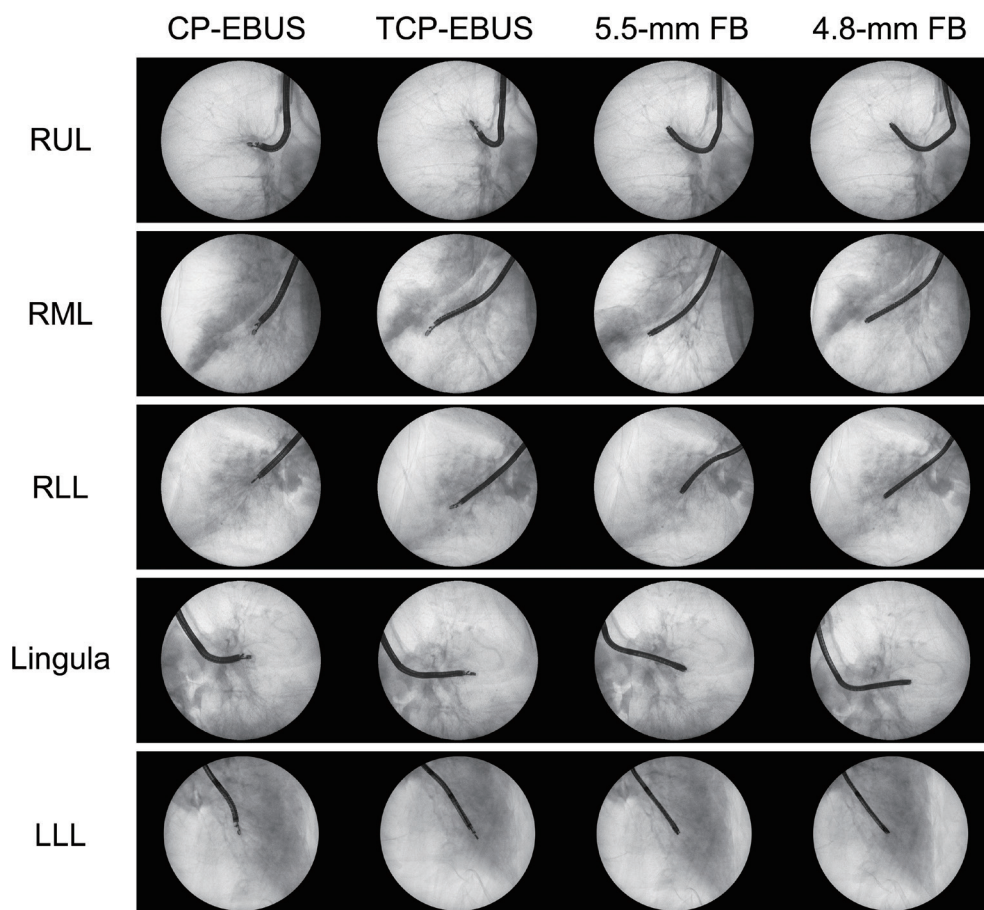
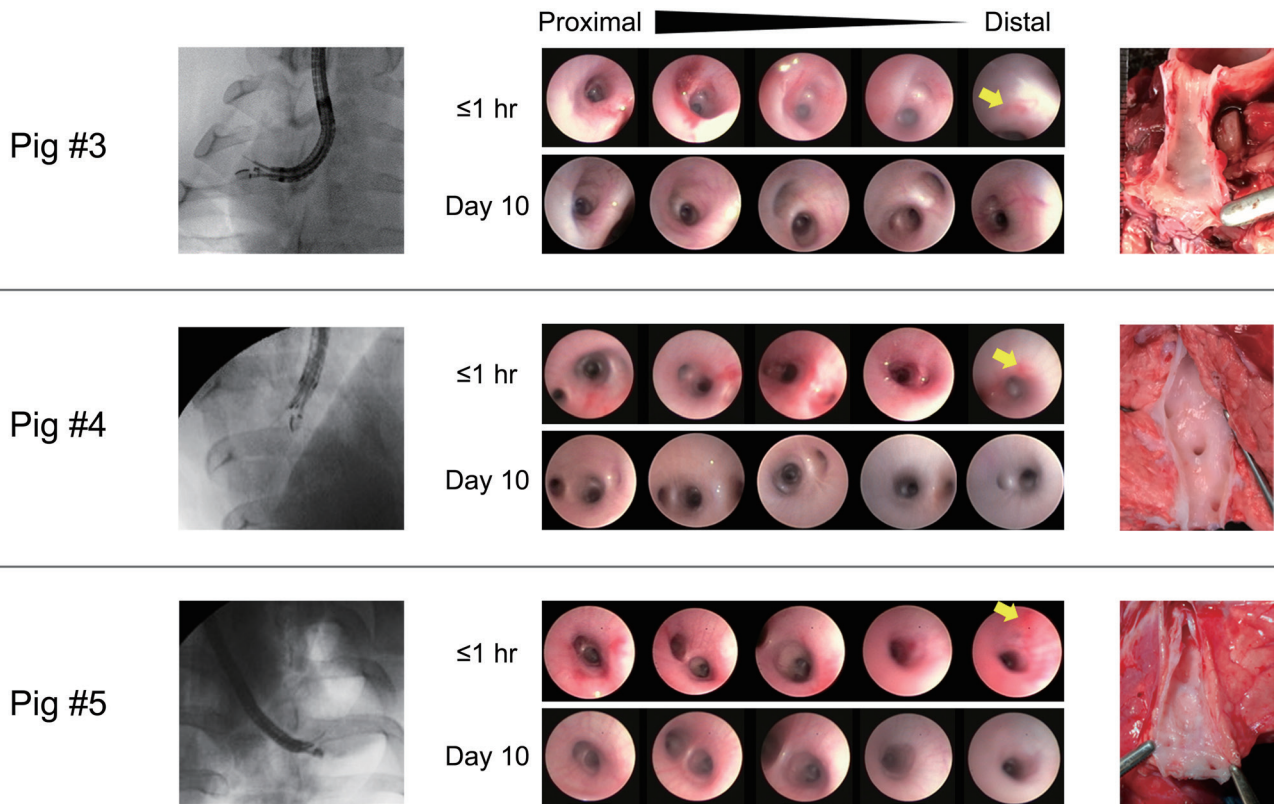


