[NM-126] A new device for safe inflation of the cuff in cuffed endotracheal tubes - An invitro validation

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INTRODUCTION:
The major concern with the use of cuffed endotracheal tubes (cETTs) in the pediatric population is the potential for airway complications related to an underinflated or overinflated cuff. It has been proposed that majority of these complications can be prevented by careful monitoring of the intracuff pressure (CP) and maintaining it within a specific safe range. A simple, syringe-like device (Tru-Cuff, AES Inc, Black Diamond, WA) has been recently introduced to give a measure of the CP range. We conducted an in vitro study to evaluate the accuracy of this device to measure the range of CP.

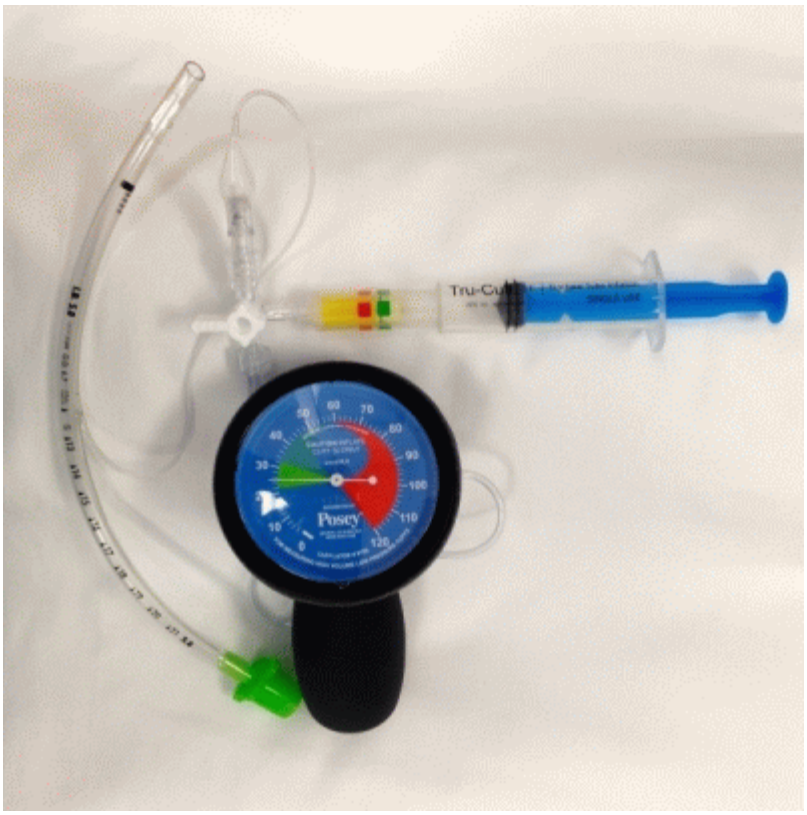
METHOD:
The apparatus consists of a syringe-like device (SD) that has an elongated nozzle with three zones (green, clear, and red) marked on it. The device is designed such that each of these zones indicates a specific CP range with the clear zone representing a CP of 20-30 cmH2O. For the study, cETTs of sizes 4.0, 5.0, and 6.0 mm ID were placed into polyvinylchloride tubes of appropriate sizes. Following inflation of the cuff using the SD, the CP readings were measured using a standard manometer (MM) at the following markings of the SD: beginning, middle, and end of the green zone; middle of the clear zone; and the start and middle of the red zone. A total of 100 pressure readings were obtained from each of the 3 sizes of cETTs.

RESULT:
The results of the CP measurements are displayed in Table 1.

CONCLUSION:
This study demonstrates considerable consistency in the CP indicated by the three zones on the SD. Although this device does not give an absolute measurement of the CP, it appears to be a simple, portable and affordable method that can be reliably used to measure the range of CP. Within the clear zone, the CP is reliably in the range of 25-35 cmH2O. This device may thus serve as a useful tool to ensure an acceptable CP and thereby reduce concerns of underinflated or overinflated cuffs.

FIGURE LEGEND
1. Table 1 gives the mean and standard deviation of the CP measurements at each marking on the SD.
2. The figure shows the set-up used in this study for measurement of CP at each marking on the SD using a MM.

ETT Size	*Green start (cmH_2O)*	*Green mid (cmH_2O)*	*Green end (cmH_2O)*	*Clear mid (cmH_2O)*	*Red start (cmH_2O)*	*Red mid (cmH_2O)*
4.0 mm ID	17.9 ± 0.8	21.5 ± 0.8	25.3 ± 1.0	29.5 ± 1.1	35.5 ± 1.2	48.4 ± 3.2
5.0 mm ID	18.2 ± 1.0	21.7 ± 2.3	25.3 ± 1.1	29.3 ± 1.3	34.9 ± 1.7	45.7 ± 3.1
6.0 mm ID	17.8 ± 0.7	21.5 ± 0.7	25.2 ± 0.9	29.3 ± 1.1	35.2 ± 1.0	46.6 ± 1.8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