

Title:

**A randomized controlled study compares lung ultrasonography  
to fiberoptic bronchoscopy confirming double lumen tube positioning for thoracic  
surgery**

NCT03314519  
version Feb 23, 2020

**Authors:**

Sawita Kanavitoon, MD<sup>a</sup>,

<sup>a</sup>Department of Anesthesiology, Faculty of Medicine Siriraj hospital, Mahidol university,  
Bangkok, Thailand

Kasana Raksamani, MD<sup>a</sup>,

<sup>a</sup>Department of Anesthesiology, Faculty of Medicine Siriraj hospital, Mahidol university,  
Bangkok, Thailand

Aphichat Suphathamwit, MD<sup>a</sup>,

<sup>a</sup>Department of Anesthesiology, Faculty of Medicine Siriraj hospital, Mahidol university,  
Bangkok, Thailand

Punnarek Thongchareon, MD<sup>b</sup> ,

<sup>b</sup>Department of Surgery, Faculty of Medicine Siriraj hospital, Mahidol University, Bangkok,  
Thailand

Sirilak Suksompong, MD<sup>a</sup>

<sup>a</sup>Department of Anesthesiology, Faculty of Medicine Siriraj hospital, Mahidol university,  
Bangkok, Thailand

**Corresponding author:**

Kasana Raksamani, MD,

Department of Anesthesiology, Faculty of Medicine Siriraj hospital, Mahidol university,  
Bangkok, Thailand, 10700

Email: [Kasana.rak@mahidol.edu](mailto:Kasana.rak@mahidol.edu) , [kasanaa@gmail.com](mailto:kasanaa@gmail.com)

Phone: +66 967841010

**Declarations of interest:**

None

## Statistical Analysis

Sample size calculation was performed by n4Studies with the hypothesis that lung ultrasonography is not inferior to fiberoptic bronchoscopy (non-inferiority study) 10, 18, 19. Non-inferiority margin equal 10% with significant *p*-value as 0.05, power 90%, the sample size each group equal 82 cases. Furthermore, concerning drop out about 15%, sample size of each group was 100.

Statistical analysis was performed using SPSS version 18 for Windows (Chicago, IL). Continuous variables with normal distribution were presented as means and standard deviation, non-normal variables were report as median and interquartile range. Comparison of demographic data, rate of lung collapse and duration were made with the independent t test, Mann Whitney U test or Pearson's chi-squared test. Statistical significance was represented by *p* value <0.05. The positive predictive value was calculated to determine the effectiveness of lung ultrasound compared to fiberoptic bronchoscopy.

## References

1. Bussieres JS, Somma J, Del Castillo JL, Lemieux J, Conti M, Ugalde PA, et al. Bronchial blocker versus left double-lumen endotracheal tube in video-assisted thoracoscopic surgery: a randomized-controlled trial examining time and quality of lung deflation. *Can J Anaesth*. 2016;63(7):818-27.
2. Boisen ML, Rolleri N, Gorgy A, Kolarczyk L, Rao VK, Gelzimis TA. The Year in Thoracic Anesthesia: Selected Highlights From 2018. *Journal of cardiothoracic and vascular anesthesia*, 2019;33(11), 2909-19.
3. Lohser J. Evidence-based management of one-lung ventilation. *Anesthesiol Clin*. 2008;26(2):241-72, v.
4. Cohen E. Double-lumen tube position should be confirmed by fiberoptic bronchoscopy. *Curr Opin Anaesthesiol*. 2004;17(1):1-6.
5. Kitabjian L, Bordi S, Elisha S, Gabot M, Heiner J, Nagelhout J, et al. Anesthesia case management for video-assisted thoracoscopic surgery. *AANA J*. 2013;81(1):65-72.
6. British Thoracic Society guidelines on diagnostic flexible bronchoscopy. *Thorax* 2001;56:i1-i21.
7. Colt HG, Prakash UBS, Offurd KP. Bronchoscopy in North America; survey by the American Association for Bronchology, 1999. *J Bronchol* 2000;7:8-25.
8. Boucek CD, Landreneau R, Freeman JA, Strollo D, Bircher NG. A comparison of techniques for placement of double-lumen endobronchial tubes. *J Clin Anesth*. 1998;10(7):557-60.
9. Alvarez-Diaz N, Amador-Garcia I, Fuentes-Hernandez M, Dorta-Guerra R. Comparison between transthoracic lung ultrasound and a clinical method in confirming the position of double-lumen tube in thoracic anaesthesia. A pilot study. *Rev Esp Anesthesiol Reanim*. 2015;62(6):305-12.

10. Parab SY, Divatia JV, Chogle A. A prospective comparative study to evaluate the utility of lung ultrasonography to improve the accuracy of traditional clinical methods to confirm position of left sided double lumen tube in elective thoracic surgeries. *Indian J Anaesth.* 2015;59(8):476-81.
11. Acosta CM, Maidana GA, Jacovitti D, Belaunzaran A, Cereceda S, Rae E, et al. Accuracy of transthoracic lung ultrasound for diagnosing anesthesia-induced atelectasis in children. *Anesthesiology.* 2014;120(6):1370-9.
12. Sustic A, Protic A, Cicvaric T, Zupan Z. The addition of a brief ultrasound examination to clinical assessment increases the ability to confirm placement of double-lumen endotracheal tubes. *J Clin Anesth.* 2010;22(4):246
13. Yamaguchi Y, Moharir A, Burrier C, Tobias JD. Point-of-care lung ultrasound to evaluate lung isolation during one-lung ventilation in children: A case report. *Saudi J Anaesth.* 2019;13(3):243-5.-9.
14. Hu WC, Xu L, Zhang Q, Wei L, Zhang W. Point-of-care ultrasound versus auscultation in determining the position of double-lumen tube. *Medicine(Baltimore).* 2018; 97(13):1-6.
15. Parab SY, Kumar P, Divatia JV, Sharma K. A prospective randomized controlled double-blind study comparing auscultation and lung ultrasonography in the assessment of double lumen tube position in elective thoracic surgeries involving one lung ventilation at a tertiary care cancer institute. *Korean J Anesthesiol.* 2019;72(1):24-31.
16. Saporito A, Lo Piccolo A, Franceschini D, Tomasetti R, Anselmi L. Thoracic ultrasound confirmation of correct lung exclusion before one-lung ventilation during thoracic surgery. *J Ultrasound.* 2013;16(4):195-9.

17. See KC, Ong V, Wong SH, Leanda R, Santos J, Taculod J, et al. Lung ultrasound training: curriculum implementation and learning trajectory among respiratory therapists. *Intensive Care Med.* 2016;42(1):63-71.
18. de Bellis M, Accardo R, Di Maio M, La Manna C, Rossi GB, Pace MC, et al. Is flexible bronchoscopy necessary to confirm the position of double-lumen tubes before thoracic surgery? *Eur J Cardiothorac Surg.* 2011;40(4):912-6.
19. Chou EH, Dickman E, Tsou PY, Tessaro M, Tsai YM, Ma MH, et al. Ultrasonography for confirmation of endotracheal tube placement: a systematic review and meta-analysis. *Resuscitation.* 2015;90:97-103.
20. Campos JH. Lung isolation techniques. *Anesthesiology Clinics of North America*, 2001;19(3), 455-474.
21. Brodsky JB. Lung separation and the difficult airway. *British journal of anaesthesia*, 2009;103(suppl\_1), i66-i75.