# Cuff pressure management

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## Continuous Endotracheal Tube Cuff Pressure Control Decreases Incidence of Ventilator-Associated Pneumonia in Patients with Traumatic Brain Injury

Sevdi MS, Demirgan S, Erkalp K, Akyol O, Ozcan FG, Guneyli HC, Tunali MC, Selcan A
J Invest Surg. 2021 Feb 14:1-15
PMID 33583304, **http://www.ncbi.nlm.nih.gov/pubmed/33583304**

| | |
|---|---|
| **Design** | Prospective randomized controlled trial |
| **Patients** | 60 mechanically ventilated ICU patients with traumatic brain injury |
| **Objectives** | To investigate the effect of automated control for continuous regulation of endotracheal tube cuff pressure (between 20 and 30 cmH2O) vs. manual adjustment with a manometer at 4-hour intervals and 25 cmH2O on the incidence of ventilator-associated pneumonia |
| **Main Results** | The clinical pulmonary infection scores were lower in the continuous pressure control group at hours 48, 72, and 96 ($p < 0.05$). The deep tracheal aspirate culture growth rate was lower in the automated continuous pressure control group. |
| **Conclusion** | Continuous maintenance of endotracheal cuff pressure using an automated cuff pressure regulator reduced the incidence of ventilator-associated pneumonia in traumatic brain injured patients |

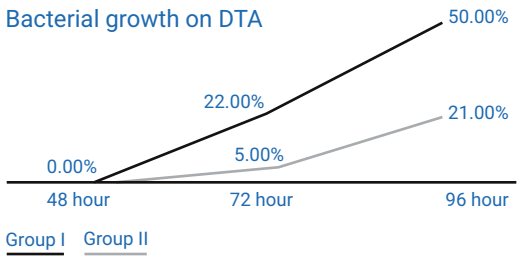


Figure 1. Bacterial growth on deep tracheal aspire (DTA).

*Figure 1:* Group I: Conventional regulation of endotracheal cuff pressure; Group II: Automatated continuous regulation of endotracheal cuff pressure. The automated continuous regulation of endotracheal cuff pressure decreased bacterial growth on the deep trachal aspirate compared to conventional manual regulation of cuff pressure

## Evaluation of an automated endotracheal tube cuff controller during simulated mechanical ventilation

Chenelle CT, Oto J, Sulemanji D, Fisher D, Kacmarek RM
Respir Care. 2015 Feb;60(2):183-90
PMID 25425705, **http://www.ncbi.nlm.nih.gov/pubmed/25425705**

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|---|---|
| **Design** | Bench study: manual regulation versus Intellicuff |
| **Patients** | Mannikin with head movement and trachea model |
| **Objectives** | Compare Pcuff regulation with Intellicuff and manual technique during 2 hours with head movement and 8 hours using static model |
| **Main Results** | During 2 hours with head movement the change in Pcuff from before (25 cm) to after (15 cm) ventilation was important for the manual technique (-39.6%, ) but not for IntelliCuff (3.5%). In the static model, the change in Pcuff from before to after ventilation was important for the manual technique (-14.39%) but not for the IntelliCuff (5.65%). |
| **Conclusion** | Pcuff decreases during mechanical ventilation with manual regulation, whereas it remains stable with Intellicuff |
| **Comment** | With manual regulation, Pcuff decrease was small but clinically important after 8 hours. This result is not consistent with patient studies showing larger and faster drops in cuff pressure, probably because the model was too static. |

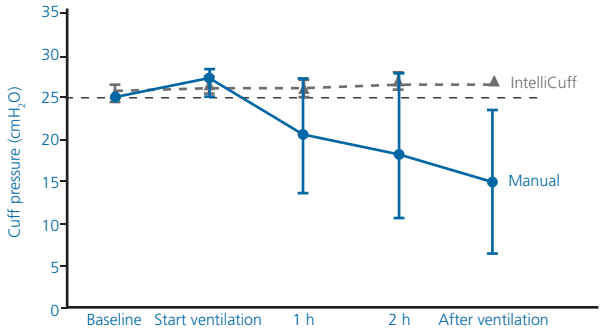


*Figure 2:* Pcuff measurements during 2 hours of ventilation with head movement. Intellicuff maintains a more stable Pcuff in narrow ranges.

