

Hospitalization Costs for Patients Undergoing Orthopedic Surgery Treated with Intravenous Acetaminophen (IV-APAP) + IV Opioids or IV Opioids Alone for Postoperative Pain

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Introduction: This study was conducted to assess the impact of intravenous acetaminophen (IV-APAP) as part of a multimodal analgesia (MMA) approach compared to IV opioid monotherapy on hospitalization costs in patients undergoing orthopedic surgery, including total knee replacement, total hip replacement, or surgical repair of hip fracture for postoperative pain management.

Methods: A retrospective analysis of Truven Health's MarketScan Hospital Drug Database (HDD), was conducted comparing patients undergoing orthopedic surgery who received multimodal postoperative pain management with combination IV APAP and other IV analgesics (IV-APAP group) to those who received only IV opioids (IV opioid group) starting on the day of surgery. Both groups could receive oral analgesics as part of their postoperative pain management regimen. Patients who underwent elective orthopedic surgery at 1 of 600 participating hospitals between January 1, 2011 and August 31, 2014, were identified and separated into postoperative pain treatment groups. Patients with evidence of substance abuse disorder and those who used methadone or buprenorphine in addition to other opioids were excluded. The 2 treatment groups were compared regarding baseline characteristics and total hospitalization costs. Differences in categorical variables were assessed using chi-square tests, while differences in continuous variables were assessed using t-tests. A multivariate sensitivity analysis was also conducted using inverse probability of treatment weighting (IPTW) with propensity scores.

Results: The IV-APAP (n=33,954) and IV opioids (n=110,300) groups were significantly different (but not clinically meaningful) across all baseline characteristics including mean age (62.1 years [IV-APAP] vs. 61.4 years [IV opioids]), percent female (56.4% vs. 55.1%) and if the hospital was a teaching hospital (16.6% vs. 16.4%); all $P < 0.0001$. Mean total hospitalization costs, which included medical costs and pharmacy costs, were statistically significantly lower for patients in the IV-APAP group as compared to patients in the IV opioids group (\$12,540 vs. \$13,242; $P < 0.0001$; see Table 1). Medical costs (medical/surgical supplies, laboratory testing, imaging, and other costs), drove the difference between treatment groups, encompassing \$701 of the \$702 between-group difference. Pharmacy costs were similar for the IV-APAP group as compared to the IV opioids group. The total cost difference remained statistically

significant in the multivariate analysis, with IV-APAP utilization associated with \$830 lower hospitalization costs compared to IV opioids ($P<0.0001$).

Conclusion: Patients undergoing orthopedic surgery who received IV-APAP as part of MMA for postoperative pain had lower total costs than patients in the IV opioid group. This difference was mainly driven by medical costs. There was no difference observed in pharmacy costs between treatment groups.

Table 1. Total costs for patients undergoing orthopedic surgery

	IV-APAP (n=33,954)		IV Opioids (n=110,300)		P Value
	Mean	SD	Mean	SD	
Total costs	\$12,540	\$9,564	\$13,242	\$35,825	<0.0001
Medical costs*	\$12,053	\$9,377	\$12,754	\$34,870	<0.0001
Medical/surgical supplies	\$2,795	\$1,870	\$2,889	\$5,717	<0.0001
Lab	\$197	\$301	\$219	\$1,019	<0.0001
Imaging	\$91	\$129	\$105	\$238	<0.0001
Other**	\$8,970	\$7,922	\$9,541	\$30,735	<0.0001
Pharmacy	\$486	\$488	\$488	\$1,120	0.6786

*Medical costs = medical/surgical supplies costs + lab costs + imaging costs + other costs

**Examples of costs included in "Other" are room and board, EKGs, oxygen, and ventilation