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# A Cost Analysis of Postoperative Pain Management in Endometrial Cancer Patients: Robotic Surgery vs. Laparoscopy Surgery

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## Background:

Postoperative pain management is an advantage of minimally invasive surgery, along with reduced morbidity, decreased hospital length of stay, and improved patient satisfaction scores.

As patients experience less pain, they consume less postoperative pain medication and perhaps less narcotic medications. This may lead to fewer nurse interventions and thus a reduction in the cost associated to deliver that care.

Robotic Surgery is the most advanced minimally invasive technique presently available compared to standard laparoscopy.

Advantages of robotic technology over standard laparoscopy include:

- Tools with six degrees of rotational freedom which enables the surgeon to make dexterous hand motions
- 3-D, high-definition view of the operative field
- Ergonomically designed console which decreases surgeon's fatigue

## Objective:

To compare the postoperative pharmacotherapeutic pain management in endometrial cancer patients who had a robotic-assisted or laparoscopic-assisted hysterectomy with/without lymph node dissections

### Primary outcomes:

- Patient-recorded pain scores
- Nursing pain management interventions

### Secondary outcomes:

- Cost of postoperative pain medication

Table 1. Patient Demographics

	Robotic (n=101)	Laparoscopic (n=114)	P value
<b>Age (y)</b>			
Mean	61.8	63.6	.241
SD	11.7	11.3	
<b>BMI (kg/m<sup>2</sup>)</b>			
Mean	35.3	33.5	.173
SD	9.6	8.3	
<b>Clinical Stage</b>			
IA	38	28	
IB	34	58	
IC	9	16	
IIA	4	2	
IIB	6	3	
IIIA/IIIB/IIIC	9	5	
IVA/IVB	0	1	
<b>Total Nodes</b>			
n	31	53	.322
Mean	18.6	16.5	
SD	10.1	7.3	
<b>Total Pelvic Nodes</b>			
Mean	14.1	12.2	.141
SD	7.3	4.7	
<b>Total Periaortic Nodes</b>			
Mean	4.6	5.3	.440
SD	3.5	3.8	
<b>Comorbidities</b>			
Hypertension	33	61	
Diabetes	12	20	
Asthma	1	3	

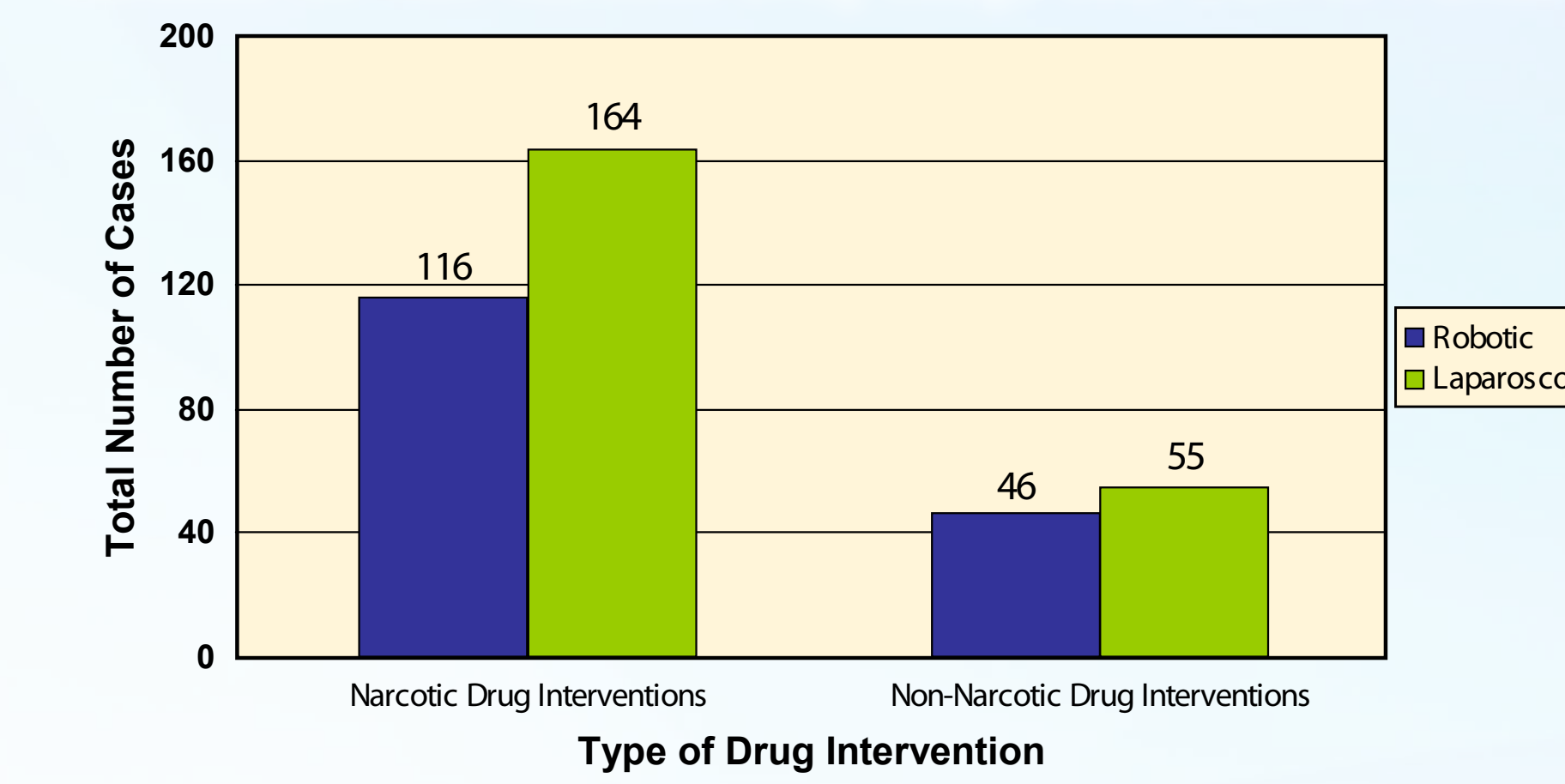
Table 2. Frequency of Postoperative Pain Management Interventions

