

IMPACT OF OPIOID RELATED ADVERSE EVENTS (ORAE) ON LENGTH OF STAY (LOS) AND HOSPITAL COSTS IN PATIENTS UNDERGOING A LAPAROSCOPIC COLECTOMY

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ABSTRACT

PURPOSE: Laparoscopic colectomy results in decreased postoperative ileus, pain, and disability, and can therefore lead to a shorter length of hospital stay (LOS) and reduced costs of care. As opioids are often used in the treatment of postsurgical pain, this retrospective analysis, a subset of data from a large health economics and outcomes research project, examined the impact of opioid-related adverse events (ORAEs) on LOS and hospital costs for patients who underwent laparoscopic colectomy procedures.

METHODS: Over a 2-year period, 9/1/2008 through 9/30/2010, approximately 10 million annual hospital discharges were reviewed from a large national database including over 450 hospitals. Data on opioid usage, ORAEs, LOS, and hospital costs were reviewed for some of the most common surgeries in the US: open colectomy, laparoscopic colectomy, laparoscopic cholecystectomy, total abdominal hysterectomy and hip replacement, and populations were matched at a 3:1 ratio for age, gender, and APR severity of illness. Statistical analysis was performed on 181,283 matched hospital discharges after surgery, including 12,620 matched laparoscopic colectomies.

RESULTS: Of the 12,620 matched laparoscopic colectomies reviewed, mean unadjusted LOS for patients who had an ORAE was 7.7 days compared to 6.2 days for patients without an ORAE (P<0.0001). Similarly, unadjusted mean total costs for patients with an ORAE were significantly higher than for patients who did not have an ORAE (\$18,322 vs. \$15,720, respectively; P<0.0001).

CONCLUSION: Patients who had a laparoscopic colectomy and experienced an ORAE had a longer LOS and higher total cost than similar patients who did not experience an ORAE. As the benefits of laparoscopic surgery include reduced LOS and cost, reducing the use of opioids and their consequent ORAEs would be expected to result in greater maintenance of those benefits.

Background

Approximately 70 million surgeries are performed annually in the United States¹ and up to 70% of these patients experience pain post-surgery.²⁻⁴ Although the majority of patients experience post-operative pain, insufficient management of pain is common and can lead to profound complications. Better management of post-surgical pain is hampered by reliance on opioid medications, which are frequently associated with numerous and potentially significant side effects. Laparoscopic procedures are associated with decreased pain and postoperative complications and may require less pain control. This retrospective post hoc analysis looked at a subset of patients undergoing laparoscopic colectomy from a large pooled national hospital database that previously identified ORAE in common surgical procedures known to require significant postoperative pain management.

Objectives

- To assess the relationship between postsurgical opioid use and occurrence of opioid-related adverse drug events following laparoscopic colectomy
- To determine ORAE impact on hospital length of stay (LOS) and total visit cost in unmatched and matched patient populations

Methods

Data Source

This study comprised a retrospective analysis of data from the Premier Research Database. The database is a complete census of all inpatients and hospital-based outpatients from a geographically diverse cohort of hospitals and contains records on approximately 85 million patients across more than 475 hospitals allowing for a broad national representation of results.

Methods

Patient selection:

- The database was queried to identify patients with the following characteristics:
- Adult (18+ years of age) patients having a laparoscopic colectomy
- Postsurgical opioid administration identified through charge master records
- Hospital discharge between 2008 and 2010
- Patients with and without ORAE assessed in unmatched and matched cohorts (1:3) based on age, APR severity of illness, and gender

Dependent Variables:

- Patient outcomes included Length of Stay (days) and Total Hospitalization Cost (US \$)
- Patients identified as "Outliers" if LOS and total cost exceeded 1 standard deviation above the mean

Independent Variables:

- Demographics recorded for age, race/ethnicity, geographic region, and urban/rural status (Tables 1A and 1B)
- ORAEs identified using ICD-9 diagnosis codes for respiratory, GI, CNS, GU events and other probable opioid-related ADEs
- Charge master records were used to identify opioid use and other analgesics

Statistical analysis:

- Descriptive statistics for continuous data included mean and standard deviation. T-tests were used to determine statistical significance between patients exhibiting ORAE and no ORAE for each surgery
- Chi-square tests determined significance between ORAE and no ORAE in categorical comparisons, expressed as percentages of patients
- A p-value of ≤ 0.05 was considered statistically significant

Results

Table 1. Unmatched Study Population Patient Demographics

	ORAE	no ORAE	p-value
Number of Discharges	4,483	16,662	p-value
Age at index (mean, SD)	65.3 ±15.2	60.7 ±14.7	<0.0001
Gender (% female)	47.6%	54.3%	<0.0001
Race (% white)	71.8%	69.9%	0.0138
Geographic Location			
Midwest	16.5%	16.3%	0.8197
South	41.5%	42.1%	0.4701
Northeast	21.0%	20.3%	0.2975
West	21.1%	21.3%	0.7179
Urban/Rural (% rural)	8.5%	8.3%	0.6888

