

Bipolar Sealer Hemostasis: Pain and Opioid Use Reduction in the Immediate Postoperative Phase following Primary Total Knee Arthroplasty

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INTRODUCTION: Bipolar sealer technology utilizes continuous saline flow and keeps tissue temperatures below 100°C, theoretically leading to decreases in charred or burnt soft tissue. In this study, we wanted to investigate whether decreased necrotic tissue from use of bipolar sealer technology influenced pain and narcotic consumption in patients following total knee arthroplasty (TKA).

METHODS:

A retrospective study of 100 primary unilateral TKAs were divided into two historical cohorts. Cohort A consisted of 50 patients (mean age = 69.39 years, SD = 9.18 years) operated with a monopolar Bovie. Cohort B consisted of 50 patients (mean age = 70.66 years, SD = 6.90 years) operated with a bipolar sealer. All other perioperative multimodal protocols between the two cohorts were kept identical.

Three pain measurements were taken for each patient on day of surgery (DOS) and on day of discharge (DOD).

Narcotics documented in medical records after surgery were extracted and normalized using morphine equivalents. DOS, DOD, and total narcotic consumption were calculated and compared. To accurately measure perioperative pain and narcotic consumption, only patients who stayed 24 hours postprocedural recovery in the hospital were included.

RESULTS:

Bipolar sealer patients reported significantly lower pain scores and narcotic usage. DOS pain levels were reduced from 3.9 to 2.8 (p<.01) and DOD pain levels were reduced from 4.6 to 3.1 (p<.01), reductions of 28% and 33% respectively. Daily morphine equivalents (ME) were reduced from 18.9 to 12.6 on DOS (p<.01). Daily morphine equivalents were reduced from 19.3 to 12.0 on DOD (p<.015). Patient demographics were comparable between both groups.

DISCUSSION AND CONCLUSION: Our study revealed statistically significant differences in pain and narcotic consumption on patients operated with bipolar sealing technology. This study suggests that there are substantial merits of its use to decrease pain and narcotic consumption in unilateral TKAs using strict multimodal treatment protocols.

	Bovie	Bipolar
Population (n)	50	50
Average Age (SD)	69.39 (9.18)	70.66 (6.90)
Height (cm) (SD)	169.46 (10.26)	167.94 (12.11)
Weight (kg) (SD)	85.76 (21.22)	86.67 (21.46)
BMI (SD)	29.59 (5.47)	30.68 (6.75)
Sex		
Male (%)	25 (50%)	19 (38%)
Female (%)	25 (50%)	31 (62%)
Race		
White (%)	47 (94%)	48 (96%)
Asian (%)	0 (0%)	1 (2%)
Black (%)	2 (4%)	1 (2%)
Other (%)	1 (2%)	0 (0%)

Table 1: Bovie and Bipolar Cohort Patient Demographics

	Bovie Monopolar (Bovie) (SD)		Bipolar Monopolar (Bipolar) (SD)	
	Day of Surgery (p=99)	Day of Discharge (p=99)	Day of Surgery (p=99)	Day of Discharge (p=99)
Total ME on each patient	94	94	49.7	56.3
Average ME per patient	1.88	1.88	0.99	1.13
Percentage reduction			-47%	-38%

Table 2: Monopolar Equivalent Usage in each Patient

	Bovie vs Bipolar (Day of Surgery)	Bovie vs Bipolar (Day of Discharge)	Bovie vs Bipolar (Total Usage)
p-value (day of surgery)	0.000716		
p-value (day of discharge)		0.002296	
p-value (total)			0.37010

Table 3: Monopolar Equivalent Usage - Test Values

	Bovie (Day of Surgery)	Bipolar (Day of Surgery)	Bovie (Day of Discharge)	Bipolar (Day of Discharge)	Bovie (Total)	Bipolar (Total)
Average	3.9	2.8	4.6	3.1	18.9	12.6
SD	1.7	1.5	1.5	1.2	1.7	1.2
p-value					0.01	0.015

Table 4: Reported Pain Levels, Day of Surgery and Day of Discharge

	Bovie vs Bipolar (Day of Surgery)	Bovie vs Bipolar (Day of Discharge)	Bovie vs Bipolar (Total)
p-value (day of surgery)	0.2709412		
p-value (day of discharge)		0.0043206	
p-value (total)			3.58E-05

Table 5: Pain - Test Values