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LITERATURE REVIEW ON HOSPITAL COSTS FOR PATIENTS UNDERGOING COLECTOMY

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Background

- ❖ Colectomy is a surgical procedure to remove all or part of the colon.
- ❖ In an open colectomy, one long incision is made in the wall of the abdomen and doctors can see the colon directly. In a laparoscopic-assisted colectomy, several small incisions are made and a thin, lighted tube attached to a video camera is inserted through one opening to guide the surgery. Surgical instruments are inserted through the other openings to perform the surgery.
- ❖ The clinical benefits of laparoscopy have been demonstrated including decreased complications and mortality¹. A dramatic increase in the rate of laparoscopic partial colectomy from 2% in 1996 to 31% in 2009².
- ❖ The impact of increasing use of laparoscopy on hospital costs across countries have not been thoroughly investigated.
- ❖ Most published studies comparing the costs of laparoscopic vs open procedures were conducted only within respective countries

Objective

- ❖ This study aims to identify the range of direct hospital costs associated with a minimally invasive or open colectomy procedure across different countries.

Table 1. Selected Study Characteristics, Design, Cost and Cost Analysis Methodologies

Citation/Year	Country/Setting	Type of Study	Cost Calculation Methodology	Approach	OR Cost (per Min)	Total Direct Cost Reported
da Luz Moreira et al., 2010	US Single Center	Observational	Bottom-up (Cost)	Laparoscopic	\$ 18.2	\$ 8,200
				Open	\$ 13.4	\$ 9,083
Ozturk et al., 2009	US Single Center	Observational	Bottom-up (Cost)	Hand-Assisted Lap	\$ 23.0	\$ 9,428
				Laparoscopic-Assisted	\$ 21.4	\$ 8,793
Koopmann et al., 2007	US Single Center	Observational	Bottom-up (Cost)	Laparoscopic	\$ 24.8	\$ 15,960
				Open	\$ 22.7	\$ 20,520
Vaid et al., 2012	US National Database	Observational	Top-down (Charge)	Laparoscopic	N/A	\$ 46,168
				Open	\$ 47,805	
Salloum et al., 2006	US Single Center	Observational	Bottom-up (Cost)	Laparoscopic	\$ 19.2	\$ 10,124
				Open	\$ 12.6	\$ 12,158
Delaney et al., 2008	US National Database	Observational	Bottom-up (Cost)	Laparoscopic	N/A	\$ 8,884
				Open	\$ 8,446	
Crawshaw et al., 2015	US National Database	Observational	Top-down (Payment)	Laparoscopic	N/A	\$ 25,140
				Open	\$ 32,431	
Hinojosa et al., 2007	US National Database	Observational	Top-down (Cost)	Laparoscopic	N/A	\$ 15,398
				Open	\$ 17,383	
Steele et al., 2007	US National Database	Observational	Top-down (Charge)	Laparoscopic	N/A	\$ 43,703
				Open	\$ 43,064	
Hardy et al., 2014	Canada Single Center	Observational	Bottom-up (Cost)	Laparoscopic	\$ 18.2	\$ 9,377
				Open	\$ 17.2	\$ 12,426
Franks et al., 2006	UK Multi-Center	RCT	Bottom-up (Cost)	Laparoscopic	\$ 14.6	\$ 18,488
				Open	\$ 14.6	\$ 18,210
Noblett et al., 2007	UK Single Center	Observational	Bottom-up (Cost)	Laparoscopic	\$ 46.9	\$ 10,958
				Open	\$ 35.0	\$ 11,493
Bertani et al., 2011	Italy Single Center	Observational	Bottom-up (Cost)	Laparoscopic	N/A	\$ 9,983
				Open	\$ 10,352	
Ehrlich et al., 2015	Finland Single Center	Observational	Bottom-up (Cost)	Laparoscopic	\$ 38.7	\$ 14,259
				Open	\$ 31.4	\$ 14,893
Liu et al., 2012	China Single Center	Observational	Bottom-up (Cost)	Hand-Assisted Lap	\$ 13.8	\$ 5,761
				Open	\$ 12.0	\$ 5,807
Sheng et al., 2012	China Single Center	Observational	N/A	Hand-Assisted Lap	N/A	\$ 5,966
				Open	\$ 5,363	
Liang et al., 2006	Taiwan Single Center	RCT	Bottom-up (Cost)	Laparoscopic	\$ 13.4	\$ 6,883
				Open	\$ 5.4	\$ 4,829
Shabbir et al., 2009	Singapore Single Center	Observational	Bottom-up (Charge)	Laparoscopic	\$ 30.6	\$ 8,817
				Open	\$ 41.5	\$ 8,051

Results

- ❖ Twenty-six of 99 articles were included in the analysis. Ten (38%) studies were conducted in North America with the remaining based in European and Asian-Pacific countries.
- ❖ For laparoscopic colectomy, several review studies reported longer operating time (27-92 mins), shorter hospital stays (2-3 days) and less blood loss (99-104 mL)^{24,25,26,27}
- ❖ The findings from 2 meta-analysis studies reporting total direct costs indicated higher costs for laparoscopies ranging from \$117 to \$836.
- ❖ Direct hospital costs varied dramatically across countries. In North America, the cost of operating rooms (minute) ranged from \$13-\$23 for open procedures and \$18-\$25 for laparoscopies. The anesthesia cost (minute) ranged from \$7-\$10 and the hospital cost (day) ranged from \$938-\$3080 regardless of procedure type.
- ❖ In European countries, the cost of operating rooms (minute) ranged from \$15-\$35 for open procedures and \$15-\$47 for laparoscopy. The hospital cost (day) ranged from \$1277-\$2852.
- ❖ In Asia, the cost of operating rooms (minute) ranged from \$5-\$12 for open procedures and \$13-\$14 for laparoscopies. The hospital cost (day) ranged from \$345-\$765.