## Continuous endotracheal tube cuff pressure control system protects against ventilator-associated pneumonia

Lorente L, Lecuona M, Jiménez A, Lorenzo L, Roca I, Cabrera J, Llanos C, Mora ML
Crit Care. 2014 Apr 21;18(2):R77
PMID 24751286, **http://www.ncbi.nlm.nih.gov/pubmed/24751286**

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|---|---|
| **Design** | Prospective observational study of continuous versus intermittent Pcuff control |
| **Patients** | 284 ICU patients with mechanical ventilation for longer than 48 h |
| **Objectives** | Compare the incidence of VAP |
| **Main Results** | The incidence of VAP was lower with the continuous (n=150) than with the intermittent (n=134) pressure control system (22.0% versus 11.2%; p=0.02) |
| **Conclusion** | Continuous control of Pcuff is associated with a decrease of VAP |

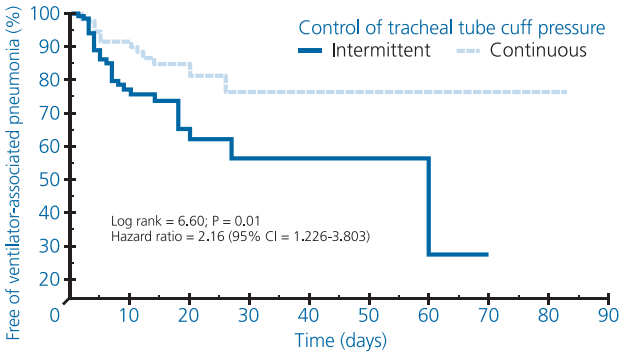


*Figure 3:* The continuous control of Pcuff allowed patients to remain free of VAP during the 90 study days

## Evaluation of an intervention to maintain endotracheal tube cuff pressure within therapeutic range

Sole ML, Su X, Talbert S, Penoyer DA, Kalita S, Jimenez E, Ludy JE, Bennett M
Am J Crit Care. 2011 Mar;20(2):109-17
PMID 21362715, **http://www.ncbi.nlm.nih.gov/pubmed/21362715**

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| **Design** | Prospective crossover randomized study: continuous monitoring and alarm or routine care of Pcuff |
| **Patients** | 32 intubated patients for 12 h |
| **Objectives** | Test the effect of an intervention on the proportion of time that Pcuff was between 20 and 30 cmH2O and evaluate changes in Pcuff over time |
| **Main Results** | During the control condition, 52% of Pcuff were out of range compared with 11% during the intervention condition. During the intervention, a mean of 8 adjustments were required, mostly to add air to the endotracheal tube cuff. During the control condition, cuff pressure decreased over time. |
| **Conclusion** | The monitoring was effective in maintaining Pcuff within an optimal range, and Pcuff decreased over time without intervention |
| **Comment** | The point of this study is that, due to resource limitations it is unrealistic to manually assess and adjust Pcuff a mean of 8 times per day. |

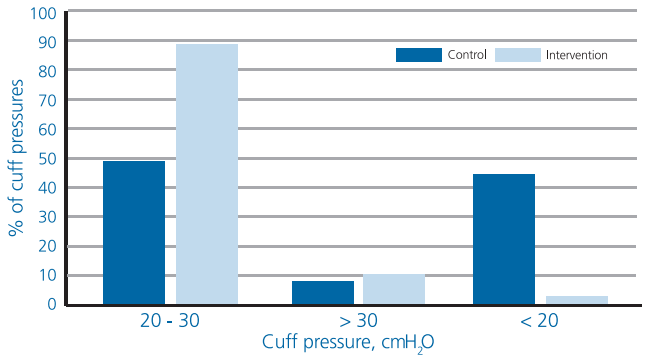


*Figure 4:* Continuous monitoring lead to pressure values spending more time in the normal pressure range, between 20 and 30 cmH2O

## A cross-over study of continuous tracheal cuff pressure monitoring in critically-ill children

Vottier G, Matrot B, Jones P, Dauger S.
Intensive Care Med. 2016 Jan;42(1):132-3.
PMID 26515515 , **http://www.ncbi.nlm.nih.gov/pubmed/26515515**