- Overall, 21.2% of patients exhibited an ORAE
- Unmatched (Table 1)
 - Mean age, gender, and race were all statistically different
 - No geographic di
- Matched (Table 2)
 - Due to matching only race was statistically different
 - After matching the northeast geographic location had statistical differences

Results

Table 2. Matched Study Population Patient Demographics

	ORAE	no ORAE	p-value
Number of Discharges	3,167	9,453	p-value
Age at index (mean, SD)	62.9 ±15.1	62.9 ±15.1	0.9898
Gender (% female)	50.3%	50.2%	0.9925
Race (% white)	72.3%	71.3%	<0.0001*
Geographic Location			
Midwest	17.1%	18.6%	0.0731
South	41.7%	42.6%	0.4099
Northeast	20.3%	18.4%	0.0177
West	20.8%	20.4%	0.6735
Urban/Rural (% rural)	8.9%	9.2%	0.6765

- Length of Stay (Figure 1)
 - Unmatched mean LOS was 9.7 (±8.7) days in patients exhibiting an ORAE vs. 5.4 (±4.2) days in patients not exhibiting an ORAE (p-value <0.0001)
 - Matched mean LOS was 7.7 (±6.1) days in patients exhibiting an ORAE vs. 6.2 (±5.0) days in patients not exhibiting an ORAE (p-value <0.0001)

