Limited Technique for Intramedullary Nailing of Intertrochanteric Hip Fractures Lowers Operative Time and Transfusion Rate, But Does Not Impact Post-Operative Morbidity or Mortality

Luke Gregory Menken, Joseph Miceli, Ian S Hong, Alex Tang, Jaclyn M Jankowski, Frank A Liporace, Richard S Yoon

INTRODUCTION:

The purpose of this study is to determine if the limited technique(LT) exhibited improved outcomes compared to the standard long intramedullary(IMN) technique(ST) in the treatment of intertrochanteric hip fractures.

METHODS:

Institutional hip fracture registry between March 2017-November 2020 were screened for inclusion. Any patient receiving a long IMN for hip fracture was included in the analysis. Groups were compared in terms of demographic, comorbidities, and perioperative variables. Outcomes of interest were intraoperative blood loss, length of procedure, transfusion rate, in-hospital complication, reoperation and mortality rate at 30-days, 90-days, and 1-year.

Limited Long IMN Technique:

Starting point obtained with starting guide wire ± cannulated awl, place long ball tip wire, measure, single pass reamer 1.5mm above nail diameter, single pass reamer (just proximal)0.5mm above proximal body width, place IMN, place cephalomedullary screws and complete with distal locking screws.

RESULTS:

A total of 128 patients were included for comparative analysis. Seventy-five patients were in the LT group; 53 patients were included in the ST group.There were no significant differences between the cohorts at baseline; except LT group had a significantly higher ASA IV score(32%vs11%,p=0.036). There were no significant differences in time to surgery(30.3±22.5hours vs 27.6±25.6hours,p=0.53). Operative time (Skin-to-extubation) was significantly faster in the LT group (69.8±27.2min vs 94.6±34.0min,p<0.001). There was a trend towards a lower transfusion rate in the LT group vs ST group (8%vs15%,p=0.26), however, there were no significant differences in postoperative hemoglobin(g/dL) change between groups (2.6±1.8g/dL vs 2.3g/dL,p=0.99). Furthermore, no difference found with regard to length of hospital stay(5.8±8.7days vs 5.5±3.2days,p=0.78), reoperation rate(7%vs9%,p=0.57), or mortality at 30-days(12.7%vs11.1%,p=0.80), 90-days(30.6%vs21.9%,p=0.39), and 1yr(45.9%vs35%,p=0.42) between groups.

DISCUSSION AND CONCLUSION: Potential benefits of the LT long IMN for the treatment of intertrochanteric hip fractures include lower operative time and potentially lower transfusion rate. However, those do not seem to translate into lower complications, morbidity, mortality or reoperations rates.

Operative Data			
	Standard (n=53)	Limited (n=75)	P-Value
Operative Time (min), mean ± SD	94.6 ± 34.0	69.8 ± 27.2	**<0.001**
TXA use, n(%)	3 (6%)	15 (20%)	**0.04**
Patients requiring intraoperative blood transfusion, n(%)	8 (15%)	6 (8%)	0.26
Intraoperative blood transfusion units, mean ± SD	2.1 ± 1.6	1.3 ± 0.5	0.28

Postoperative Outcomes			
	Standard (n=53)	Limited (n=75)	P-Value
Preoperative Hemoglobin, mean ± SD	11.3 ± 1.9	11.1 ± 1.7	0.51
Postoperative Hemoglobin, mean ± SD	8.7 ± 1.5	8.7 ± 1.8	0.99
Change in Hemoglobin, mean ± SD	2.6 ± 1.8	2.3 ± 1.8	0.99
Length of Stay (days), mean ± SD	5.5 ± 3.2	5.8 ± 8.7	0.78
Disposition, n(%)			
Home	19 (36%)	21 (28%)	0.200
Skilled Nursing Facility	26 (49%)	43 (57%)	
Hospice	4 (8%)	4 (5%)	
Long-term Care Facility	4 (8%)	1 (1%)	
Transfer to Stroke Center	0 (0%)	1 (1%)	
All-Cause Reoperation Rate, n(%)	5 (9%)	5 (7%)	0.57
All-Cause 30 Day Mortality, (%)	11.10%	12.70%	0.80
All-Cause 90 Day Mortality, (%)	21.90%	30.60%	0.39
All-Cause 1 Year Mortality, (%)	35.00%	45.90%	0.42
Clinical follow-up time (years), mean ± SD	1.7 ± 1.7	0.8 ± 1.2	**0.003**

Limited Technique Data			
	Standard (n=53)	Limited (n=75)	P-Value
Age (in Years) at DOS, mean ± SD	72.9 ± 16.6	74.5 ± 18.3	0.62
BMI, mean ± SD	24.5 ± 5.0	26.0 ± 8.2	0.21
Percent Female, n(%)	30 (57%)	47 (63%)	0.49
Delay of Surgery (hours), mean ± SD	27.6 ± 25.6	30.3 ± 22.5	0.53
Community Ambulator pre-injury, n(%) *Missing information for 6 patients*	47 (94%)	69 (96%)	0.48
Diagnosis, n(%)			
FNF	1 (2%)	0 (0%)	0.41
IT Fx	37 (70%)	60 (82%)	
IT Fx w/ ST ext	3 (6%)	2 (3%)	
ST Fx	12 (23%)	13 (17%)	
Comorbidities, n(%)			
Diabetes	17 (32%)	24 (32%)	0.99
Renal Disease	7 (13%)	16 (32%)	0.24
Liver Disease	3 (6%)	2 (3%)	0.39
Pulmonary Disease	8 (15%)	14 (19%)	0.6
Cancer	6 (11%)	15 (20%)	0.19
Dementia	13 (25%)	12 (16%)	0.23
Smoker	11 (21%)	13 (17%)	0.63
Race, n(%) *Missing information for 20 patients*			
Asian	2 (4%)	2 (3%)	0.13
Black	8 (15%)	18 (24%)	
Caucasian	27 (51%)	27 (36%)	
Hispanic	2 (4%)	7 (9%)	
Other	3 (6%)	5 (7%)	
Preoperative Anticoagulant Use, n(%)	21 (40%)	36 (48%)	0.47
ASA Classification *Missing information for 2 patients*			
I	1 (2%)	3 (4%)	0.036
II	12 (23%)	15 (20%)	
III	33 (64%)	32 (43%)	
IV	6 (11%)	24 (32%)	