INTRODUCTION

- External ventricular drains (EVD) are used to monitor intracranial pressure and cerebrospinal fluid (CSF) drainage.
- About 10% (range 0-22%) develop infections.
- In 2014, at a 408 bed community-teaching hospital and level I trauma center, 6 patients developed an EVD infection (9.9 infections/1000 EVD days), prompting an investigation.

METHODS

- Problems identified:
  - 2 types of EVD catheters
  - 5 types of drainage systems
  - No standardized protocols for insertion and maintenance.
- Multidisciplinary team formed to create comprehensive insertion and maintenance EVD bundle.
- Nursing monitored adherence with bundle.
- Outcomes statistically analyzed.

EVD BUNDLE

- Insertion
  - Appropriate antibiotic prophylaxis administered < 1 hour prior to insertion
  - Inserter performs hand hygiene and wears mask, hat, sterile gown and gloves
  - Others present wear hat and mask
  - Tunneled catheters preferred over bolt type
  - Insertion site covered with an impervious dressing
- Maintenance and care
  - Catheter and drainage system maintained as closed sterile system
  - EVD need assessed daily
  - Drainage system checked hourly for patency and leakage
  - Insertion site examined daily for leakage
  - Dressing changed at least weekly or when soiled
- CSF specimens
  - CSF obtained only when necessary, not routinely
  - Collector performs hand hygiene and dons sterile gloves and mask
  - Specimen collected from medial port
  - Port disinfected prior to access
  - CSF obtained using needleless syringe

RESULTS

<table>
<thead>
<tr>
<th>EVD DAYS</th>
<th>Tunneled Days</th>
<th>Bolt Days</th>
<th>Unknown Type Days</th>
<th>Total Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2014-12/2014</td>
<td>316</td>
<td>257</td>
<td>6</td>
<td>579</td>
</tr>
<tr>
<td>1/2015-6/2016</td>
<td>475</td>
<td>28</td>
<td>23</td>
<td>526</td>
</tr>
<tr>
<td>P value (Chi Square test)</td>
<td>&lt;0.0001</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NO. OF EVDS BY TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
</tr>
<tr>
<td>1/2014-12/2014</td>
</tr>
<tr>
<td>1/2015-6/2016</td>
</tr>
<tr>
<td>P value (Chi Square test)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EVD INFECTION RATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
</tr>
<tr>
<td>1/2014-12/2014</td>
</tr>
<tr>
<td>1/2015-6/2016</td>
</tr>
<tr>
<td>P value (Fisher's Exact test)</td>
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</tbody>
</table>

DISCUSSION AND CONCLUSIONS

Creation of a bundle by a multidisciplinary team lead to statistically significant:
- Decrease in EVD days
- Increase in use of tunneled catheters
- Decrease in EVD associated infections

REFERENCES


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