**Complications Associated with Early versus Delayed Fixation of Pelvic Ring Injuries**

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**Purpose:** This study aims to compare survival, complications, and length of stay between patients with pelvic ring injuries undergoing early definitive fixation, delayed definitive fixation, or temporary damage control external fixation.

**Methods:** A retrospective chart review of 285 severely injured (ISS >15) patients with pelvic ring fractures at a Level-I trauma center was performed. Early versus delayed definitive fixation was defined by a cutoff of 36 hours and did not require temporary external fixation. Early fixation was performed in 45 patients (16%), delayed fixation in 148 (52%), and damage control external fixation in 92 (32%). The review included associated injuries, admission lactate, pelvic ring injury classification, hospital management, and complications.

**Results:** Compared to early fixation, delayed fixation had a lower admission Glasgow Coma Scale (GCS) and more Tile C pelvic ring injuries, acetabular fractures, chest injuries, days in the ICU, days on a ventilator, and cases of pneumonia (Table 1). The early and delayed fixation groups did not differ in hospital length of stay, ISS, admission lactate, abdominal and urologic injuries, acute respiratory distress syndrome (ARDS), pulmonary embolism (PE), deep venous thrombosis (DVT), sepsis, multiple organ failure (MOF), or survival. Comparatively, the damage control external fixation group had a higher ISS and presenting lactate, and more cases of ARDS, PE, DVT, sepsis, and MOF compared to both early and delayed fixation groups, but similar survival (Table 1).

**Conclusion:** Delayed fixation had more chest injuries and consequently more ventilator days and cases of pneumonia than early fixation. However, there was no difference in ARDS, PE, DVT, sepsis, MOF, or mortality between these 2 groups, suggesting that the development of these complications may be more dependent on initial injury severity and other clinical factors than on timing of definitive fixation.

**Table 1.** Demographics, injury complex and outcomes. ISS - Injury Severity Score, GCS - Glasgow Coma Scale, ICU - Intensive Care Unit, LOS - Length of Stay, ARDS - Acute Respiratory Distress Syndrome, MVC - Motor Vehicle Collision, MCC - Motor Cycle Collision, AP - Auto Pedestrian. *p <0.01 compared to Delayed and Early Fixation, ** p <0.01 compared to Early Fixation.

| | Early Fixation (n=45) | Delayed Fixation (n=148) | External Fixation (n=92) |
|---|---|---|---|
| Age (years) | 47±17 | 41±15 | 45±17 |
| Injury Mechanism | MVC: 18, MCC: 6, AP: 11, Fall: 14 | MVC: 81, MCC: 16, AP: 29, Fall: 28, Crush: 2 | MVC: 30, MCC: 13, AP: 26, Fall: 3, Crush: 8 |
| ISS | 24±9 | 26±9 | 38±12* |
| GCS | 14±2 | 12±4** | 10±5* |
| Type C pelvic fracture (%) | 38 | 24** | 64* |
| Acetabular fracture % | 15 | 25** | 0* |
| Admission lactate (mmol/L) | 2.8±1.9 | 3.2±1.9 | 4.9±3* |
| Time to fixation (hours) | 22±10 | 104±79** | 170±130* |
| Associated Head/Face (%) | 33 | 29 | 38 |
| Associated Chest (%) | 40 | 68** | 66** |
| Associated Abdomen (%) | 17 | 27 | 55* |
| Associated Urologic (%) | 17 | 16 | 33* |
| Hospital LOS (days) | 12±12 | 17±13 | 29±37* |
| ICU LOS (days) | 3±3 | 7±8** | 12±9* |
| Ventilator days | 0.8±2 | 4±8** | 9±9* |
| ARDS (%) | 17 | 25 | 41* |
| Pneumonia (%) | 4 | 19** | 42* |
| Pulmonary embolism (%) | 6 | 3 | 14* |
| Deep vein thrombosis (%) | 4 | 3 | 17* |
| Sepsis (%) | 4 | 6 | 16* |
| Multiple organ failure (%) | 0 | 5 | 16* |
| Survival (%) | 91 | 97 | 97 |