How to Effectively Reduce Costs Associated with Robotic Surgery: Is This Even Possible?

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Objective:
The purpose of this study is to determine if transparency of surgeon knowledge is provided to surgical teams of the actual costs associated with each case item by using visibility boards located near robotic operating rooms. These findings suggest that reducing operating room costs is feasible through teamwork and transparent interventions.

Methods:
This is a retrospective cohort study of all patients who had a robotic-assisted hysterectomy from 7/1/10 to 6/30/11. All surgeries were performed by board-certified gynecologic oncologists using the da Vinci S or Si surgical systems with 4 arms (including the camera arm). Studer Visibility Boards were installed in the robotic surgery rooms on 1/1/11 and their presence was emphasized to all robotic team members (Figure 1). The first six-month period (7/1/10-12/30/10) was identified as the pre-visibility board cohort (Pre-VB) while the latter six-month period (1/1/11-6/30/11) was identified as the post-visibility board cohort (Post-VB). Demographic data reviewed included patient’s age, BMI, uterine weight, and benign versus malignant diagnosis. The direct variable cost represents all costs incurred in the operating room that are controllable by the OR team. Data was analyzed using Pearson’s \( \chi^2 \) tests and Student’s t-tests in SPSS. This study was IRB-approved.

Results:
Two hundred eighty-eight patients met the inclusion criteria (140 Pre-VB and 148 Post-VB). There were no significant differences between the groups in age, uterine weight, BMI, and benign versus malignant diagnoses (Table 1). The Post-VB cohort had a significantly lower direct variable OR cost compared to the Pre-VB cohort ($2410.96 vs. $2635.39, P=.01). The lowest direct variable cost per robotic case at the conclusion of this study was $1878.00. The Post-VB cohort also experienced a shorter total OR time (229 min vs. 235 min, P=.55) and incision time (158 min vs. 166 min, P=.46) compared to their Pre-VB counterparts, even though there was no statistical significance (Table 2).

Conclusion:
The costs associated with robotic surgery may be reduced when knowledge is provided to surgical teams of the actual costs associated with each case item by using visibility boards located near robotic operating rooms. These findings suggest that reducing operating room costs is feasible through teamwork and transparent interventions.

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**Table 1. Patient Demographics**

<table>
<thead>
<tr>
<th></th>
<th>Pre-VB (n=140)</th>
<th>Post-VB (n=148)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE (years) Mean ± SD</td>
<td>55.2 ± 12.1</td>
<td>55.2 ± 13.4</td>
<td>0.927</td>
</tr>
<tr>
<td>BMI (kg/m²) Mean ± SD</td>
<td>32.9 ± 7.7</td>
<td>33.1 ± 9.6</td>
<td>0.908</td>
</tr>
<tr>
<td>UTERINE WEIGHT (g) Mean ± SD</td>
<td>170.1 ± 163.4</td>
<td>166.2 ± 129.2</td>
<td>0.518</td>
</tr>
<tr>
<td>BENIGN DIAGNOSIS n (%)</td>
<td>81</td>
<td>80</td>
<td>0.516</td>
</tr>
<tr>
<td>MALIGNANT DIAGNOSIS n (%)</td>
<td>59</td>
<td>68</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2. Outcome Measures**

<table>
<thead>
<tr>
<th></th>
<th>Pre-VB (n=140)</th>
<th>Post-VB (n=148)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIRECT VARIABLE OR COST</td>
<td>$2635.39 ± 727.80</td>
<td>$2410.96 ± 677.74</td>
<td>0.010</td>
</tr>
<tr>
<td>OVERTIME TIME (min) Mean ± SD</td>
<td>234.8 ± 65.3</td>
<td>220.7 ± 65.2</td>
<td>0.546</td>
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<tr>
<td>INCISION TIME (min) Mean ± SD</td>
<td>165.8 ± 62.7</td>
<td>158.4 ± 62.2</td>
<td>0.463</td>
</tr>
</tbody>
</table>

**Figure 1. Robotic Costs Per Case**

**Figure 2. Impact of Study Costs by Surgeon**