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|---|---|
| **Design** | Crossover study: manual regulation and automatic regulation |
| **Patients** | 30 children weighing less than 15 kg |
| **Objectives** | Compare the cuff pressure by manual or automatic regulation in pediatric patients. |
| **Main Results** | The percentage of time spent out of range was reduced from 48 % during manual regulation period to 0 % during automatic regulation period |
| **Conclusion** | Automatic regulation of Pcuff in pediatric patients decreased the time spent out of range |

## Prevalence and predictors of out-of-range cuff pressure of endotracheal and tracheostomy tubes: a prospective cohort study in mechanically ventilated patients

Alzahrani AR, Al Abbasi S, Abahoussin OK, Al Shehri TO, Al-Dorzi HM, Tamim HM, Sadat M, Arabi YM
BMC Anesthesiol. 2015 Oct 15;15(1):147
PMID 26471790 , **http://www.ncbi.nlm.nih.gov/pubmed/26471790**

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| **Design** | Prospective observational study of Pcuff in endotracheal tube and tracheostomy |
| **Patients** | 2120 cuff-pressure measurements taken by RT using handheld manometer |
| **Objectives** | Find predictor for out of range Pcuff |
| **Main Results** | Among all patients, 37.8% patients had low cuff pressure (at least two pressures < 20 cmH2O). Low cuff pressure was more common with smaller tube size (OR, 0.34 per 0.5 unit increase in ETT size; 95% CI,0.15 to 0.79) and with lower peak airway pressure (OR per cmH2O, 0.93; 95% CI, 0.87 to 0.99) |
| **Conclusion** | Patients with small tubes and low Pinsp must be carefully monitored |

## Continuous control of tracheal cuff pressure and microaspiration of gastric contents in critically ill patients

Nseir S, Zerimech F, Fournier C, Lubret R, Ramon P, Durocher A, Balduyck M
Am J Respir Crit Care Med. 2011 Nov 1;184(9):1041-7
PMID 21836137, **http://www.ncbi.nlm.nih.gov/pubmed/21836137**

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| **Design** | RCT: continuous regulation with pneumatic device or routine care of Pcuff |
| **Patients** | 122 patients expected to receive mechanical ventilation for at least 48 h |
| **Objectives** | Determine the impact of continuous control of Pcuff on microaspiration of gastric contents |
| **Main Results** | The pneumatic device was effective in controlling Pcuff. The percentage of patients with abundant microaspiration (18% vs. 46%), bacterial concentration in tracheal aspirates (1.6 ±2.4 vs. 3.1 ± 3.7 log(10) cfu/ml), and VAP rate (9.8% vs. 26.2%) were significantly lower in the intervention group compared with the control group. No significant difference was found in tracheal ischemia score between the two groups. |
| **Conclusion** | Continuous control of Pcuff is associated with a decrease of microaspiration and VAP |

## Assessment of endotracheal cuff pressure by continuous monitoring: a pilot study

Sole ML, Penoyer DA, Su X, Jimenez E, Kalita SJ, Poalillo E, Byers JF, Bennett M, Ludy JE
Am J Crit Care. 2009 Mar;18(2):133-43
PMID 19255103, **http://www.ncbi.nlm.nih.gov/pubmed/19255103**

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|---|---|
| **Design** | Prospective observational study |
| **Patients** | 10 intubated patients |
| **Objectives** | Assess the accuracy and feasibility of continuous monitoring of Pcuff, describe changes in cuff pressure over time, and identify clinical factors that influence Pcuff |
| **Main Results** | 54% of Pcuff measurements were within the recommended range of 20 to 30 cmH2O. Pcuff was high in 16% of measurements and low in 30%. No significant changes over time were noted. Endotracheal suctioning, coughing, and positioning affected Pcuff. |
| **Conclusion** | Continuous monitoring of cuff pressure is feasible and accurate. Pcuff varied with endotracheal suctioning, coughing, and positioning |
| **Comment** | Cuff pressures, if measured at all, are most commonly done every 8-12 hrs, during which time cuff pressure often drops below 20 cmH2O. Cuff pressures below 20 cmH2O were not associated with audible leaks, so a 'minimal leak' cuff technique does not insure adequate cuff pressure |

