Ultrasound Guided “Easy IJ” vs Traditional Central Venous Access

Larissa Morsky, MD2; Daniel Quesada, MD1; Phillip Aguiniga-Navarrete3; Laura C. Castro3; Veronica Sanchez3; Rachel O’Donnell, MD3; Kieron Barkatakai, DO1

Affiliations
1 Faculty, Emergency Department, Kern Medical 2 PGY II, Emergency Department, Kern Medical 3 Research Assistant, Emergency Medicine Research Assistant Program, Kern Medical

Background

- Difficult peripheral intravenous access causes significant delay in necessary evaluation and treatment of patients in the Emergency Department (ED).
- When traditional alternative approaches fail (internal jugular vein or ultrasound guided peripheral vein catheterization), Central Venous Line Placement (CVLP) has been the standard procedure to obtain venous access. CVLP can be costly, time consuming, and uncomfortable for the patient given the extended measures taken to prevent infection.

Objective

- Setting
  - We expect peripheral IJUG lines to be quicker, cost efficient, less painful and less traumatic for the patient given the extended measures taken to prevent infection.
  - A few studies have shown that an “easy IJ” catheter (or Ultrasound Guided Internal Jugular [IJUG] catheter) can be safe, timely placed and accessed for a short duration of time without an increased risk of infection or failure.
  - The IJUG catheter seeks to provide an alternative method to gain intravenous access when a traditional peripheral IV is not an option. There is little evidence in the current literature on this technique as it is limited by small sample sizes and has only been evaluated when performed by experienced emergency medicine physicians.
  - There is little evidence for placement guidance regarding failure rates.
  - We expect peripheral IJUG to be quicker, cost efficient, less painful and have equal to lower complication rates compared to central venous line placement (CVLP).
- We expect to see no difference in failure rates when comparing measures between pharmacy placement and facility pharmacy.

Methods

- **Prospective, non-blinded, interventional cohort of adults**
- **Setting**: All departments where peripheral Internal jugular and Central Lines are monitored (IR, ICU, OR, Floor…).

Results

- **Significant difference in mean procedure time between the IJUG and CVLP: 10.55 minutes and 26.25 minutes (P<0.05; Figure 1, Table 1)**
- **No significant difference in mean pain scores 3.3 and 4.4, respectively (P>0.05; Figure 2, Table 2)**

Analysis of Variance (ANOVA)

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor</td>
<td>1142.299</td>
<td>1</td>
<td>1142.299</td>
<td>32.139</td>
<td>.000</td>
</tr>
<tr>
<td>Error</td>
<td>604.277</td>
<td>17</td>
<td>35.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1746.576</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean Procedure Time

![Mean Procedure Time Graph](image)

![Table 1](image)

Mean Pain Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor</td>
<td>3.025</td>
<td>1</td>
<td>3.025</td>
<td>218.653</td>
<td>.653</td>
</tr>
<tr>
<td>Error</td>
<td>111.000</td>
<td>9</td>
<td></td>
<td>13.815</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>114.025</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Table 2](image)

![Figure 1](image)

![Figure 2](image)

Discussion

- **Evaluated the success and complication rates associated with IJUG catheterization in a cohort of patients with failed attempts to obtain peripheral IV access.**
- The purpose was to be the first study to date evaluating this technique and, to our knowledge, the only one which accounts for training level and compares outcome measures to a control group (CVLP).
- Significant difference in mean procedure time between IJUG and CVLP (<59%).
- No significant difference in mean pain scores, but expect to see a difference in the future.
- Initial success rates of IJ line placement were non-inferior when compared to central lines with no difference between residents in various levels of training.
- We have not yet encountered any difference in complication rates involving cases of arterial puncture, pneumothorax, line failure or insertion site infection in either group.

Conclusions

- **Our study self-support and build on what has been evident in the literature thus far.**
  - The IJUG technique is an efficient and rapid alternative for establishing effective IV access in patients who lack suitable peripheral venous access.
- This procedure can be safely and effectively performed by both experienced and resident Emergency Medicine physicians.

References