

Is External Beam Radiation Therapy Really Associated with Low Rates of Heterotopic Ossification After Acetabular Surgery?

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Purpose: Heterotopic ossification (HO) after surgical fixation of acetabular fractures is known to be common and potentially debilitating, but unfortunately it is still unclear what the best HO prophylaxis treatment should be. Currently, there are only small series on the use of external beam radiation therapy (XRT) for HO prophylaxis (range, 12-78 patients). Our hypothesis is that XRT will demonstrate lower HO than patients without XRT in a larger dataset even after controlling for risk factors associated with development of HO.

Methods: We report on 178 consecutive patients from a single center who underwent surgical fixation of an acetabular fracture via a posterior or combined surgical approach. All patients were offered XRT within 72 hours of surgery. Patients who refused or had contraindications to XRT were offered indomethacin therapy (25 mg TID) for 6 weeks. Patients who received no prophylaxis were those who were unable to undergo XRT and had contraindications to indomethacin therapy. Fractures were classified according to the Judet and Letournel system. The primary outcome measure was radiographic evidence of HO based on the Brooker classification. Severe HO was defined as Brooker class 3 or 4. Logistic regression analyses were performed and odds ratios (ORs) reported with 95% confidence intervals (CIs).

Results: Of the 178 patients included in this study, 158 patients (89%) underwent XRT therapy, 7 patients (4%) received indomethacin, and 13 patients (7%) received no HO prophylaxis. There was a significant difference in overall HO rates between groups ($P = 0.02$). 48 patients (30%) who received XRT developed HO compared to 5 patients (71%) in the indomethacin group and 7 patients (54%) in the no prophylaxis group. Patients who did not receive XRT were over 3× more likely to develop HO (OR 3.4, 95% CI 1.3-8.9; $P = 0.01$). Postoperative HO was associated with need for mechanical ventilation (OR 2.1, 95% CI 1.1-4.1; $P = 0.02$) and nonelementary (associated) fracture patterns (OR 2.0, 95% CI 1.0-3.7; $P = 0.04$). After controlling for need for mechanical ventilation and associated fracture patterns, patients who did not receive XRT were still 3× more likely to develop HO (OR 3.0, 95% CI 1.1-8.1; $P = 0.03$). The severe HO rate for the XRT group was 4.4% compared to 15.0% for patients who did not receive XRT ($P = 0.05$). There was no significant association between HO formation and hip dislocation or need for trochanteric osteotomy during surgical fixation.

Conclusion: This series represents the largest study to date on HO after a protocol of XRT for acetabular surgery. Patients who receive XRT as HO prophylaxis after acetabular surgery are 3× less likely to develop postoperative HO, even after attempting to control for previously identified HO risk factors. These data may inform clinicians and patients considering HO treatment options. The rate of severe HO (4%) compares favorably with prior studies on severe HO after debridement only (12%-19%).