	Robotic (n=101)	Laparoscopic (n=114)	P value
<b>INITIAL INTERVENTION</b>			
Narcotic drug interventions	17	43	
Non-narcotic drug interventions	4	9	.860
Total drug interventions	21	52	
Non-drug interventions	32	12	.00000371
<b>2nd INTERVENTION</b>			
Narcotic drug interventions	33	42	
Non-narcotic drug interventions	12	10	.383
Total drug interventions	45	52	
Non-drug interventions	10	7	.344
<b>3rd INTERVENTION</b>			
Narcotic drug interventions	25	31	
Non-narcotic drug interventions	11	12	.796
Total drug interventions	36	43	
Non-drug interventions	8	9	.911
<b>4th INTERVENTION</b>			
Narcotic drug interventions	30	29	
Non-narcotic drug interventions	10	14	.448
Total drug interventions	40	43	
Non-drug interventions	14	7	.130
<b>5th INTERVENTION</b>			
Narcotic drug interventions	11	19	
Non-narcotic drug interventions	9	10	.458
Total drug interventions	20	29	
Non-drug interventions	5	5	.592
<b>Total narcotic drug interventions over 24 hour period</b>			
	<b>116</b>	<b>164</b>	
<b>Total non-narcotic drug interventions over 24 hour period</b>			
	<b>46</b>	<b>55</b>	<b>0.473</b>
<b>Total drug interventions over 24 hour period</b>			
	<b>162</b>	<b>219</b>	
<b>Total non-drug interventions over 24 hours period</b>			
	<b>69</b>	<b>40</b>	<b>0.000127</b>

