A Prospective Observational Study Of Clinical Outcomes Associated With Proficiency-based Progression Training In Epidural Insertion For Patients In Labour

Hassan Mohamed, Niamh McAuliffe, Alejandra Ceballos, Ray O'Connor, Karthik Srinivasan, George Shorten

Department of Anaesthesia, Cork University Hospital, University College of Cork

Efforts to move from time-based to outcome-based training have led to development of novel training methodologies including Proficiency-Based Progression (PBP). Recently, our group has demonstrated that PBP training based on pre-defined metrics improves, not just physician performance, but meaningful patient outcome (53% decrease in failure incidence of epidurals placed by anaesthetic trainees) (1).

Objectives

The principal objective of this study is to examine for association i. quality of performance (in a simulated setting) of epidural insertion by novices following PBP training and ii. subsequent success in achieving epidural analgesia for labouring parturients.

Methods

With institutional ethical approval, all trainees in anaesthesiology (approximately 12) scheduled to train in obstetric anaesthesia at Cork University Maternity Hospital during 2019-2020 will be invited to participate.

Following baseline testing (knowledge, visuospatial ability and handedness), trainees will undertake PBP training with one-to-one supervision of a consultant anaesthetist trained in PBP. Detailed descriptions of pre-defined metrics/errors will be provided (Fig 1).

c)	**Subsequent attempts**	
29	**Does not wait for local anesthetic to work**	Error
30	**Does not prep again if drape is removed**	
31	**Undertakes an attempt in an unprepared and unsterilized interspace**	
32	**On seeing blood in epidural needle, the anaesthetist proceeds with the same needle without flushing with saline or changing the needle**	
33	**Injects more than 0.5 ml of air**	
34	**Returns syringe to any place other than sterile field**	
IX:	**Catheter insertion**	
35	**Threads catheter during contraction**	Error
36	**Inserts catheter with caudal angulation or direction**	
37	**Does not stabilize needle while passing catheter**	
38	**Pulls catheter back through needle**	
39	**Advances needle over catheter at any point**	
40	**Rotates epidural needle after catheter insertion**	
41	**Inserts epidural catheter without mentioning paresthesia to the patient**	
42	**Does not place epidural needle back in sterile "TRAY"**	
43	**Failure to aspirate catheter "gently" with 2 ml syringe prior to fixing**	
44	**Continues to administer local anaesthetic with blood in the catheter**	

Fig. 1: Sample of labour epidural insertion metrics

Each will then practice each metric in a simulated setting with metrics-based feedback in real time. Trainees will proceed to the clinical phase when they have attained the pre-defined proficiency benchmark (1). All subsequent attempts at labour epidural catheter placement performed by participating trainees will be documented, including success, defined as satisfactory analgesia achieved within 60 minutes of placement.

Overall incidence of success and other performance parameters will be calculated and compared with historical reports (including at CUMH).

Results

This study is still recruiting, we successfully trained five novices who performed seventy-four labour epidural catheter placement. Trainee characteristics were comparable. The proportion of epidural failure was 14.9% (11/74), the proportion of senior takeover was 8% (6/74), the incidence of complications was 6% (5/74), difficulty to insert epidural due to patient factors was 18% (14/74), patient satisfaction with the epidural performance and overall hospital experience satisfaction on a scale (0-10) are 8.8±1.6 and 9.5±0.8 respectively.

Table (1): Labour analgesia variables

	N= 74
Epidural Failure, n (%)	11 (14.9%)
Complications, n (%)	5 (6%)
Difficulty, n (%)	14 (18%)
Proportion of senior takeover (%)	6 (8%)
Patient satisfaction with epidural performance Mean±SD	8.8±1.6
Overall hospital satisfaction Mean±SD	9.5±0.8

(1) K. KS et al. Proficiency-based progression training: An end to end' model for decreasing error applied to achievement of effective epidural analgesia during labour: A randomised control study. BMJ Open. 2018;8(10):e020099