Conclusion

Open procedures seem to result in lower hospital costs across studies conducted in several regions, which is consistent with the cost analysis of a recent meta-analysis²⁸. Asian-Pacific countries have reported lower direct hospital costs. Cost calculations are challenging even for common surgical procedures like colectomy due to different costing methodologies and categories. A standardized costing methodology guideline is warranted and may shed light on the future considerations of reimbursement strategy.

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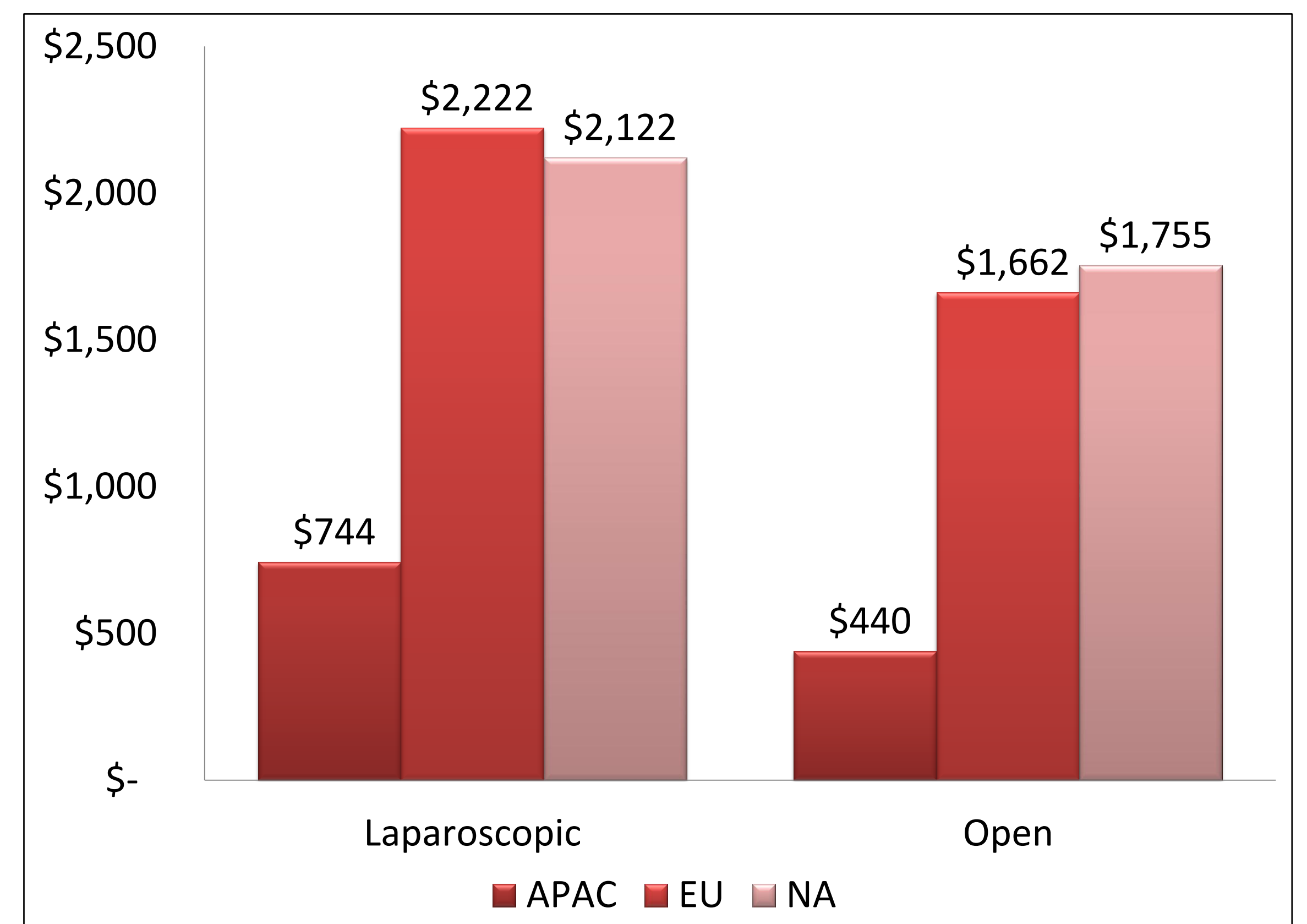


Figure 1. Average Total Direct Cost Reported per Day
* Studies reported charge or payment data were excluded