## Automatic control of tracheal tube cuff pressure in ventilated patients in semirecumbent position: a randomized trial

Valencia M, Ferrer M, Farre R, Navajas D, Badia JR, Nicolas JM, Torres A
Crit Care Med. 2007 Jun;35(6):1543-9
PMID 17452937, **http://www.ncbi.nlm.nih.gov/pubmed/17452937**

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| **Design** | RCT: continuous regulation with automatic device or routine care of Pcuff |
| **Patients** | 142 intubated patients without aspiration or pneumonia at admission |
| **Objectives** | Assess the efficacy of an automatic device for the continuous regulation of tracheal Pcuff in preventing VAP |
| **Main Results** | Cuff pressure <20 cmH2O was more frequently observed in the control than in the automatic group (45.3% vs. 0.7%). However, the rate of clinical VAP, microbiological confirmation, the distribution of early and late onset, the causative microorganisms, and ICU and hospital mortality were similar for the automatic and control group. |
| **Conclusion** | Pcuff is better controlled with an automatic device. Rate of VAP, distribution, microorganisms, and ICU and hospital mortality were similar in both groups |
| **Comment** | All patients were managed with continuous aspiration of subglottic secretions. This decreased early VAP. The study was not blinded. |

## Pneumonia in intubated patients: role of respiratory airway care

Rello J, Soñora R, Jubert P, Artigas A, Rué M, Vallés J
Am J Respir Crit Care Med. 1996 Jul;154(1) :111-5
PMID 8680665, **http://www.ncbi.nlm.nih.gov/pubmed/8680665**

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|---|---|
| **Design** | Prospective observational study |
| **Patients** | 83 patients undergoing continuous aspiration of subglottic secretions |
| **Objectives** | Assess risk factors for VAP in patients undergoing CASS |
| **Main Results** | Persistent intracuff pressure below 20 cmH2O (RR = 4.23, 95% CI = 1.12 to 15.92) were factors independently associated with the development of pneumonia even if CASS ETTs were used, if patients were not receiving antibiotics. When the cuff pressure was maintained at less than 20 cmH2O, the risk for ventilator-associated pneumonia (VAP) was four times higher than when pressure was maintained at higher values |
| **Conclusion** | The study confirms the importance of maintaining adequate intracuff pressure and effective aspiration of subglottic secretions in preventing pneumonia in intubated patients who are not receiving antibiotic treatment |

## Cuff pressure of endotracheal tubes after changes in body position in critically ill patients treated with mechanical ventilation

Lizy C, Swinnen W, Labeau S, Poelaert J, Vogelaers D, Vandewoude K, Dulhunty J, Blot S
Am J Crit Care. 2014 Jan;23(1):e1-8
PMID 24382623, **http://www.ncbi.nlm.nih.gov/pubmed/24382623**

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| **Design** | Prospective observational study of Pcuff in 16 different body positions |
| **Patients** | 12 ICU patients under neuromuscular blockers |
| **Objectives** | Assess the effect of changes in body position on Pcuff compared with Pcuff in neutral position (backrest, head-of-bed elevation 30°, head in neutral position) |
| **Main Results** | 192 measurements were made. 40.6% were above the upper limit of 30 cmH2O. No measurement was lower than 20 cmH2O. There is a significant variability in patients' Pcuff across the 16 positions. |
| **Conclusion** | Changes in body position increased Pcuff compared with maintaining a neutral position |
| **Comment** | This physiological study strongly supports the use of automatic control of cuff pressure to adapt to the changes occurring during patient care. |

## Efficiency of a pneumatic device in controlling cuff pressure of polyurethane-cuffed tracheal tubes: a randomized controlled study

Jaillette E, Zerimech F, De Jonckheere J, Makris D, Balduyck M, Durocher A, Duhamel A, Nseir S
BMC Anesthesiol. 2013 Dec 26;13(1):50
PMID 24369057, **http://www.ncbi.nlm.nih.gov/pubmed/24369057**

