

## **A Multicenter Parallel-Intervention Study of Radiotherapy Versus Usual Care for Heterotopic Ossification Prophylaxis Following Fixation of Acetabular Fractures Via a Posterior Approach**

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**Purpose:** We sought to determine the effect of postoperative radiotherapy (XRT) on heterotopic ossification (HO) incidence and severity following acetabular fracture fixation via a posterior approach.

**Methods:** This was a multicenter, retrospective, parallel-intervention cohort study utilizing patients from 2 Level I trauma centers. Trauma center 1 (TC1) offers postoperative XRT to all patients undergoing posterior acetabular fracture fixation. If accepted, patients receive a single unfractionated radiotherapy dose. In contrast, trauma center 2 (TC2) does not offer any specific postoperative HO prophylaxis intervention. From 2017-2021, CPT codes identified all patients who underwent acetabular fracture fixation; patients who had fixation via a posterior approach and had at least 3-month follow-up were included. Two fellowship-trained orthopaedic traumatologists reviewed every postoperative radiograph for HO development and assigned a Brooker score.

**Results:** TC1 had higher tobacco use and head injury rates; TC2 had higher rates of hip dislocation. The remainder of demographic and injury characteristics did not differ between institutions. At TC1, 53 patients (45.7%) received XRT. Comparing centers, rates of HO incidence trended lower at TC1 (TC1 vs TC2: 19.0% vs 31.1%,  $P = 0.09$ ); TC2 had approximately double the rate of Brooker III/IV HO (6.0% vs 13.1%,  $P = 0.10$ ). Comparing treatment groups (XRT: 53, no XRT: 124), XRT reduced HO incidence (10.9% vs 27.5%,  $P = 0.008$ ) and severity (1.00 vs 2.13,  $P = 0.02$ ), with differing rates of Brooker III/IV (0% vs 12.1%,  $P = 0.006$ , NNT [number needed to treat] = 9). Multivariable analysis further supported this result (XRT HO incidence: odds ratio [OR]: 0.30, confidence interval [CI]: 0.09-0.92,  $P = 0.03$ ). Complication and HO excision rates did not differ between groups. When comparing the results of the 2 sites for only non-XRT conditions, HO incidence (27.0% vs 31.1%,  $P = 0.69$ ), mean severity (2.2 vs 2.1,  $P = 0.87$ ), and Brooker III/IV rates (11.1% vs 13.1%,  $P = 0.79$ ) did not differ. Multivariable analysis identified higher ISS as an independent risk factor for HO incidence and Brooker III/IV severity.

**Conclusion:** Radiotherapy (XRT) appears to reduce the incidence and severity of HO following acetabular fixation performed via posterior approach. Treating 9 patients with XRT may prevent 1 case of severe HO.