## **Tip-Apex Distance as a Long-Term Risk Factor for Hospital Readmission Following Intramedullary Fixation of Intertrochanteric Fractures**

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Abstract : Purpose: Tip-apex distance (TAD) has long been discussed as a metric for determining risk of failure in the fixation of peritrochanteric fractures. TAD measurements over 25 millimeters (mm) have been associated with higher rates of screw cut out and other complications in the first several months after surgery. However, there is limited evidence for the efficacy of this measurement in predicting the long-term risk of negative outcomes following hip fixation surgery. The purpose of our study was to investigate risk factors including TAD for hospital readmission, loss of pre-injury ambulation and development of complications within 1 year after hip fixation surgery. Methods: A retrospective review of proximal hip fractures treated with single screw intramedullary devices between 2016 and 2020 was performed at a 327-bed regional medical center. Patients included had a postoperative follow-up of at least 12 months or surgery-related complications developing within that time. Results: 44 of the 67 patients in this study met the inclusion criteria with adequate follow-up post-surgery. There was a total of 10 males (22.7%) and 34 females (77.3%) meeting inclusion criteria with a mean age of 82.1 (± 12.3) at the time of surgery. The average TAD in our study population was 19.57mm and the average 1-year readmission rate was 15.9%. 3 out of 6 patients (50%) with a TAD > 25mm were readmitted within one year due to surgery-related complications. In contrast, 3 out of 38 patients (7.9%) with a TAD < 25mm were readmitted within one year due to surgery-related complications (p=0.0254). Individual TAD measurements, averaging 22.05mm in patients readmitted within 1 year of surgery and 19.18mm in patients not readmitted within 1 year of surgery, were not significantly different between the two groups (p=0.2113). Conclusions: Our data indicate a significant improvement in hospital readmission rates up to one year after hip fixation surgery in patients with a TAD < 25 mm with a decrease in readmissions of over 40% (50% vs 7.9%). This result builds upon past investigations by extending the follow-up time to 1 year after surgery and utilizing hospital readmissions as a metric for surgical success. With the well-documented physical and financial costs of hospital readmission after hip surgery, our study highlights a reduction of TAD < 25mm as an effective method of improving patient outcomes and reducing financial costs to patients and medical institutions. No relationship was found between TAD measurements and secondary outcomes, including loss of pre-injury ambulation and development of complications.

Keywords : hip fractures, hip reductions, readmission rates, open reduction internal fixation

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1