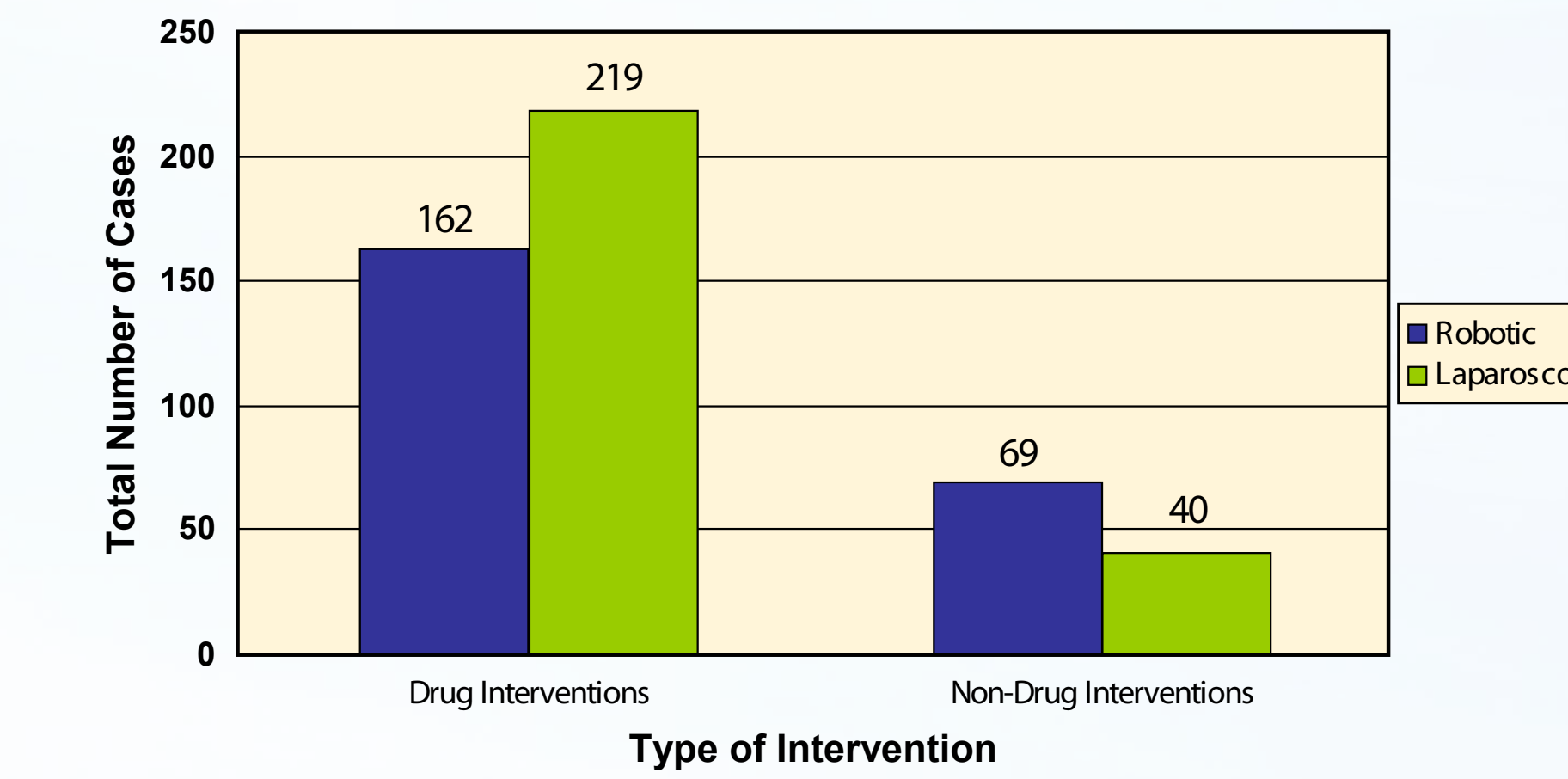
Table 3. Patient Recorded Pain Levels

	Robotic (n=101)	Laparoscopic (n=114)	P value
<b>Initial Pain Score</b>			
Mean	2.1	3.0	
SD	2.48	2.61	0.012
<b>2nd Pain Score</b>			
Mean	2.8	2.5	
SD	2.65	2.65	0.396
<b>3rd Pain Score</b>			
Mean	2.2	2.2	
SD	2.38	2.47	0.929
<b>4th Pain Score</b>			
Mean	2.8	3.1	
SD	2.32	2.63	0.566
<b>5th Pain Score</b>			
Mean	2.3	2.6	
SD	2.52	2.54	0.504

