Background and Rationale

Literature suggests 10% of all clinical malpractice was due to the ignorance of anatomical variations (Sañudo et al, 2003). Practicing clinicians believe learning about variations earlier in medical education would be beneficial for medical students (Raikos & Smith, 2015) such as seen in Fig. 1.

Methods

Part 1: National Survey
- 24% response rate from medical course faculty nationally
- Survey results indicate diversity in integration of variations in medical education, but faculty hold positive views on the value of variations in curricula (Fig. 2).
- Out of 8 categories, respondents ranked relationship variations as most important to include in medical curriculum (Fig. 3).

Part 2: Module Development
- In the module created from the national survey results, students learn about 3 different relationship variations in the brachial plexus (Fig. 4) and also have opportunities to test themselves throughout the module (Fig. 5).

Part 3: Module Evaluation
- Students took a pre and post-test that consisted of a group of perception questions which generally showed a trend for higher mean ratings among module users (Fig. 6).
- Students also took a set of knowledge questions, and overall module users had a higher percent correct among questions compared to non-module users (Fig. 7).

Part 3: Module Evaluation
- Students took a pre and post-test that consisted of a group of perception questions which generally showed a trend for higher mean ratings among module users (Fig. 6).
- Students also took a set of knowledge questions, and overall module users had a higher percent correct among questions compared to non-module users (Fig. 7).

Results: National Survey

Part 1: National Survey
- Importance of Specific Relationship Variations (only top 3 shown)

<table>
<thead>
<tr>
<th>Variations (Likert scale: importance 1-5)</th>
<th>Average (Likert scale: importance 1-5)</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationships in femoral triangle</td>
<td>4.63</td>
<td>0.63</td>
</tr>
<tr>
<td>Relationships in the brachial plexus</td>
<td>4.39</td>
<td>0.64</td>
</tr>
<tr>
<td>Scatic nerve relationship to psoas muscle</td>
<td>4.44</td>
<td>0.75</td>
</tr>
</tbody>
</table>

Fig. 2 Faculty Perceptions of Variations in Medical Curriculum across the USA

Fig. 3 Variations provide valuable in UME clinical relevance to gross anatomy

Results: Module

Part 3: Module Evaluation
- Students took a pre and post-test that consisted of a group of perception questions which generally showed a trend for higher mean ratings among module users (Fig. 6).
- Students also took a set of knowledge questions, and overall module users had a higher percent correct among questions compared to non-module users (Fig. 7).

Fig. 4 Module includes 3 different relationship variation types in the brachial plexus:
- Scalene muscles/subclavian artery, connecting lig., & within the cords.
- In the module, students test their knowledge through 4 interactive quizes across the variations.

Fig. 5 In the module, students test their knowledge through 4 interactive quizzes across the variations.

Fig. 6 Mean faculty importance rating for the relationship variation category = 4.20, SD = 0.36. Faculty rated the importance of the relationship variation category significantly more important than organs, nerves, and arterial variations (p<0.01, Mann-Whitney U pairwise with Bonferroni corrections).

Fig. 7 Comparing 3 Themes Among Pre and Post-Test Perception Questions

Discussion

- As dissection time continues to decrease in many medical schools across the country (Drake et al, 2009) anatomy course directors are likely focusing on clinically relevant variations, especially those in anatomical relationships.

Supplemental tools such as the interactive module may continue to become more beneficial for students to study outside of lab/lecture.

- Student attitudes in Part 3 module evaluation revealed a trend toward higher mean ratings for module users across the 3 themes, although the differences were generally not statistically significant.

- The percentage of correct responses in the 20 knowledge-based questions mostly improved from pre to post-test, and in select questions students who used the module had higher percent correct responses in the post-test.

Conclusions

- This study shows that both anatomy faculty and students value the inclusion of variations in an anatomy curriculum.

- Both faculty and students value variations in gross anatomy, and it is feasible and effective to teach targeted variations through an interactive module.

References and Acknowledgements

References


Acknowledgements

Thank you class of 2012 M&A AA students for assisting with data collection, faculty survey participants, Dr. Strother, Dr. Cary, Dr. Wagner, Jennifer Thurston for their advice, and the NKH class of 2014 for their support.