

# Endotracheal Tube Cuff Pressure Monitor: A Fancy Gadget or Necessary Tool in Intensivist's Armamentarium

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In the pediatric intensive care unit (PICU), endotracheal intubation and mechanical ventilation are an integral part of managing sick patients, especially those having respiratory failure, altered sensorium, hemodynamic compromise, or neuromuscular weakness. Evidence in favor or against cuffed and uncuffed endotracheal tube (ETT) in pediatric practice exists in literature and is much debated. A meta-analysis on studies about this topic revealed no difference in intubation related adverse effects like post-extubation croup or accidental extubation in patients on uncuffed or cuffed ETT.<sup>1</sup> ETT might accelerate the potential risk of ventilator-associated pneumonia as it affects the upper airway's natural defense mechanism. Peritubal leakage of contaminated orogastric secretions is a significant risk factor for ventilator-associated pneumonia (VAP).

Maintenance of optimal ETT cuff pressure is a matter of concern for pediatric intensivists. Higher cuff pressure can cause ischemic injury in the airway leading to post-extubation stridor, and in some cases, reintubation.<sup>2</sup> Underinflated cuffs carry a potential danger of increasing microaspiration and VAP. Different techniques are used over the years for optimal inflation of the ETT cuff.<sup>3</sup> Recommended pressure varies in various literature and among ages, but  $\leq 20$ – $25$  cm H<sub>2</sub>O of cuff pressure is highlighted in the recent American Heart Association (AHA) guidelines. Many clinical situations can alter cuff pressure, mainly in prolonged mechanically ventilated patients.<sup>4,5</sup> In a prospective observational study, Wettstein et al. found that cuff underinflation is an essential phenomenon in PICU patients.<sup>6</sup> The above fact highlights the importance of standard guidelines for monitoring cuff pressure in critically ill intubated pediatric patients. The various traditional monitoring methods are minimal leak technique, manual palpation of the pilot balloon, bedside manometry, and direct intracuff monitoring.

In this issue of the *Indian Journal of Critical Care Medicine*, Shaikh et al. elegantly researched the utility of protocolized cuff pressure monitoring in PICU.<sup>7</sup> The authors must be appreciated for selecting this vital area of research. The study question has a real practical benefit, especially in resource-limited settings with a higher nurse:patient ratio, making it difficult to monitor the cuff pressure regularly. In this well-designed randomized controlled trial, Shaikh et al. studied 160 PICU patients and divided them into two groups. In the standard group (SG), six-hourly ETT cuff pressure was adjusted by bedside minimal leak technique and monitoring of the leak percentage parameter was available on the ventilator screen. In the other group of patients, cuff pressures were monitored by a bedside device every six hours. The result of this study, in line with previously

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published literature, suggests no benefit of regular cuff pressure monitoring in reducing intubation related adverse effects like VAP rates, post-extubation stridor, or reintubation rates.<sup>8</sup> However, the study contradicted the previous evidence published by Schneider et al., where the authors emphasized the advantages of regular cuff pressure monitoring.<sup>9</sup>

Microcuff tube has the particular property of having low pressure and high volume, making its widespread acceptance in PICU and pediatric anesthesia practice.<sup>10</sup> Studies had proven the benefit of microcuff ETT in reducing airway related morbidity when it was used in proper size.<sup>11</sup> This aspect was rightly accepted as a limitation by Shaikh et al. in their present article where the benefit of microcuff tubes was not studied. The present study was a single-center study with a relatively less sample size. Despite these facts, the authors have to be commended for conducting a first of its kind study in Indian settings. This study should serve as a launching pad for further multicenter research especially with microcuff tubes, across the PICUs in the different parts of the country. Despite its limitations, this study by Shaikh et al. showed the need for a protocol on cuff pressure monitoring as a supporting PICU tool to enhance the safety of intubated children.

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