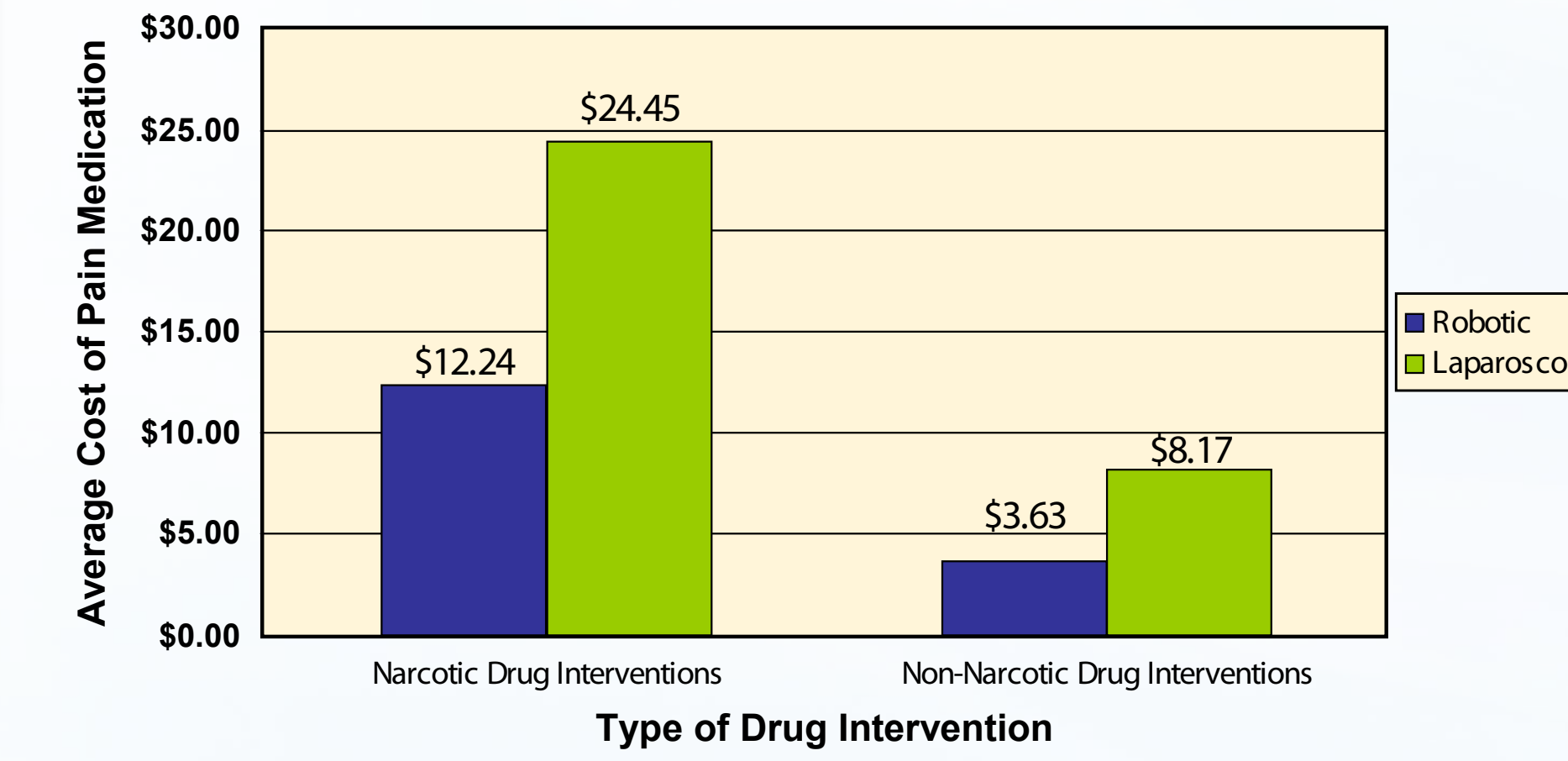
Total Postoperative Pain Management Interventions: Narcotic vs. Non-narcotic Drug Usage over a 24 Hr Period