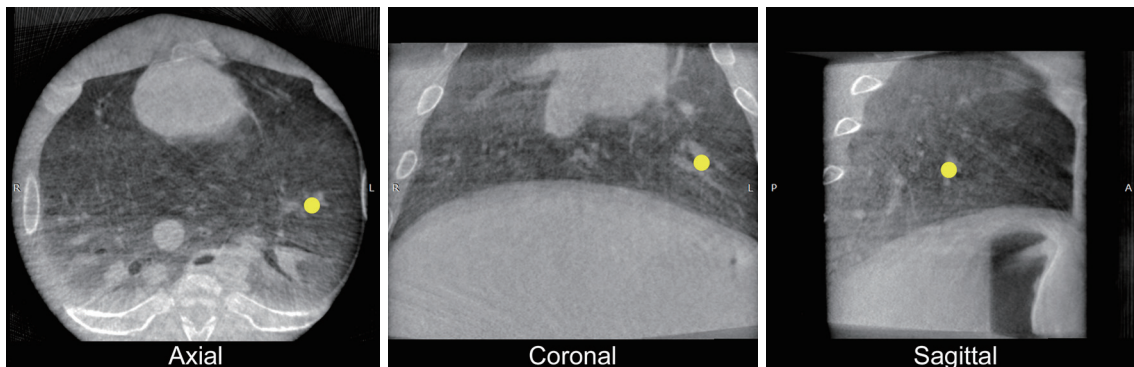
**Figure S1** Preliminary radiological assessment of TCP-EBUS peripheral reach using *in-vivo* pig lungs. TCP-EBUS was compared with clinically available FBs including a 6.2-mm therapeutic FB (BF-1TH190), a 5.5-mm FB (BF-H190), a 4.8-mm FB (BF-Q190), and a 4.2-mm FB (BF-P190) (all bronchoscopes from Olympus Medical Systems Corp., Japan). Bronchoscopes were inserted through an 8.5-mm endotracheal tube without fluoroscopy until significant resistance was encountered; at this point, a fluoroscopic image documented the bronchoscope position. TCP-EBUS went obviously further than the 6.2-mm FB and less far than the 4.2-mm FB. Based on these results, TCP-EBUS was compared more comprehensively with the 5.5-mm and 4.8-mm FBs in the current study. TCP-EBUS, thin convex probe endobronchial ultrasound; FB, flexible bronchoscope; RUL, right upper lobe; RML, right middle lobe; RLL, right lower lobe; LUL, left upper lobe; LLL, left lower lobe.