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| **Design** | Prospective crossover randomized study: continuous control or routine care of Pcuff |
| **Patients** | 64 patients expected to receive mechanical ventilation for at least 48 h |
| **Objectives** | Determine the efficacy of a pneumatic device in controlling Pcuff |
| **Main Results** | The percentage of patients with underinflation (31% vs 68%) or overinflation (53% vs 100%) of tracheal cuff, and percentage of time spent with underinflation (0.9 [0, 17] vs 14% [4, 30]) or overinflation (0 [0, 2] vs 32% [9, 54]) were reduced during continuous control of Pcuff compared with routine care. |
| **Conclusion** | Pneumatic device was effective in controlling Pcuff |
| **Comment** | This pneumatic device still let Pcuff be less than 20 cmH2O for more than 30 minutes in 25% of patients. An electronically controlled continuous cuff inflation system can respond faster. |

## Tracheal pressure and endotracheal tube obstruction can be detected by continuous cuff pressure monitoring: in vitro pilot study

Efrati S, Deutsch I, Gurman GM, Noff M, Conti G
Intensive Care Med. 2010 Jun;36(6):984-90
PMID 20232044, **http://www.ncbi.nlm.nih.gov/pubmed/20232044**

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| **Design** | Simulation study: Phase I evaluated the correlation between Pinsp and Pcuff. Phase II evaluated the relation between Pcuff versus ventilator Pinsp and ETT obstruction (range of obstruction 0-58%). In Phase III, the analytical model developed in phase II was used to predict the degree of obstruction of five tubes removed from ICU patients. |
| **Patients** | Bench |
| **Objectives** | Evaluate whether the degree of tube obstruction can be predicted by changes of Pcuff as a function of Pinsp |
| **Main Results** | In phases I and II, it was found that Pcuff correlates significantly with Pisnp. The gradient Pcuff/Pinsp reflected the degree of tube obstruction. The degree of obstruction of the tube could be predicted in ICU patients. |
| **Conclusion** | Monitoring of Pcuff allowed prediction of the degree of tube obstruction |
| **Comment** | An interesting article for future consideration but would need more studies. The study does not address all of the other causes for increased peak airway pressure that have nothing to do with ETT occlusion. |

## Rapid pressure compensation by automated cuff pressure controllers worsens sealing in tracheal tubes

Weiss M, Doell C, Koepfer N, Madjdpour C, Woitzek K, Bernet V
Br J Anaesth. 2009 Feb;102(2):273-8
PMID 19112060, **http://www.ncbi.nlm.nih.gov/pubmed/19112060**

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|---|---|
| **Design** | In vitro laboratory study |
| **Objectives** | To compare the effects of manual vs. two automated cuff controllers on ETT sealing |
| **Main Results** | On the basis of in vitro findings, automatic cuff pressure regulators may interfere with the self-sealing mechanism of HVLP tube cuffs, as long as the set cuff pressures are lower than PIPs |
| **Conclusion** | An ideally designed automated cuff pressure controller should immediately stabilize any acute cuff pressure drops (sudden widening of the trachea before coughing) or chronic fall in cuff pressure (out diffusion of air from the cuff), whereas elevated cuff pressures by respiratory pressures or coughing should be corrected only by slow decompression. |
| **Comment** | The IntelliCuff automated Pcuff controller algorithm immediately increases cuff pressure if it is too low, whereas if cuff pressure is too high, cuff pressure is reduced slowly and only if high Pcuff is sustained so as to not drop cuff pressure associated with coughing, etc. |

## Continuous control of endotracheal cuff pressure and tracheal wall damage: a randomized controlled animal study

Nseir S, Duguet A, Copin MC, De Jonckheere J, Zhang M, Similowski T, Marquette CH
Crit Care. 2007 Oct;11(5):R109
PMID 17915017, **http://www.ncbi.nlm.nih.gov/pubmed/17915017**

