Clinical Comparisons of Split Septum Positive and Negative Mechanical Valve Intravenous Connectors to an Intraluminal Protection Connector on Infection Rates

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Background
CH-BSI elimination is a national priority. IV Connectors are the gatekeepers of the intravascular fluid pathway. It has been hypothesized that IV connector design features may affect CH-BSI. One large multicenter study found that both positive and negative IV connectors may impact CH-BSI. Two studies that involved smaller populations of patients have also been published. This study examined CH-BSI rates among patients with IV connectors and found that CH-BSI rates were lower in patients with positive pressure mechanical valve connectors but higher in patients with negative pressure mechanical valve connectors. This study also found that CH-BSI rates were lower in patients with a negative pressure mechanical valve connector than in patients with a positive pressure mechanical valve connector. These findings were consistent with the results of the previous studies and supported the hypothesis that CH-BSI rates are lower in patients with positive pressure mechanical valve connectors and higher in patients with negative pressure mechanical valve connectors. The results of this study also suggested that CH-BSI rates are lower in patients with a negative pressure mechanical valve connector than in patients with a positive pressure mechanical valve connector.

Theoretical Model
The model used in the study was developed by health care technology experts. The model was based on the premise that CH-BSI rates are influenced by the design of the intravascular fluid pathway. The model was also based on the assumption that CH-BSI rates are influenced by the design of the intravascular fluid pathway. The model was used to predict CH-BSI rates in patients with different types of IV connectors.

Purpose
Using the Healthcare and Technology Synergy (HATS) Model, the purpose of this study was to compare the infection rates of CH-BSI in patients with positive and negative pressure mechanical valve connectors to the infection rates of CH-BSI in patients with a negative pressure mechanical valve connector. The study also aimed to determine whether the differences in infection rates were statistically significant.

Comparison
Split Septum (17,730 catheter days - 2 states), Positive (50,067 catheter days - 4 states), Negative (25,564 catheter days - 3 states) for a total of 53,361 catheter days to an IPD connector (total of 68,752 catheter days) for infection rates per 1000 catheter days.

Results
There were no statistically significant differences between total number of catheter days before and after adoption of the IPD.

Table: Mean Infection Rates by Setting per 1000 catheter days.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Infection Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>3.83</td>
</tr>
<tr>
<td>Negative</td>
<td>2.93</td>
</tr>
</tbody>
</table>

Pre Post Comparison: Bundle Group vs. Connector Only [CO] Group

Nursing Implications
- Supports HATS model
- Swabbing and flushing protocols should be individualized based on product
- Achieving zero CH-BSI rates can not depend entirely on nursing practice
- Further research needs to be done on products impact on nursing practice

Disclosures
- N. Photon Limited Partnership, Houston, TX
- R. Swanson, Boston Scientific
- N. Appleby, BD, Inc.
- N. Novascope Technologies, Inc.

Methods
- Interview (telephone): 8 states (CA, CO, FL, NV, NY, PA, TN, TX), Range beds = 34-500
- 8 settings (ICU, MICU, SICU, Long-term acute care, in patient oncology and hospital wide)
- Total of 10 units (MICU, ICU, SICU/21AC, 100, 1 loop wide)

Conclusions
Catheter days were similar pre and post IPD adoption. There was a statistically significant higher BSI rate when negative (p = 0.0015) or positive (p = 0.0041) pressure mechanical valve NCIs were used. Overall, a decrease in infections per 1000 catheter days was found after changing from any ftr connector to the IPD connector (p = 0.0008). In this study clinically there were infections reported prior to changes 228 reported after changes 50 Change 178 $35,000/ infection COST SAVINGS Over $6.2 million

Limitations
- Not all marketed connectors were studied
- Different pressure access device types were not separated out
- Catheter day totals do not reflect monthly fluctuations
- Data sets were not all matched.