

Introduction: Competence-based assessments are integral to medical education. Checklists and global rating scales assess the procedural skills of trainees. Both have good inter-rater reliability and assess observable behaviors. While checklists capture stepwise actions, global rating scales capture a holistic assessment which may better reflect expertise and can have better reliability and validity (Regehr 1998). Moreover, conventional checklists may fail to detect procedural incompetence even when high cut-off scores are used. Error-focused checklists focusing on procedural errors rather than the completion of steps have been shown to be more sensitive to incompetence than conventional checklists in a study of lumbar puncture (Ma 2015). The aim of this study was to compare the reliability and accuracy of an error-focused checklist with that of a conventional checklist in assessing procedural incompetence during lumbar epidural placement.

Methods: Three stages: (1) creation of a conventional checklist and a novel error-focused checklist and adapting a global rating scale to supervision anchors; (2) video recording anesthesia providers placing an epidural in a simulator model; and (3) rating the videos using both checklists and a global rating scale (1-5 scale). The conventional checklist was refined by 14 experts and during pilot testing. An error-focused checklist was created by three study team members while reviewing videos of trainees and recording errors until saturation was reached. Each video was rated independently by three board certified anesthesiologists with subspecialty expertise in obstetric anesthesia using one checklist, then rated again using the other checklist. The global rating was completed after each checklist. When disagreement between raters occurred, independent reassessment and discussion allowed for consensus.

Results: There were 58 participants (52 residents, 3 fellows, 3 faculty) who created 83 video recordings. The internal consistency (Cronbach's alpha) of the error-focused checklist was 0.31, while that of the conventional checklist was 0.60. By global rating scale, 30 (36%) videos were considered "competent". Global rating scale scores did not differ whether preceded by the conventional or error-focused checklist ( $3.87 \pm 1.15$  vs.  $3.93 \pm 1.10$ ). The accuracy of the conventional checklist in identifying competence was acceptable (AUC 0.76). Accuracy of the error-focused checklist in identifying incompetence was excellent (AUC 0.82).

Discussion: The error-focused checklist outperformed the conventional checklist in diagnosing incompetence in epidural placement. The global rating assessment was not affected by the type of checklist immediately preceding it. Educators wanting to identify procedural incompetence in epidural placement should consider using an error-focused checklist.

References:

Ma IW, et al. (2015) Medical Education 49(10): 1004-1015.

Regehr G, et al. (1998) Academic Medicine 73(9): 993-7.