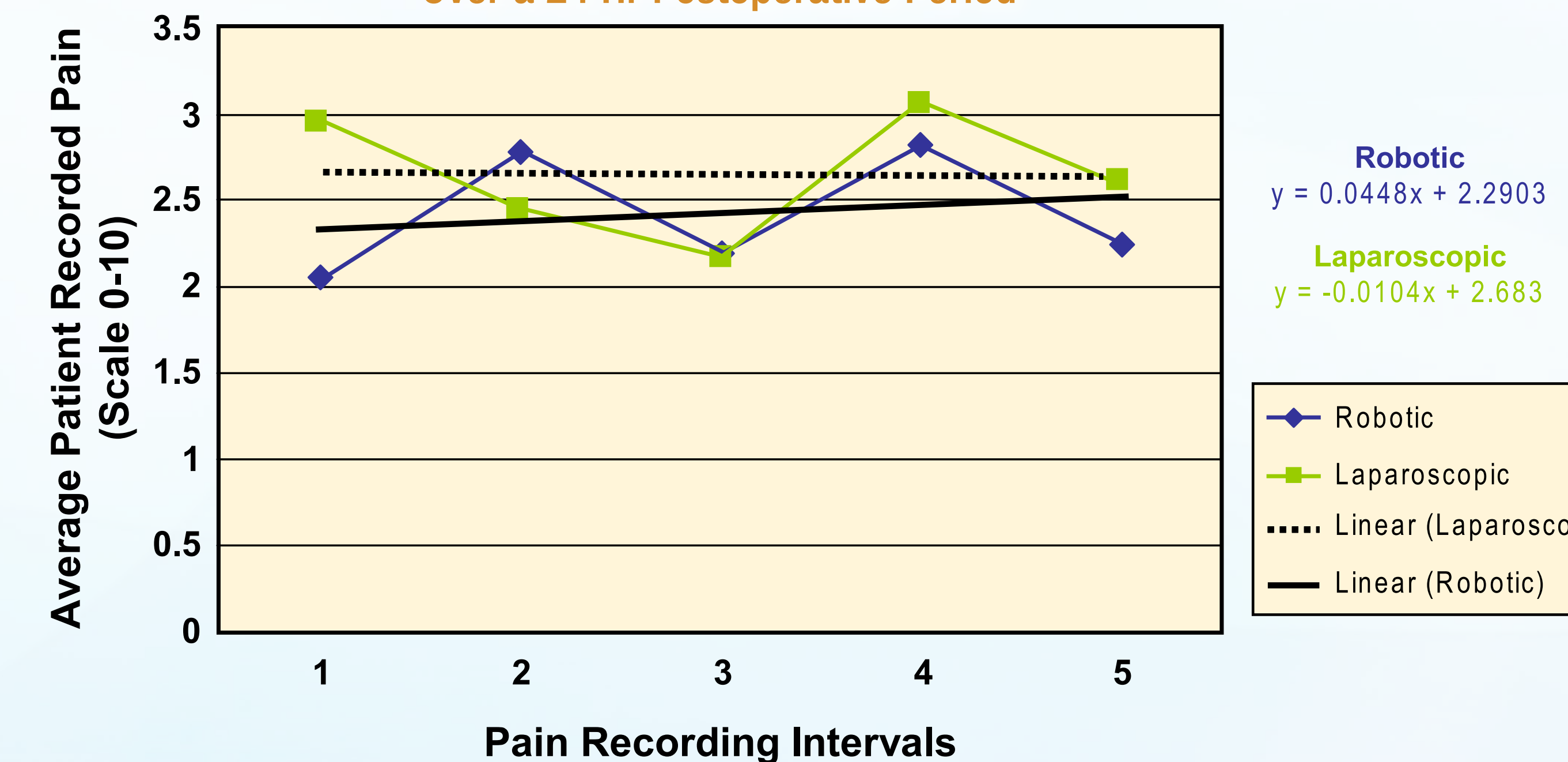
Total Postoperative Pain Management Interventions: Drug vs. Non-drug Interventions over a 24 Hr Period



Average Pain Medication Cost During Patient Hospital Stay



Average Patient Recorded Pain Over a 24 Hr Postoperative Period



## Methods:

- Pain scores and nursing interventions were analyzed for five intervals over a 24-hour postoperative period, beginning once the patient entered the floor.
- Nursing interventions were categorized as either a drug or non-drug intervention.
- Drug interventions were subcategorized as narcotic or non-narcotic.
- Data was analyzed using Student's t-tests and Pearson's  $X^2$  tests in SPSS.
- This is an IRB approved, retrospective cohort study.

## Results:

Two hundred fifteen (101 robotic and 114 laparoscopic) patients met the inclusion criteria. There were no significant differences between the two groups in age, BMI, clinical stage, comorbidities, lymph nodes retrieved, and the number of narcotic v. non-narcotic drug interventions administered.

### Primary outcomes:

- Robotic patients had a lower number of initial drug interventions (21 vs 52;  $P < .01$ ) and total drug interventions (162 vs 219;  $P < .01$ ). The robotic cohort also had a lower initial patient-recorded pain score (2.1 vs 3.0;  $P = .012$ ).

### Secondary outcomes:

- There was a 50% reduction in the postoperative pain medication cost on the day of surgery for robotic patients (\$12.24 vs \$24.45;  $P < .01$ ), and a 56% cost reduction for the rest of their length of stay (\$3.63 vs \$8.17;  $P < .01$ ).

## Conclusion:

- Endometrial cancer patients who have robotic surgery experience less initial postoperative pain and have fewer drug interventions to manage their pain.
- The cost associated to deliver that care represents a savings of greater than 50% when compared to a laparoscopic cohort.
- These factors demonstrate the value of robotic surgery by delivering higher quality care at a lower cost.

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