered a damage control measure; however, there is a strong preference for definitive fixation over temporizing measures. If external fixation is performed, this should be converted to medullary nails within seven days for tibias and before two weeks for femurs.[2]

Lower Extremity
Femur fractures are ideally treated first, followed by tibias.

Upper Extremity
Long bone fractures of the upper extremity also should be considered for operative fixation to assist in patient mobilization. Forearm fractures are almost always treated with operative management. These injuries might be prioritized over humerus fractures, especially in intubated and sedated patients with specific concerns of soft tissue injuries caused by splint immobilization. Humerus shaft fractures are also commonly treated operatively in polytraumatized patients to allow for mobilization, self-care, and ADLs. The humerus fracture is usually a lower priority than the other long bone fractures.

Timing of open fracture care

Per protocol and best practices, open fractures of the long bones should have a debridement and irrigation formally in the operating room within 24 hours of injury when possible. Patient instability is the most common reason to miss timely debridement. Institutional and personnel constraints should be rarely, if ever, the reason for missed timeliness of debridement. Antibiotics should be continued for 24 hours post-closure per best antibiotic stewardship practices.[1]

Management of open wounds associated with long bone fractures

Open fractures should be closed primarily when possible, and fractures requiring soft tissue coverage should be arranged as soon as possible, preferably within four days after definitive fixation. Long bones that cannot be primarily closed should have sealed dressings (e.g., wound vac) to minimize bedside dressing changes.

PERFORMANCE MONITORING:

1. Definitive management of closed femur shaft fracture repair is performed within 24 hours of ED arrival.

REFERENCES:

1. UAMS Open Fracture Antibiotic Guideline. Available from https://medicine.uams.edu/surgery/wp-content/uploads/sites/5/2023/08/Open-Fx-Abx-2022.pdf
2. Bunzel EW, Wilkinson B, Rothberg D, Higgins T, Marchand L, Haller J. Conversion of External Fixator to Intramedullary Nail in Tibial fractures. Journal of the American Academy of Orthopaedic Surgeons. 2023 Jan 1;31(1):41-8.