Figure 1. Mean Length of Stay (Days) Comparing ORAE to no ORAE

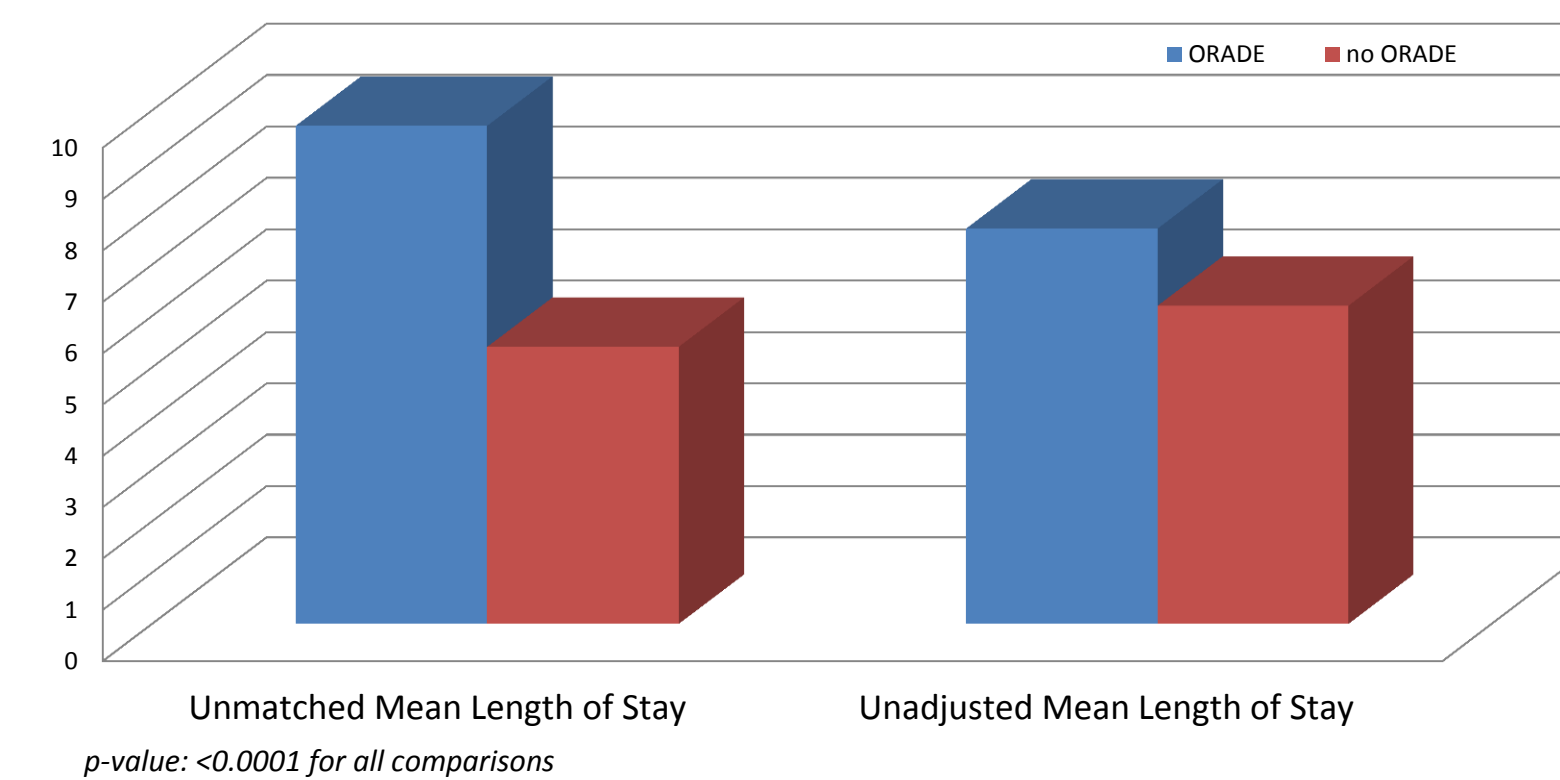
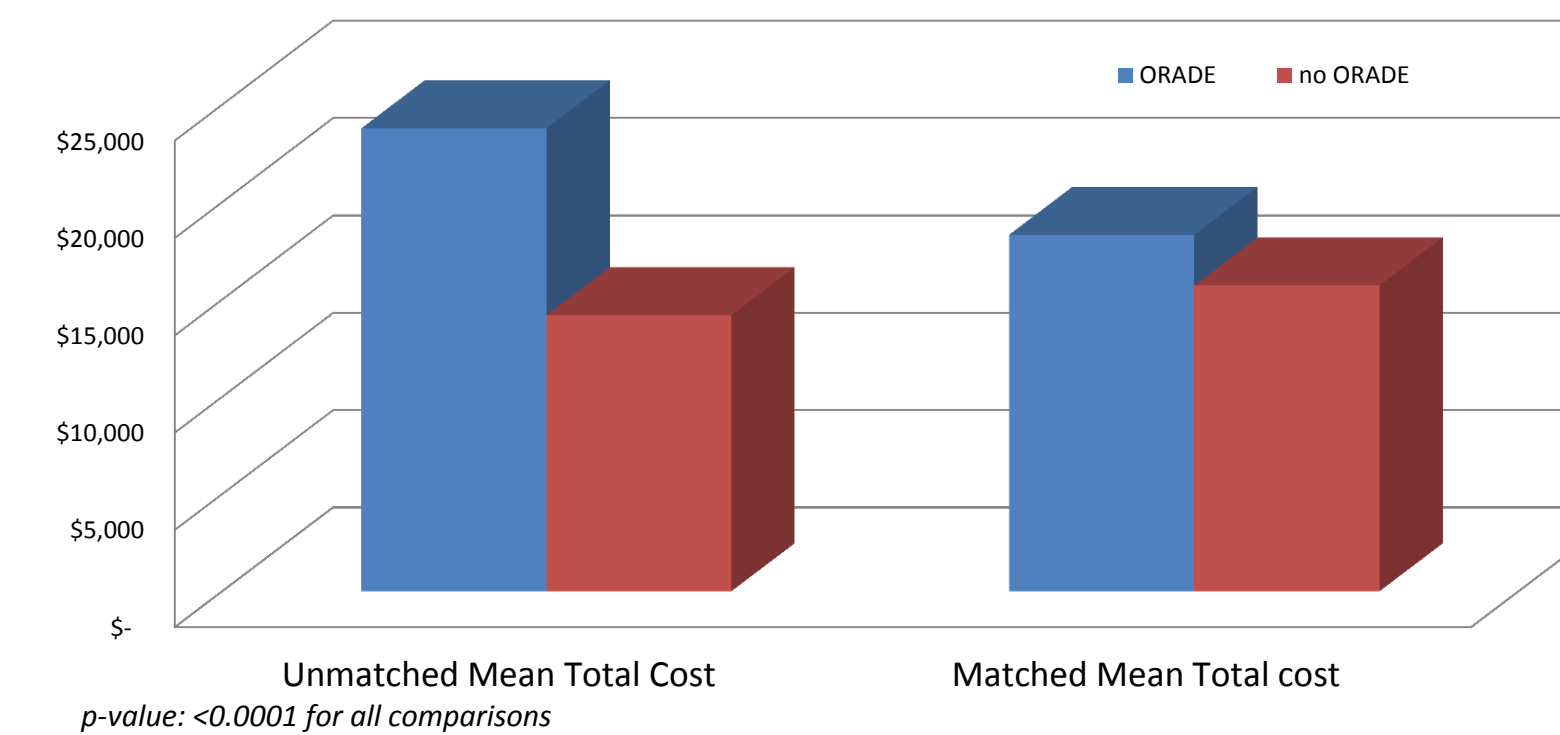