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|---|---|
| **Design** | Animal randomized study: manual vs. automatic control of Pcuff |
| **Patients** | 12 piglets ventilated for 48 h |
| **Objectives** | Test whether control of Pcuff using a pneumatic device would reduce tracheal ischemic lesions due to overinflation of the cuff |
| **Main Results** | Pcuff was lower with the pneumatic device than in the control group. No difference was found in the percentage of time spent with Pcuff <15 cmH2O and with Pcuff between 30 and 50 cmH2O. The percentage of time between 15 and 30 cmH2O of Pcuff was higher with the pneumatic device than in the control group. The percentage of time with Pcuff >50 cmH2O was lower with the pneumatic device than in the control group. Histological examination showed no difference in tracheal lesions between animals with and without the pneumatic device. |
| **Conclusion** | The pneumatic device provides effective continuous control of Pcuff in this experimental model without difference in tracheal lesions |

## Changes in endotracheal tube cuff pressure in mechanically ventilated adult patients

Motoyama A, Asai S, Konami H, Matsumoto Y, Misumi T, Imanaka H, Nishimura M
Journal of Intensive Care. 2014 Jan 31; 2:7
PMID 25520824 , **http://www.ncbi.nlm.nih.gov/pubmed/25520824**

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|---|---|
| **Design** | Prospective observational study of Pcuff |
| **Patients** | 27 ICU patients |
| **Objectives** | Determine the cuff pressure variation by manual measurement every 2 h |
| **Main Results** | Cuff pressure was < 20 cmH2O in 45% of the measurements, < 24% in 93%, and > 30% in 0.05% of the measurements |
| **Conclusion** | During manual control of Pcuff, the pressure decreased in less than 2 h |
| **Comment** | The limitations of the study are: a) the format because letters describe only the main results without details about methodology, b) the relatively low number of patients (27) |

## Control of tracheal cuff pressure: a pilot study using a pneumatic device

Duguet A, D'Amico L, Biondi G, Prodanovic H, Gonzalez-Bermejo J, Similowski T
Intensive Care Med. 2007 Jan;33(1):128-32
PMID 17063357, **http://www.ncbi.nlm.nih.gov/pubmed/17063357**

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|---|---|
| **Design** | Prospective, randomized, crossover pilot study |
| **Patients** | 9 intubated patients |
| **Objectives** | Compare the efficacy of a mechanical device and manometer (control) to maintain constant Pcuff |
| **Main Results** | Pcuff > 50 cmH20 were recorded in 6 patients during the control, but never during the prototype day. During the control day, Pcuff was between 30 and 50 cmH20 for 29+/-25% of the time, vs 0.3+/-0.3% during the prototype day. Pcuff was between 15 and 30 cmH20 for 56+/-36% of the time during the control day, vs 95+/-14% during the prototype day. During the control day, Pcuff was below 15 cmH20 for 15+/-17% of the time, vs 4.7+/-15% during the prototype day. |
| **Conclusion** | The automatic control of Pcuff is more effective than using a manometer to maintain Pcuff constant and within the target range |

## Automatic regulation of the cuff pressure in endotracheally intubated patients

Farré R, Rotger M, Ferre M, Torres A, Navajas D
Eur Respir J. 2002 Oct;20(4):1010-3
PMID 12412697, **http://www.ncbi.nlm.nih.gov/pubmed/12412697**

| | |
|---|---|
| **Design** | Simulation bench study and prospective interventional study |
| **Patients** | 8 intubated patients during 24 h |
| **Objectives** | Evaluate the performance of a device to maintain constant Pcuff |
| **Main Results** | The bench test showed that the procedure was able to maintain Pcuff at a constant level, regardless of the changes imposed in the tracheal section. PCuff recorded values coincided with the target value within +/-2 cmH2O in all of the patients. |
| **Conclusion** | Tight control of Pcuff is feasible |

# Additional files

## Effectiveness of continuous cuff pressure control in preventing ventilator-associated pneumonia: a systematic review and meta-analysis of randomized controlled trials

Maertens B, Lin F, Chen Y, Rello J, Lathyris D, Blot S
Crit Care Med. 2022 Oct 1;50(10):1430-1439
PMID 35880890, **http://www.ncbi.nlm.nih.gov/pubmed/35880890**