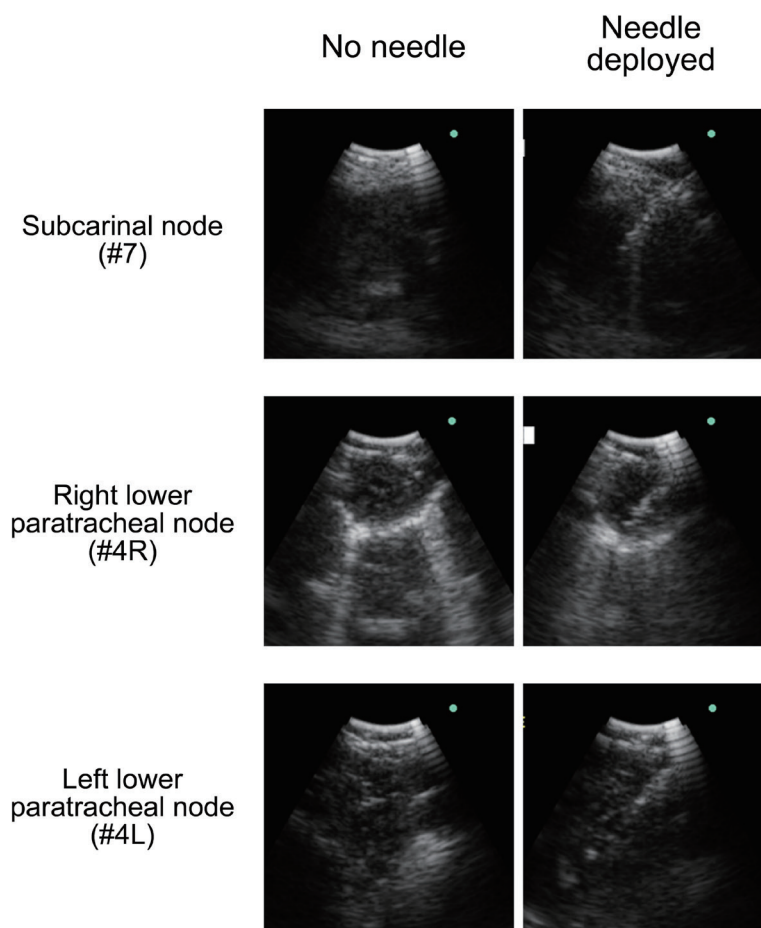
**Figure S2** Additional representative fluoroscopic images of TCP-EBUS insertion into the distal airways of ex-vivo human lungs. Bronchoscopes were inserted into the right upper lobe (RUL, rtB<sup>1</sup>b), right middle lobe (RML, rtB<sup>4</sup>b), right lower lobe (RLL, rtB<sup>9</sup>b), lingula (ltB<sup>4</sup>a), left lower lobe (LLL, ltB<sup>9</sup>b). CP-EBUS, convex probe endobronchial ultrasound; TCP-EBUS, thin convex probe endobronchial ultrasound; FB, flexible bronchoscope.



**Figure S3** Medium-term safety of TCP-EBUS-guided TBNA in the peripheral lungs of live pigs, continued from *Figure 3*. Left, fluoroscopic images during TCP-EBUS-guided TBNA; middle, endobronchial findings at  $\leq 1$  h (top, yellow arrows indicate the needle insertion point) and at day 10 (bottom) post-TCP-EBUS-guided TBNA; right, gross pathology on day 10. TCP-EBUS was inserted into the right upper lobe in pig #3, the right lower lobe in pig #4, and the lingula in pig #5. In all pigs, erythema of the bronchial mucosa was observed right after insertion of the TCP-EBUS. However, the erythema self-resolved by day 10. All pigs showed normal respiratory status over the 10-day monitoring period. TCP-EBUS, thin convex probe endobronchial ultrasound; TBNA, transbronchial needle aspiration.



**Figure S4** Cone-beam CT images of a representative case (Pig #2) 10 days after TCP-EBUS insertion into the distal airway. Yellow dots show the distal-most insertion point of the TCP-EBUS from Day 0, as confirmed by the endobronchial images. No abnormal infiltrates are observed in the lungs. CT, computed tomography; TCP-EBUS, thin convex probe endobronchial ultrasound.



**Figure S5** Representative ultrasound images of TCP-EBUS-guided TBNA of mediastinal lymph nodes in live pigs. The deployed 25-gauge needle is clearly seen on ultrasound within the lymph node without any impairment in visualization. TCP-EBUS, thin convex probe endobronchial ultrasound; TBNA, transbronchial needle aspiration.

**Table S1** Subject characteristics and diagnostic outcome in *ex-vivo* assessment

Case	Age (y)	Gender	Lobe	Segment	Lung field	Lesion size (mm)	Radiographic lesion type	Bronchial generation	Bronchial diameter (mm)	Surgery type	<i>Ex-vivo</i> TCP-EBUS diagnosis	Final pathological diagnosis
#1	67	M	LUL	S4	Middle	21	Solid	3	4	Lobectomy	Ad	Ad
#2	72	M	RUL	S2	Middle	35	Solid	4	3.8	Lobectomy	Ad	Ad
#3	57	F	RML	S4	Middle	22	Solid	4	3.1	Lobectomy	Sm	Sm

The lesion size and the bronchial diameter were measured from the preoperative computed tomography images. Gender M, male; F, female; LUL, left upper lobe; RUL, right upper lobe; RML, right middle lobe; TCP-EBUS, thin convex-probe endobronchial ultrasound; Ad, adenocarcinoma; Sm, small cell lung cancer.