**Introduction**

- Enhanced recovery after surgery (ERAS) protocols have been shown to improve patient outcomes in adult populations, but there is very little data on the use of ERAS for pediatric patients.
- The purpose of this study was to compare outcomes in children undergoing colorectal surgery before and after implementation of a pediatric ERAS protocol.

**Methods**

- After IRB approval, we identified all patients who underwent colorectal surgery at Children’s Hospital of Atlanta at Egleston between January 2013 and October 2016. A pediatric ERAS protocol was implemented at the beginning of September of 2015. Surgeries performed prior to this date were designated as being in the pre-ERAS group.
- Procedure CPT codes were converted to work relative value units (wRVU) and used as a surrogate to account for average length of stay. Outcomes measured included length of stay (LOS), complication rates, and 30 day readmission rates.
- Complications were defined as postoperative anastomotic leaks, return to the operating room, post-operative bleeding requiring transfusion, and abscesses. All statistical analyses were performed using the R software package (version 2.15.1). Univariate analyses were performed using Student’s t test, Wilcoxon Rank Sum test, or Fisher exact test based on the distribution of the data. A multiple linear regression was also performed on the response variable, log LOS, to control for potential confounders.

**Results**

- There were 40 patients included in the ERAS group and 36 patients included in the Non-ERAS group. The groups had similar mean wRVU rates with the ERAS group mean wRVU of 28.9 and the non-ERAS group mean wRVU of 28.7 ($p = \text{NS}$).
- Complication rate was also similar between the two groups with 4 complications (10%) occurring in the ERAS group and 4 complications (11%) occurring in the pre-ERAS group ($p = \text{NS}$).
- Thirty day readmission rates were also similar with 4 readmissions (10%) in the ERAS group and 5 readmissions (14%) in the pre-ERAS group ($p = \text{NS}$).
- The ERAS group had a lower median length of stay (LOS) of 2 days, while the non-ERAS group had a median LOS of 4 days ($p = 0.007$, Figure 1). After controlling for wRVU and complications, there was still a statistically significant decrease in log-transformed LOS with ERAS implementation ($p = 0.005$, Table 1).
- With exponentiation, the ERAS protocol was associated with a decrease in LOS of 0.8 days in this analysis.

**Table 1**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Estimate</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERAS</td>
<td>-0.269</td>
<td>-0.500 to -0.038</td>
<td>0.026</td>
</tr>
<tr>
<td>wRVU</td>
<td>0.012</td>
<td>0.001 to 0.023</td>
<td>0.034</td>
</tr>
<tr>
<td>Complication</td>
<td>1.123</td>
<td>0.731 to 1.515</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

CI = confidence interval, wRVU = work relative value units

*This ANCOVA model was generated using the generalized linear model function (GLM) of the R statistical software package with wRVU modeled as a continuous variable and the remaining factors modeled as binary variables. The response variable, length of hospital stay, was natural log transformed. P-value < 0.05 was considered statistically significant.

**Discussion**

- The use of an enhanced recovery after surgery protocol was associated with a statistically significant decrease in length of stay for pediatric colorectal surgery patients without an increase in complication rate.
- ERAS protocols offer a safe and effective way to shorten hospital stay, thereby improving patient safety by decreasing the risk of hospital associated complications such as infection.
- Further research may also show the added benefit of decreasing hospital costs associated with pediatric colorectal surgery when using an ERAS protocol.