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Outcomes of Percutaneous Lumbopelvic Fixation in Patients with High Energy Sacral Trauma

BACKGROUND: High energy, complex sacral and pelvic fractures following trauma can result in lumbar spine disassociation from the remainder of the sacrum and pelvis resulting in highly unstable fracture patterns. Through minimally invasive percutaneous incisions and intra-operative fluoroscopic guidance, lumbopelvic fixation (LPF) entails stabilizing the lumbosacral junction through a surgical construct using pedicle screws, iliac screws, and connecting rods. This creates a triangular osteosynthesis construct that is highly stable allowing for fracture healing and early weight bearing in high energy trauma patients.

OBJECTIVE: The objective of this study was to review outcomes of patients who had undergone percutaneous lumbopelvic fixation (LPF) following high-energy sacral fractures with or without additional pelvic ring fixation and compare surgical techniques.

METHODS: This retrospective study included 20 patients who underwent LPF with at least 3-month follow-up. Time intervals in count of days was collected between admission and initial pelvic stabilization (if indicated), admission and LPF, pelvic stabilization and LPF (if separate), days to successful immobilization relative to admission and LPF, and length of hospital stay. Different operative methods for LPF (L4-Pelvis or L5-Pelvis) were also compared and analyzed using negative binomial regression.

RESULTS: Increased time between initial pelvic stabilization and LPF was associated with a longer time from LPF to successful mobilization ($\beta = 0.094$, $p = 0.002$). Time between LPF and mobilization was not different for patients who underwent instrumentation including L4 (mean 6.9 ± 1.6 days) and patients who underwent instrumentation to L5 (7.7 ± 2.6 days). Similarly, increased time between admission and mobilization was increased by increased time between initial pelvic stabilization and LPF ($\beta = 0.103$, $p < 0.0001$). Admission to mobilization was not different between L4 patients (13.4 ± 1.2 days) and L5 patients (12.4 ± 4.4 days). However, undergoing a two-stage procedure (pelvis fixation first, followed by LPF versus LPF in single stage) was associated with a decreased time from admission to mobilization ($\beta = -0.987$, $p < 0.001$) These results likewise affected length of stay.

CONCLUSION: Delaying final LPF stabilization of unstable pelvic fractures results in longer immobilization times. This association holds for patients even if the pelvic stabilization and LPF are performed in two separate stages. Addressing these severe injuries in an expeditious fashion facilitates quicker mobilization and lower lengths of stay.