

Rotator Cuff Tears Between Various Treatment Groups for Those Patients With A Humeral Shaft Fracture**Neil Werthmann, MD; John Riehl, MD; Mason Poffenbarger, MD; Kyle P. O'Connor, MD**

Purpose: Humeral shaft fractures are commonly treated nonsurgically, with open reduction and internal fixation (ORIF), and with intramedullary nailing (IMN). Each of these treatments has advantages and disadvantages. One concern surgeons have raised with IMN is its effect on the rotator cuff (RC). The aim of this study is to compare rates of rotator cuff tear (RCT) among nonsurgical (NS), ORIF, and IMN within 24 months of treatment.

Methods: Data were collected retrospectively through an institutional database, and 4117 patients age 18 years and older with humeral shaft fractures were identified. Patients were categorized into NS, ORIF, and IMN treatment groups. The primary outcome of the study was RCT within 24 months as well as infection, radial nerve injury, and nonunion. Demographic information, smoking status, and open fracture status were recorded.

Results: In total, 3008 ORIF patients, 627 IMN patients, and 482 NS patients were identified. RCT within 24 months was not significantly associated with the treatment modality ($p = 0.8993$). The ORIF group experienced RCT in 20 (0.67%) patients, 4 (0.64%) in the IMN group, and 2 (0.42%) in the NS group. Infection was statistically significant and occurred at a rate of 0.83% (4/482) in the NS group, 1.66% (50/3008) in the ORIF group, and 0.48% (3/627) in the IMN group ($p = 0.0354$). Radial nerve injury occurred at a rate of 0.02% (1/482) in the NS group, 1.33% (40/3008) in the ORIF group, and 0.96% (6/627) in the IMN group ($p = 0.0673$). The nonunion rate was 2.28% (11/482) in the NS group, 2.03% (61/3008) in the ORIF group, and 2.87% (18/627) in the IMN group ($p = 0.4174$).

Conclusion: The findings of the current study suggest there is no increased incidence of RCT with humeral IMN compared to ORIF and NS treatment of humeral shaft fractures at 24 months postoperatively. The IMN treatment group also demonstrated lower rates of complications including infection and radial nerve palsy compared to ORIF. The IMN treatment group experienced a similar rate of nonunion compared to the other treatment groups. IMN is a safe and effective treatment option in humeral shaft fractures.