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

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Background:

- 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.
- The majority of these complications can be prevented by careful monitoring of the intracuff pressure (CP) and maintaining it within a specific safe range.
- Most of the current methods available to measure the CP seem too cumbersome or expensive.
- A simple, syringe-like device (Tru-Cuff, AES Inc, Black Diamond, WA) has been recently introduced to give a measure of the CP range.
- In this study, we evaluated the accuracy of this device to measure the range of CP

Apparatus consists of a syringe-like device (SD) that has an elongated nozzle with three zones (green, clear, and red) marked on it. These zones indicate a specific CP range with the clear zone designed to represent a CP of 20-30 cmH2O

Method:

- In vitro study

cETTs of sizes 4.0, 5.0, and 6.0 mm ID were placed into polyvinylchloride tubing of various sizes and the cuff inflated using the syringe device

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CP readings were measured using a standard manometer at:
beginning, middle, and end of the green zone; middle of the clear zone; and the start and middle of the red zone

Result:

A total of 100 pressure readings were obtained from each of the 3 sizes of cETTs

The result of the CP measurements:

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

Conclusion:

This study demonstrates considerable consistency in the CP indicated by the three zones on the SD. Within the clear zone, the CP has been reliably in the range of 25-35 cmH_2O.

Benefits:

- Simple, portable, affordable and reliable method to measure the range of CP

Drawback:

- Does not give an absolute measurement of the CP