Assessing Confusion: An Investigation Into Healthcare Provider Perception of Ammonia Testing
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INTRODUCTION

• Hepatic encephalopathy (HE) is a common complication in decompensated cirrhosis
• Presentation of HE is variable and may be a source of clinical uncertainty
• Ammonia levels have historically been used to aid in HE diagnosis despite low positive and negative predictive values

• Primary Objective: Determine the perception of ammonia testing in our institution

• Secondary Objective: Delineate specific factors or scenarios that make practitioners more or less likely to check ammonia levels

METHODS

• 17-question anonymous RedCap© survey distributed to attending physicians, residents, and advanced practice providers at UK in the departments of:
  • Hospital medicine
  • Internal Medicine (IM)
  • Gastroenterology
  • Emergency medicine (EM)
• 7 multiple choice questions assessed propensity to check ammonia based on clinical presentations
• Response options ranged from “never” to “100% of the time”
• 8 clinical vignettes of increasing complexity with question of checking an ammonia level
• Responses were either “yes” or “no”

RESULTS & DISCUSSION

• 140 total survey responses
• Most responded “never” or “<25% of the time” to checking an ammonia level when diagnosis was clear
• Propensity to check an ammonia level increased when the diagnosis was unclear and the physical exam was unreliable (See Table 1)

<table>
<thead>
<tr>
<th>Variable Evaluated</th>
<th>Check Ammonia?</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Scenario: Confused cirrhotic w/ poor sleep but no confusion (Q. 8 x y 9)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>No hx of HE</td>
<td>14</td>
<td>116</td>
</tr>
<tr>
<td>Positive Hx of HE</td>
<td>33</td>
<td>99</td>
</tr>
<tr>
<td>Clinical Scenario: Confused cirrhotic w/ NEGATIVE HE tx (Q. 10 x 11)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>NO asterals</td>
<td>69</td>
<td>59</td>
</tr>
<tr>
<td>Asterias Present</td>
<td>55</td>
<td>73</td>
</tr>
<tr>
<td>Clinical Scenario: Confused cirrhotic w/ POSITIVE HE tx (Q. 12 x 13)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>NO Asterias</td>
<td>89</td>
<td>76</td>
</tr>
<tr>
<td>Positive Asterias</td>
<td>43</td>
<td>82</td>
</tr>
<tr>
<td>Clinical Scenario: Confused, unknown med tx apart from hx of alcoholism. Negative ETOH (Q. 3 x 35)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Asterias present/absence of other liver disease signs</td>
<td>78</td>
<td>43</td>
</tr>
<tr>
<td>Asterias present/absences present</td>
<td>59</td>
<td>62</td>
</tr>
</tbody>
</table>

Table 1: Propensity to check ammonia level based on clinical presentation.

• In cirrhotic patients presenting to the hospital with and without confusion, comparing EM vs. IM with a Kruskal-Wallis test:
  • EM significantly more likely to order ammonia testing in all scenarios
  • EM significantly more likely to agree that ammonia testing would impact their patient management (See Figure 1)

CONCLUSION

• This single institution survey shows that a significant portion of providers across specialties consider including an ammonia level in their work-up for HE despite ample evidence supporting the poor utility of ammonia testing
• EM appears significantly more likely to order ammonia levels compared to IM
• Results of this survey suggest that widespread educational campaigns centering on the poor utility of ammonia testing for the diagnosis of HE is necessary

REFERENCES

4. Study data were collected and managed using REDCap electronic data capture tools hosted at University of Kentucky. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.