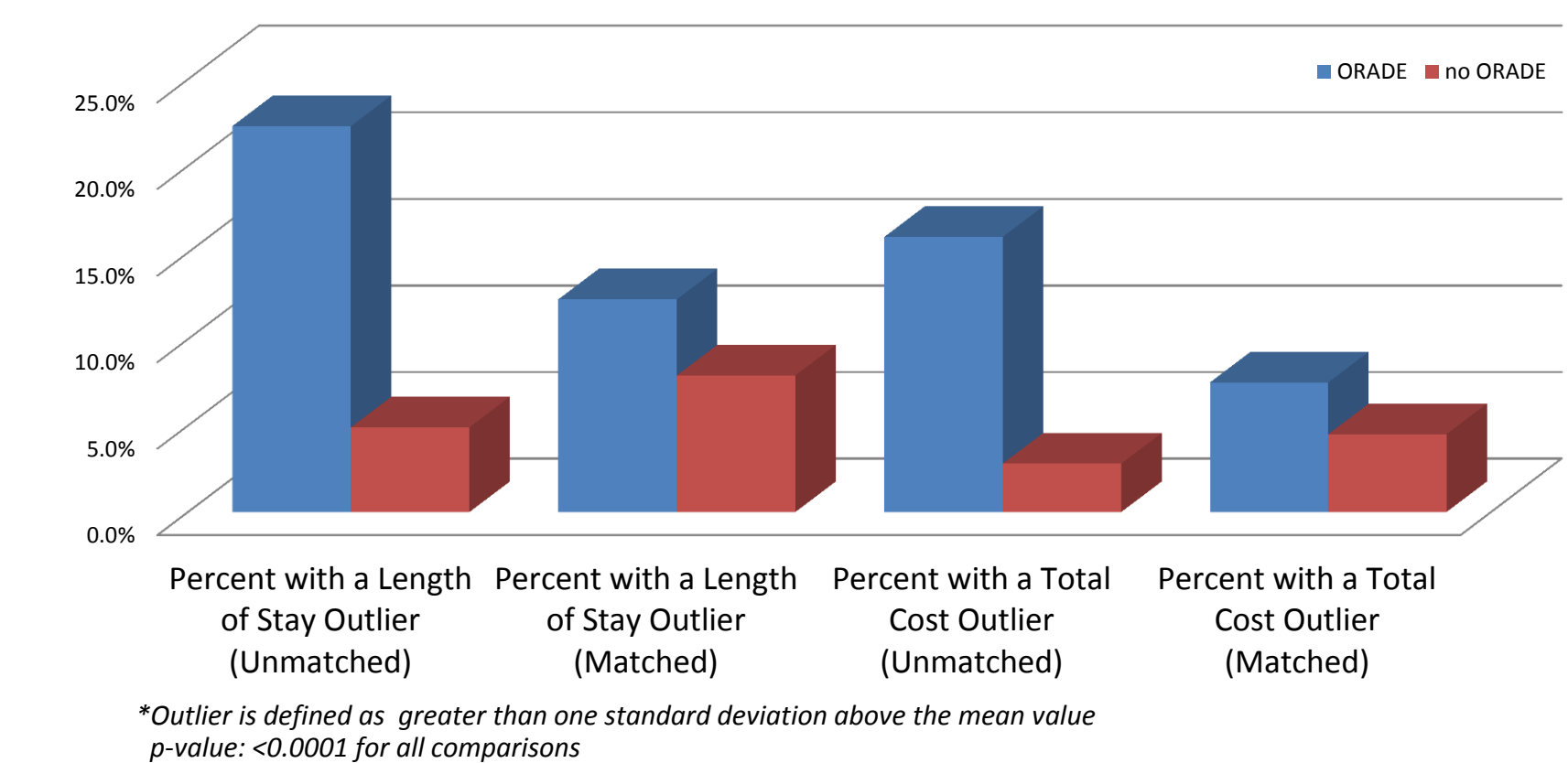
Figure 2. Mean Total Visit Cost (US \$) Comparing ORAE to no ORAE



Results

- Total cost (Figure 2)
 - Unmatched mean total cost was \$23,776 (±24,693) in patients exhibiting an ORAE vs. \$14,189 (±12,675) in patients not exhibiting an ORAE (p-value <0.0001)
 - Matched mean total cost was \$18,322 (±15,008) in patients exhibiting an ORAE vs. \$15,720 (±15,767) in patients not exhibiting an ORAE (p-value <0.0001)

Figure 3. Percent of Patients with Outliers (Length of Stay & Total Cost) in Comparing ORAE to no ORAE



Conclusions

Patients who had a laparoscopic colectomy and experienced an ORAE had a longer LOS and higher total cost than similar patients who did not experience an ORAE. Moreover, more outliers were identified in the ORAE group attenuating the known benefits of shorter hospital stay and reduced costs associated with laparoscopic procedures. This study underscores the need to reduce the use of opioids for pain control.

Limitations

Use of observational administrative databases has noted limitations which include selection bias and reliance on accurate and complete ICD-9 coding and billing, as utilized in this study.

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