Abstract

Objectives: Implement a novel epistaxis training module with hands-on model and observe emergency medicine residents’ treatment outcomes for epistaxis patients.

Methods: An epistaxis training module including lectures and hands-on practical sessions was performed with emergency medicine residents. Pre and Post Session Questionnaires were administered. Patients presenting to the emergency department who were treated by residents attending the session in a 6 month window prior to and post training session were evaluated.

Results: An epistaxis model provided scenarios to control active anterior and posterior epistaxis using varied basic and advanced techniques. 15 residents attended the session with an average level of comfort increasing from 1.8 to 3.9 on a 5-point scale. 23 patients were treated for epistaxis during the 6 months surrounding the training session. No effects were observed in change in treatment method, recidivism, or otolaryngology consultation.

Conclusions: Practical models for epistaxis can be developed which simulate bleeds requiring different methods of control. This can increase comfort of managing epistaxis amongst emergency medicine residents. However, the low rates of patient treatment by these residents should be further examined in training programs.

Methods and Materials

Epistaxis model was created using an Acclarent (Acclarent, Inc) balloon sinuplasty model after company approval. The model provided high fidelity intranasal anatomy including septum, inferior and middle turbinates, nasopharynx, and external anatomy including midface, nasal dorsum, and alar (Figure 1). 18ga IV catheter tubing was secured into the model at 3 sites: posterior lateral, anterior floor, and anterior septum. Using 3 way stopcocks, the site of bleeding and rate of flow could be controlled by an external assistant (Figure 2). A pressure bag filled with red dye tinged water enhanced fidelity.

All participants were required to perform tasks including thorough nasal evaluation, and control of each different site of active epistaxis. An otolaryngology resident acted as proctor to ensure adequate completion of each task. The anterior epistaxis could be controlled with petrolatum jelly on a cotton tip applicator to simulate silver nitrate. Additional methods for anterior and posterior control included Webril to simulate Surgicel fibrillar (Ethicon US); a RapidRhino (Smith&Nephew, LLC); and formal posterior packing with 10Fr Foley catheter balloon and 1/2x72” petrolatum gauze (Figure 3). An instructional video demonstrating methods of control can be viewed at http://youtu.be/BQZiB7ny3E

All emergency department residents who participated in the training completed a questionnaire regarding experience, confidence levels, and level of comfort post training6. IRB approval was obtained for a review of all emergency department patients presenting with a diagnosis of epistaxis and exclusively treated by ED residents who attended and completed the training session. Patients presenting in a 6 month window, 3 months before and 3 months after the training, were evaluated. Outcomes including ED recidivism, method of control, and if otolaryngology consultation was obtained was recorded.

<table>
<thead>
<tr>
<th># of Patients</th>
<th>Pre-Session</th>
<th>Post-Session</th>
</tr>
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<tbody>
<tr>
<td>Cautery Performed</td>
<td>0/6 (0%)</td>
<td>4/17 (24%)</td>
</tr>
<tr>
<td>Absorbable Packing</td>
<td>2/6 (33%)</td>
<td>7/17 (41%)</td>
</tr>
<tr>
<td>Non-Absorbable Packing</td>
<td>2/6 (33%)</td>
<td>2/17 (12%)</td>
</tr>
<tr>
<td>Otolaryngology Consult</td>
<td>1/6 (17%)</td>
<td>3/17 (18%)</td>
</tr>
<tr>
<td>1 week ED recidivism</td>
<td>1/6 (17%)</td>
<td>1/17 (6%)</td>
</tr>
</tbody>
</table>

Table 1. Emergency Department Outcomes.

Results

15 residents completed the training session. Pre-training average comfort level at tasks including headlight/speculum assisted nasal evaluation, silver nitrate application, and anterior/posterior packing was 1.8 (scale 1-5). Immediately post training session, comfort level increased to 3.9.

23 patients were treated in the emergency department by the 15 residents in a 6 month time period, 6 pre-session and 17 post-session. Treatment outcomes of these patients can be seen in Table 1. No appreciable changes could be discerned between the treatment groups.

Conclusions

Simulation remains an important tool for training procedural techniques to residents in training. The development of high-fidelity models, including for epistaxis, can improve residents’ comfort level and abilities to handle varied clinical scenarios. The techniques described can help other Otolaryngology and Emergency Department residency programs to design similar functioning epistaxis simulators.

No differences were observed in management approach of epistaxis pre and post training. However, the overall number of patients treated by this cohort was exceptionally small. Holding the training session in the late fall when epistaxis is more prevalent, as opposed to August when this training was conducted, may allow quicker reinforcement of learned techniques and higher patient numbers for evaluation. However, during this same time period 164 epistaxis patients were treated by ED attendings or nurse practitioners. This raises the concern if residency programs are providing adequate exposure to epistaxis patients for the trainees to gain sufficient experience.

References


Contact

David W. Timme, MD
Southern Illinois University
Email: dtimme@siu.edu
Phone: 217-545-4777