Evaluating Factors Affecting Postoperative Follow-up Compliance in Rural vs. Non-Rural Patients with Hip Fractures at a Single Institution: A Matched Cohort Analysis

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INTRODUCTION: Rural populations face increased barriers to care which predispose them to worse outcomes compared to non-rural populations.[1] Within the setting of orthopedic trauma, low compliance to follow-up is a common area of concern, with rates reported to be as low as 41%.[2] These follow-up rates are particularly interesting in the setting of traumatic hip fractures, which carry a significant association of mortality and morbidity, making it important for close clinical observation to assess healing and rehabilitation progress.

This study aims to investigate the differences in short-term follow-up compliance between rural and non-rural patients who were treated for traumatic hip fracture in a geographically isolated Level I Trauma Center using matched-cohort analysis. While previous studies have sought to assess risk factors related to loss of follow-up in orthopedic trauma patients, no study has reported on the differences in short-term follow-up rates between rural and non-rural traumatic hip fracture patients using matched-cohort analysis.

METHODS: Approval from institutional IRB board was obtained prior to study initiation. Patients surgically treated for traumatic hip fracture between January 2014 and December 2023 at a Level I Trauma Center serving a large rural population were retrospectively reviewed. Rural patients were identified and included if their home Zip Code was classified a rural census tract per United States Department of Agriculture Rural-Urban Area Commuting (RUCA) codes. Exclusion criteria included discharge into a long-term care facility and death prior to 1-year follow-up. Forty nine rural patients (RP) were identified, and then 1:2 matched by Age, Sex, and BMI to 98 non-rural patients (NRP) treated in the same institution for the same injury.

Demographics, comorbidities, injury classifications, and surgical procedure were recorded. Patients' home distance to the hospital was calculated using the Haversine formula. A total of 147 patients met inclusion criteria with 69 males (47%) and 78 females (53%). All patients were scheduled for regular postoperative follow-up visits at 2 weeks, 6 weeks, 3 months, 6 months, and 1 year. Patients' attendance to these follow-up appointments were recorded, as well as any documented postoperative complications. The 3-month follow up visit served as a key functional assessment for all patients including postoperative X-ray series, so it was selected as a primary endpoint for statistical analysis of risk factors. Multivariate logistic regression analysis was conducted to assess the influence of collected risk factors on attendance to follow-up.

RESULTS: Mean age of the cohort was 71.39 (±13.5) and mean BMI was 26.3 (±7.0), with no significant differences between rural and non-rural cohorts (p-value = 0.708 and p-value = 0.338, respectively). Most common hip fracture patterns included Femoral Neck (n = 98, 66.7%), Intertrochanteric (n = 40, 27.2%), and Subtrochanteric (n = 4, 4.1%). Most common procedures performed were hemiarthroplasty (n = 51, 34.7%), total hip arthroplasty (n = 27, 18.4%), and CM Nail (n = 38, 25.9%).

When comparing between rural and non-rural cohorts, there was a significant difference in compliance to follow-up at three months (RP:14/49 (28.6%), NRP: 64/98 (65.3%), p-value = <0.001) and six months (RP: 8/49 (16.3%), NRP: 33/98 (33.7%), p-value = 0.032). However, there was no significant difference in compliance to one year follow-up (RP: 5/49 (10.2%), NRP: 19/98 (19.4%), p-value = 0.235). There was a significant difference between the rural and non-rural patients in having an institutional primary care provider (PCP) (16% vs. 48%, respectively; p-value = <0.001), smoking status (22% vs. 49%, respectively; p-value = 0.002), hypertension (51% vs. 79.6%, respectively; p-value = <0.001), and dyslipidemia (22% vs. 51%, respectively; p-value = 0.001). Mean distance to institution was 126.1 km (±69.1) in the rural patients and 8.0 km (±4.0) in the non-rural patients (p-value = <0.001).

In multivariate logistic regression using 3-month follow-up as an endpoint, there was a statistically significant difference in compliance to follow-up in rural patients (OR: 0.19, 95% CI: 0.04 – 0.84, p-value = 0.023) and patients with dyslipidemia (OR: 2.67, 95% CI: 1.16 – 6.37, p-value = 0.023). Smoking status, having an institutional PCP, HTN, and distance were not associated with a statistically significant difference in adherence to follow-up.

DISCUSSION: In the setting of traumatic hip fracture, rural patients are less likely to be compliant with short-term follow-up. Extrinsic factors such as distance to the facility and having an established PCP do not sufficiently explain the differences in follow-up. Intrinsic factors, such as patient comorbidities, appear to have some contribution to follow-up compliance. Limitations in this study include its retrospective nature and selection bias due to inclusion of a single institution.

SIGNIFICANCE/CLINICAL RELEVANCE: When considering follow-up compliance in the setting of traumatic hip fracture, rural patients have a lower rate of follow-up as compared to non-rural patients. Extrinsic factors such as distance and insurance status do not adequately describe differences in follow-up compliance between rural and non-rural patients.

References:

1. Weeks WB, Chang JE, Pagán JA, Lumpkin J, Michael D, Salcido S, Kim A, Speyer P, Aerts A, Weinstein JN, Lavista JM. Rural-urban disparities in health outcomes, clinical care, health behaviors, and social determinants of health and an action-oriented, dynamic tool for visualizing them. PLOS Glob Public Health. 2023 Oct 3;3(10):e0002420. doi: 10.1371/journal.pgph.0002420.
2. Zelle BA, Buttacavoli FA, Shroff JB and Stirton JB. Loss of Follow-up in Orthopaedic Trauma: Who Is Getting Lost to Follow-up? J. Orthop. Trauma. 2015;29(11):510-5. doi:10.1097/BOT.0000000000000346.