Introduction
Patients undergoing major spine surgery experience severe pain, require large amounts of opioids and have frequent respiratory adverse events in the postoperative period. Use of intraoperative methadone, a mu agonist with long half-life and stable plasma levels, may help reduce intraop and postop opioid requirements and thereby reduce opioid related adverse events. In adults undergoing cardiac surgery, a single dose of intraop methadone has been shown to reduce postop pain and opioid requirements. We previously demonstrated that methadone (0.1, 0.2, 0.3mg/kg) follows linear pharmacokinetics in adolescents. Our current study was designed to assess if a single dose of intraoperative methadone reduces postoperative opioid consumption and postoperative pain. Our secondary aim was to study the pharmacokinetics of the higher dose 0.4mg/kg of methadone.

Methods
• After IRB approval, 48 patients with idiopathic scoliosis, ASA status 1 and 2, ages 11-18 and scheduled for posterior spinal fusion were consented for the study.
• Patients were randomized (1:2) to receive either standard opioid treatment or a single dose of methadone 0.3 mg/kg (cohort 1) or 0.4 mg/kg (cohort 2) given intraoperatively. Anesthetic technique was not modified and was left to the discretion of anesthesia provider. Fentanyl was used for break through pain.
• Serial blood samples were drawn for pharmacokinetic and pharmacogenomic data.
• Pain assessments were prospectively conducted each post-operative hospital day up to six days or until discharge.
• For purpose of analysis, all opioids were converted to morphine equivalents.

Patient Demographics

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Total</th>
<th>Control</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Mean(SD))</td>
<td>14.3(1.8)</td>
<td>14.5(1.9)</td>
<td>14.2(1.7)</td>
</tr>
<tr>
<td>Range</td>
<td>11-18</td>
<td>11-18</td>
<td>12-18</td>
</tr>
<tr>
<td>Sex</td>
<td>Female 34 (71%)</td>
<td>10 (67%)</td>
<td>24 (73%)</td>
</tr>
<tr>
<td>Race</td>
<td>White 85%</td>
<td>80%</td>
<td>88%</td>
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| P-Value | 0.59 | 0.67 | 0.47 |

Use of Methadone in Pediatric Posterior Spinal Fusion: A Randomized, Controlled Trial
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Total Opioid Consumption in Morphine Equivalents

Total Perioperative Opioid Consumption

Daily Opioid Consumption in Morphine Equivalents

Pain Assessments

Results & Discussion
• Total 48 participants: 15 in control group, 33 in the methadone group
• During the entire hospital stay, patients in the methadone group (mean 2.61mg/kg ± 0.86) consumed significantly less (P=0.02) morphine equivalents than the control group (mean 3.43mg/kg ± 0.93). This difference was most observable in postop day 0 and postop1. The lack of difference in opioid consumption after postop1 could potentially be due to the fixed PO opioid protocol as per standard of care for all patients.
• Pain scores were lower in the methadone group on day of surgery. The difference however was not statistically significant. Further analysis will be performed to determine the role of pharmacokinetics, pharmacogenomics and psychosocial factors on postoperative pain.

• Conclusion: Preliminary data analysis demonstrates that a single dose of intraoperative methadone is associated with a significant decrease in overall opioid consumption and lower pain scores.

References