

Costs and Complications of Single-Stage Fixation Versus 2-Stage Treatment of Select Bicondylar Tibial Plateau Fractures

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Purpose: Many surgeons advocate a 2-stage approach with initial external fixation and delayed fixation for bicondylar tibial plateau (BTP) fractures. Recent evidence has shown that selected BTP fractures can be treated with early definitive fixation with a low rate of complications. This investigation examines the difference in cost and complications among BTP fractures treated with single-stage definitive fixation versus 2-stage treatment.

Methods: We performed a retrospective review of all BTP fractures (OTA 41-C) treated at a Level I trauma center from 2013-2015. Inclusion criteria were age ≥17 years and follow-up to healed fracture (minimum 6 months). Charts and radiographs were reviewed. Functional outcomes were assessed with the PROMIS (Patient-Reported Outcomes Measurement Information System) score. Direct implant-related costs and hospital charges were obtained via hospital data. Outcomes and costs were compared between patients with 1-stage and 2-stage fixation.

Results: There were 28 patients in the 1-stage group and 24 patients in the 2-stage group after exclusions. Mean follow-up was 21.8 months. Mean implant cost in the 2-stage group was \$10,768 greater than the 1-stage group. Median inpatient charges in the 2-stage group exceeded the 1-stage group by over \$68,000. There was no difference between groups with respect to complications or functional outcomes.

Conclusion: This study demonstrated that single-stage definitive treatment of BTP fractures dramatically decreases costs without an increase in complications in selected patients.

		One-Stage Fixation	Two-Stage Fixation	P-value
	Number of Patients	28	24	
Demographics and Comorbidities	Age (mean)	48	51	0.48
	Sex (M:F)	14:14	17:7	0.16
	BMI (mean)	30	31	0.43
	Smoker (%)	36	42	0.78
	Diabetes (%)	18	17	1.00
	Osteoporosis (%)	3	4	0.91
Injury Data	OTA 41-C3 : OTA 41-C1/2	24:4	24:0	0.12
	Number of days to definitive fixation (mean)	1.25	7.8	<0.01
	Number of days to definitive fixation (range)	0-3	3-15	
	Open Fracture (%)	14	4	0.36
Clinical and Radiographic Outcomes	Unplanned Reoperation (%)	7	29	0.06
	Nonunion (%)	4	13	0.32
	Deep Infection (%)	7	17	0.40
	Change in Coronal or Sagittal Alignment >5 deg (%)	11	17	0.69
	PROMIS Physical Function	40	40	0.82
	PROMIS Pain Interference	61	56	0.10
Cost	Implant Cost (mean)	\$3,475	\$14,243	<0.01
	Inpatient Hospital Charges (mean)	\$97,608	\$182,942	<0.01
	Inpatient Hospital Charges (median)	\$90,085	\$158,658	<0.01
	Inpatient Hospital Charges for Isolated BTP (mean)	\$74,438	\$153,519	<0.01
	Inpatient Hospital Charges for Isolated BTP (median)	\$72,285	\$134,009	<0.01

Table 1. Staged treatment of bicondylar tibial plateau fractures resulted in significantly higher hospital charges and implant costs in comparison to patients treated with early definitive fixation. There were no differences observed between the groups with respect to demographics, comorbidities, clinical, and radiographic outcomes.