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|---|---|
| **Design** | Systematic review and meta-analysis of 11 randomized controlled trials |
| **Patients** | 2092 intubated patients |
| **Objectives** | Assess the effectiveness of continuous cuff pressure control in preventing ventilator-associated pneumonia (VAP) |
| **Main Results** | The use of continuous cuff pressure control was associated with a reduced risk of VAP (OR, 0.51). Meta-analyses of secondary endpoints showed no significant difference in mortality, but significant differences in the duration of mechanical ventilation and ICU stay in favor of continuous cuff pressure control. |
| **Conclusion** | The use of continuous cuff pressure control was associated with a reduction in VAP incidence |

## Is continuous better than intermittent control of tracheal cuff pressure? A meta-analysis

Wen Z, Wei L, Chen J, Xie A, Li M, Bian L
Nurs Crit Care. 2019 Mar;24(2):76-82
PMID 30537009, **http://www.ncbi.nlm.nih.gov/pubmed/30537009**

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|---|---|
| **Design** | Meta-analysis of 7 randomized controlled trials |
| **Patients** | 970 mechanically ventilated patients |
| **Objectives** | To compare and evaluate the efficacy and safety of continuous and intermittent control of cuff pressure |
| **Main Results** | Continuous control of cuff pressure reduced the incidence of cuff pressure < 20 cmH2O, Pcuff > 30 cmH2O and ventilator-associated pneumonia (VAP) when compared with intermittent control of cuff pressure. No significant differences in duration of mechanical ventilation (MV), length of ICU stay or mortality were found. |
| **Conclusion** | Continuous control of cuff pressure offers more benefits in stabilizing the cuff pressure and reducing the incidence of VAP |

## Optimal care and design of the tracheal cuff in the critically ill patient

Jaillette E, Martin-Loeches I, Artigas A, Nseir S
Ann Intensive Care. 2014 Feb 27;4(1):7
PMID 24572178, **http://www.ncbi.nlm.nih.gov/pubmed/24572178**

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| **Design** | Review |
| **Conclusion** | Provides an overview of continuous Pcuff monitoring and regulation and its benefits |
| **Comment** | The authors cite a study stating the use of a pneumatic controller is more 'efficient' than an electronic controller. But the electronic devices did not include IntelliCuff and its algorithms to prevent 'over compensation' of increased cuff pressures. |

## Continuous control of tracheal cuff pressure for the prevention of ventilator-associated pneumonia in critically ill patients: where is the evidence?

Rouzé A, Nseir S
Curr Opin Crit Care. 2013 Oct;19(5):440-7
PMID 23856895, **http://www.ncbi.nlm.nih.gov/pubmed/23856895**

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|---|---|
| **Design** | Review |
| **Conclusion** | Why and how to continuously monitor Pcuff |

## Strategies to prevent ventilator-associated pneumonia in acute care hospitals

Coffin SE, Klompas M, Classen D, Arias KM, Podgorny K, Anderson DJ, Burstin H, Calfee DP, Dubberke ER, Fraser V, Gerding DN, Griffin FA, Gross P, Kaye KS, Lo E, Marschall J, Mermel LA, Nicolle L, Pegues DA, Perl TM, Saint S, Salgado CD, Weinstein RA, Wise R, Yokoe DS
Infect Control Hosp Epidemiol. 2008 Oct;29 Suppl 1:S31-40
PMID 18840087, **http://www.ncbi.nlm.nih.gov/pubmed/18840087**

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|---|---|
| **Design** | Review |
| **Objectives** | Practice recommendations to prevent ventilator-associated pneumonia in acute care hospitals |
| **Main Results** | Maintain an endotracheal cuff pressure of at least 20 cmH2O |

## Evidence on measures for the prevention of ventilator-associated pneumonia

L Lorente, S Blot, J Rello
Eur Respir J. 2007 Dec;30(6)1193-207
PMID 18055704, **http://www.ncbi.nlm.nih.gov/pubmed/18055704**

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|---|---|
| **Design** | Review |
| **Objectives** | 2007 review of guidelines of European Task Force, US Centers for Disease Control and Prevention, Canadian Critical Care Society, American Thoracic Society, and Infectious Diseases Society of America |
| **Main Results** | The intracuff pressure should be persistently maintained between 20–30 cmH2O |
| **Conclusion** | Main reasons for non adherence to guidelines is unavailability of resources |



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