EVMS SCHOOL OF HEALTH PROFESSIONS | Medical and Health Professions Education Master's Program

Use of Just-In-Time Training to Enhance Lumbar Puncture Confidence and Success in the Pediatric Emergency Department

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Introduction

Balancing resident education with provision of patient care services in a busy tertiary care children's hospital is a challenge faced by residency program administrators across the United States (Kesselheim, 2017). An additional challenge is that procedural opportunities in medical school are declining, and medical students have poor self-assessed proficiency and low comfort levels in most procedures (Promes, 2009). This leads to most pediatric interns arriving for residency training having had little or no experience with many procedures, in particular with lumbar punctures (LPs) (Auerbach, 2013).

As the Accreditation Council on Graduate Medical Education (ACGME) requires that pediatric residents demonstrate competency in thirteen core procedures prior to graduation, programs must determine how to provide sufficient procedural training and opportunities to ensure residents meet this requirement. Just-in-time (JIT) training has been utilized in other emergency department settings and has been shown to improve trainee confidence in their ability to perform lumbar punctures (Kessler, 2015).

Objectives

- **To create a JIT lumbar puncture curriculum in the pediatric emergency department and trauma center (EDTC)**
- **To enhance procedural training opportunities for residents**
- **To improve resident procedural confidence, specifically in lumbar punctures**
- **To improve first-pass success in infant lumbar punctures in the EDTC**

Methods

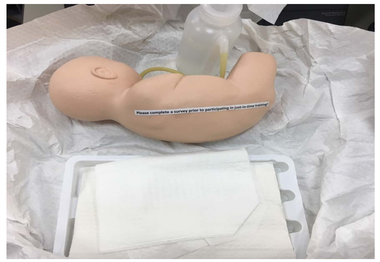
After institutional review board (IRB) determination that this project was not research, the lumbar puncture JIT kit was introduced into the clinician work space in the EDTC. The lumbar puncture kit contains (Figures 1 and 2):

- Laerdal Baby Stap mannequin (Laerdal, n.d.)
- Institutional lumbar puncture tray
- Several additional lumbar puncture needles.

All materials were introduced to fellows and faculty at a staff meeting shortly after becoming available for use in the EDTC to help familiarize staff with the goals of the program and opportunities to enhance faculty members' clinical teaching. Informal education was given to attending and fellow providers during EDTC shifts when questions arose about JIT training. Residents were encouraged to use the materials the next time they prepared to perform a lumbar puncture.

Paired pre-participation and post-procedural surveys were conducted for resident participants (Figure 3). Surveys were then placed in a folder in the JIT kit and were collected via a convenience sample.

Data were analyzed with descriptive statistics.



Figures 1 and 2. Contents of lumbar puncture JIT kit

How useful were the online resources prior to participating in a simulated lumbar puncture (LP)?

1	2	3	4	5
Not useful at all	Not very useful	Neutral	Somewhat useful	Very useful

How useful was the just-in-time simulation prior to performing a LP (i.e., performing the LP on the mannequin)?

1	2	3	4	5
Not useful at all	Not very useful	Neutral	Somewhat useful	Very useful

How confident were you in your abilities at the time the procedure was performed?

1	2	3	4	5
Not at all confident	Not very confident	Neutral	Somewhat confident	Very confident

Did the supervising physician need to correct your technique while performing the lumbar puncture on the live patient?

o Yes
o No

How many total attempts were required by you and the supervising physician (if necessary) to obtain CSF on the patient?

o 1
o 2
o 3
o 4
o 5
o N/A (fluid not obtained)

Please include any suggestions to improve the just-in-time training program:

Figure 3. JIT Participant Questionnaire

Results

- Seven surveys were completed
  - Anecdotal reports suggested that the JIT kits were used more frequently, but that surveys were not being completed regularly
- All participants had previously completed a LP on at least one patient
  - 4/7 reported 1-2 prior LPs
  - 3/7 reported 3-5 prior LPs
- Resident pre-procedure confidence ranged from 2 to 4 out of 5
- Six of the participants successfully obtained CSF
  - 3/6 obtained CSF on the first attempt (42.9% first-pass success rate)
- All residents reported an increase in confidence with JIT training
  - Average change in confidence from pre- to post-procedure = +1 on a 5 point Likert scale (range = -1 to +2)

Discussion

Implementation of a JIT program for lumbar punctures is feasible in a pediatric emergency department and trauma center. Residents at our institution who take part in JIT training self-report an increase in confidence with JIT training. While survey completion rate has been low to this point, we feel continued offering of JIT training in the emergency department is an important teaching tool. We hope to expand JIT training to new advanced practice providers and students to increase the impact of the training in our clinical environment.

References/Acknowledgements

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