

Regional Anesthesia is Safe for Use in Nailing of Tibial Shaft Fractures

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INTRODUCTION:

The purpose of this study was to assess the efficacy of regional anesthesia for intramedullary (IM) nailing of tibial shaft fractures and to compare perioperative outcomes of patients who underwent general, regional, and spinal anesthesia for these injuries.

METHODS:

Retrospective chart review was performed on a consecutive series of tibial shaft fracture patients who presented to a single academic medical center and a level 1 trauma center who underwent operative repair with a reamed IM nail. Collected information included demographics, injury information, anesthesia type (general, regional i.e., peripheral nerve block or spinal), intraoperative opiate consumption (converted to morphine milliequivalents [MME]), and postoperative pain visual-analog scale [VAS] pain scores. Patients were divided into 3 groups based on the type of anesthesia received: general, regional, or spinal. Univariate analysis was performed to compare the 3 groups.

RESULTS:

One-hundred-sixty-eight patients were identified, with an average age of 41.02±16.5 and predominantly male patients (156, 92%). There were 111 (66.0%) who underwent general anesthesia, 47 (28.0%) who were administered regional anesthesia in the form of a peripheral nerve block, and 10 (6.0%) who were administered spinal anesthesia. There was no difference in patient demographics between groups. There was a lower rate of open fractures (17.0%, 43.2%, 40.4%, p = 0.007) and fractures secondary to a high energy mechanism (57.4%, 81.1%, 70.0%, p = 0.028) in the regional cohort compared to the general and spinal groups. Regional anesthesia patients spent less time in the operating room (147.36±52.3, 180.69±70.3, 167.3±45.8 minutes, p = 0.014) and received less intraoperative MME (18.2±11.3, 29.6±12.1, 53.9±88.9, p <0.001). However, there were no differences in postoperative VAS pain scores. There were no cases of postoperative compartment syndrome. There were no complications related to the administration of the anesthetic.

DISCUSSION AND CONCLUSION:

Regional anesthesia in tibial shaft fracture surgery led to shorter time in the operating room with less intraoperative opioid requirements, without any untoward effects. Peripheral nerve blocks can be safely utilized in closed tibial shaft fractures in order to decrease opioid usage.

Table 1. Demographics and Injury Characteristics

	Total Cohort (N = 168)	General (N = 111)	Regional (N = 47)	Spinal (N = 10)	Sig.
Age (years, mean ± std)	41.02±16.5	40.23±16.1	42.19±16.5	44.20±22.2	0.653
Male Gender, n (%)	92.9% (156)	91.9% (102)	95.7% (45)	90.0% (9)	0.647
BMI* (kg/m ² , mean ± std)	26.56±5.6	26.52±5.8	26.15±4.1	28.88±9.3	0.379
CCI** (mean ± std)	0.90±1.3	0.79±1.3	1.15±1.4	1.00±1.5	0.283
Open Fracture, n (%)	35.7% (60)	43.2% (48)	17.0% (8)	40.4% (4)	0.007
High Energy Mechanism, n (%)	73.8% (124)	81.1% (90)	57.4% (27)	70.0% (7)	0.008
Fracture Location, n (%)	Proximal: 11.9% (20) Midshaft: 55.4% (93) Distal: 32.7% (55)	Proximal: 12.6% (14) Midshaft: 61.3% (68) Distal: 26.1% (29)	Proximal: 10.6% (5) Midshaft: 42.6% (20) Distal: 46.8% (22)	Proximal: 10.0% (1) Midshaft: 50.0% (5) Distal: 40.0% (4)	0.149
AO/OTA Classification	41A: 1 (0.6%) 42A: 116 (69.5%) 42B: 39 (23.4%) 42C: 9 (5.4%) 43A: 2 (1.2%)	41A: 1 (0.9%) 42A: 76 (68.5%) 42B: 27 (24.3%) 42C: 6 (5.4%) 43A: 1 (0.9%)	41A: 0 (0%) 42A: 32 (69.6%) 42B: 11 (23.9%) 42C: 2 (4.3%) 43A: 1 (2.2%)	41A: 0 (0%) 42A: 8 (80%) 42B: 1 (10%) 42C: 1 (10%) 43A: 1 (10%)	0.959

*BMI: body-mass index

**CCI: Charlson Comorbidity Index

Table 2. Intra-Operative and Post-Operative Parameters

	Total Cohort (N = 168)	General (N = 111)	Regional (N = 47)	Spinal (N = 10)	Sig.
Time to Surgery (days, mean ± std)	1.63±1.8	1.55±1.6	1.87±2.4	1.30±1.1	0.508
Pre-op VAS* Pain Scores (mean ± std)	6.45±1.9	6.45±1.9	6.51±1.5	6.20±2.6	0.892
Time in Operating Room (minutes, mean ± std)	170.57±65.9	180.69±70.3	147.36±52.3	167.3±45.8	0.014
Total Intra-Operative MME (mean ± std)	27.9±25.1	29.6±12.1	18.2±11.3	53.9±88.9	<0.001
Post-op VAS Pain Scores on Arrival in PACU** (mean ± std)	2.88±1.92	2.99±1.8	2.47±2.1	3.50±2.6	0.168
Post-Op VAS Pain Scores on Discharge from PACU (mean ± std)	1.49±1.7	1.40±1.8	1.60±1.7	1.90±1.6	0.595
PODI*** VAS Pain	3.98±3.0	4.11±3.1	3.59±2.6	4.4±3.3	0.552
PODI MME	43.15±69.3	41.3±59.1	38.9±70.9	83.5±137.1	0.162
PODI Ambulation	47.29±36.3	45.62±38.0	54.57±33.6	32.30±20.0	0.149
Length of Stay (days mean ± std)	3.50±1.6	3.28±3.4	2.92±0.4	3.50±1.6	0.721
Compartment Syndrome, n (%)	1.2% (2)	0.9% (1)	2.1% (1)	0% (0)	0.759

*VAS: Visual-Analog Scale

**PACU: Post-Anesthesia Care Unit

***PODI: post-operative day 1