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Rates of Ondansetron Administration Prior to Spinal Anesthesia: Evaluating the Practice of Prophylactic Attenuation of Spinal-Induced Hypotension and Bradycardia

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Background

Hypotension and bradycardia are common complications of spinal anesthesia. Intraoperative hypotension and bradycardia may lead to complications that require additional treatment and increase cost. The literature identifies intervention strategies to attenuate spinal-induced hypotension (SIH) and bradycardia.1 Prophylactic administration of ondansetron, a serotonin 5-hydroxytryptamine receptor antagonist, prior to spinal anesthesia is associated with reduced SIH and bradycardia. 1,2,3,4

The objective of this scholarly project was to report the practice of ondansetron prophylaxis for SIH and bradycardia and the rate of rescue interventions in patients who received ondansetron prior to spinal anesthesia.

Methods

• Retrospective, multi-center observational evidence-based practice project conducted at Providence Sacred Heart Medical Center (PISHMC) and Providence Holy Family Hospital (PHFH)
• Approved by the PSHMC Clinical Innovation and Research Council, and deemed exempt by Providence Health Care Institutional Review Board
• Data was retrospectively extracted, de-identified, encrypted, and stored in a HIPAA-compliant REDCap database
• Eligibility inclusion criteria: obstetric and orthopedic surgery undergoing spinal anesthesia from January 2018 to December 2019, age 18-90 years old, ondansetron administered prior to spinal anesthesia, spinal anesthesia with bupivacaine 0.5% and bupivacaine 0.75%
• Exclusion criteria: general anesthesia with ET/ILMA, spinal anesthesia medications other than bupivacaine, other surgical services
• Univariate and bivariate analyses to report baseline group comparability and prophylactic ondansetron relationships
• Multivariable analysis to report independent risk factors
• Multivariable analysis to report descriptive time series

Results

This retrospective EBP project demonstrated a gap in practice with the administration of prophylactic ondansetron to attenuate SIH and bradycardia across service lines and facilities.

Rates of prophylactic ondansetron administration prior to spinal anesthesia were 42-73% among obstetric surgery, and 2-12% among orthopedic surgery.

This project is retrospective and observational in nature, which cannot account for confounding factors that may affect the results. Limitations of this project include the inability to differentiate the use of ondansetron for prophylactic SIH or post-operative nausea and vomiting. Other SIH and bradycardia prevention strategies may have also been performed but not described in this project (such as fluid pre-loading or co-loading, prophylactic low dose phenylephrine infusion, or prophylactic vasopressor prior to spinal anesthesia). This project suggests EBP improvements for the utilization of ondansetron to attenuate SIH and bradycardia.

Discussion


References


Table 1. Comparison of Baseline Demographics and Characteristics (N=3335)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obstetrics (n=1245)</th>
<th>Orthopedics (n=1199)</th>
<th>PHFH Obstetrics (n=200)</th>
<th>PHFH Ortho (n=578)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>M 0 0</td>
<td>F 533 46</td>
<td>0 0</td>
<td>259 48</td>
</tr>
<tr>
<td>Age</td>
<td>0 0 12 1</td>
<td>1 2 24 2</td>
<td>1 6 2 1</td>
<td>3 2 1 5 1</td>
</tr>
<tr>
<td>ASA*</td>
<td>I 1 1 1</td>
<td>II 863 866</td>
<td>III 331 289</td>
<td>IV 4 0 2 2</td>
</tr>
<tr>
<td>BMI</td>
<td>34 8 29 5</td>
<td>35 7 31 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case Duration (min)</td>
<td>90 81-101</td>
<td>129 116-147</td>
<td>80 72-90</td>
<td>147 111-172</td>
</tr>
</tbody>
</table>

Figure 1. Flow Diagram of Patient Selection

Figure 2. Descriptive Time Series of Ondansetron Administration for SIH and Bradycardia Prophylaxis

Table 2. Proportion of Patients Treated with Rescue Medications after Ondansetron Prophylaxis

<table>
<thead>
<tr>
<th>Rescue Treatment</th>
<th>Ondansetron Prophylaxis</th>
<th>n</th>
<th>%</th>
<th>RR</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenylephrine (100 mcg IVB)</td>
<td>Obstetric</td>
<td>337</td>
<td>48%</td>
<td>1.06</td>
<td>0.95-1.19</td>
<td>0.27</td>
</tr>
<tr>
<td>Orthopedic</td>
<td>No</td>
<td>229</td>
<td>36%</td>
<td>0.94</td>
<td>0.84-1.05</td>
<td>0.28</td>
</tr>
<tr>
<td>Ephedrine (10 mg IVB)</td>
<td>Obstetric</td>
<td>109</td>
<td>14%</td>
<td>1.01</td>
<td>0.84-1.42</td>
<td>0.49</td>
</tr>
<tr>
<td>Orthopedic</td>
<td>No</td>
<td>91</td>
<td>14%</td>
<td>0.90</td>
<td>0.73-1.08</td>
<td>0.23</td>
</tr>
<tr>
<td>Glycopyrrolate (0.1 mg IVB)</td>
<td>Obstetric</td>
<td>113</td>
<td>14%</td>
<td>0.92</td>
<td>0.82-1.12</td>
<td>0.55</td>
</tr>
<tr>
<td>Orthopedic</td>
<td>No</td>
<td>103</td>
<td>16%</td>
<td>0.85</td>
<td>0.81-0.93</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Note: *ASA=American Society of Anesthesiologist Physical Status Classification System; SD=standard deviation; IQR=interquartile range (25 *ASA=American Society of Anesthesiologist Physical Status Classification System; SD=standard deviation; IQR=interquartile range (25