

## 1. Background

Radial probe endobronchial ultrasound (radial EBUS) is widely used for the diagnosis of pulmonary lesions. However, the diagnostic value of radial EBUS-guided transbronchial lung biopsy varies, and its complications, especially the risk of bleeding, are not well studied. In this study, we evaluated the diagnostic outcomes and complication rate of this procedure and investigated the risk factors associated with procedure-related bleeding events.

## 2. Methods

This retrospective study included consecutive patients who underwent radial EBUS-guided transbronchial lung biopsy from December 2019 to July 2022. Radial EBUS was performed under moderate sedation in inpatients and outpatients. The severity of bleeding was graded by the Delphi consensus statement.

## 3. Results

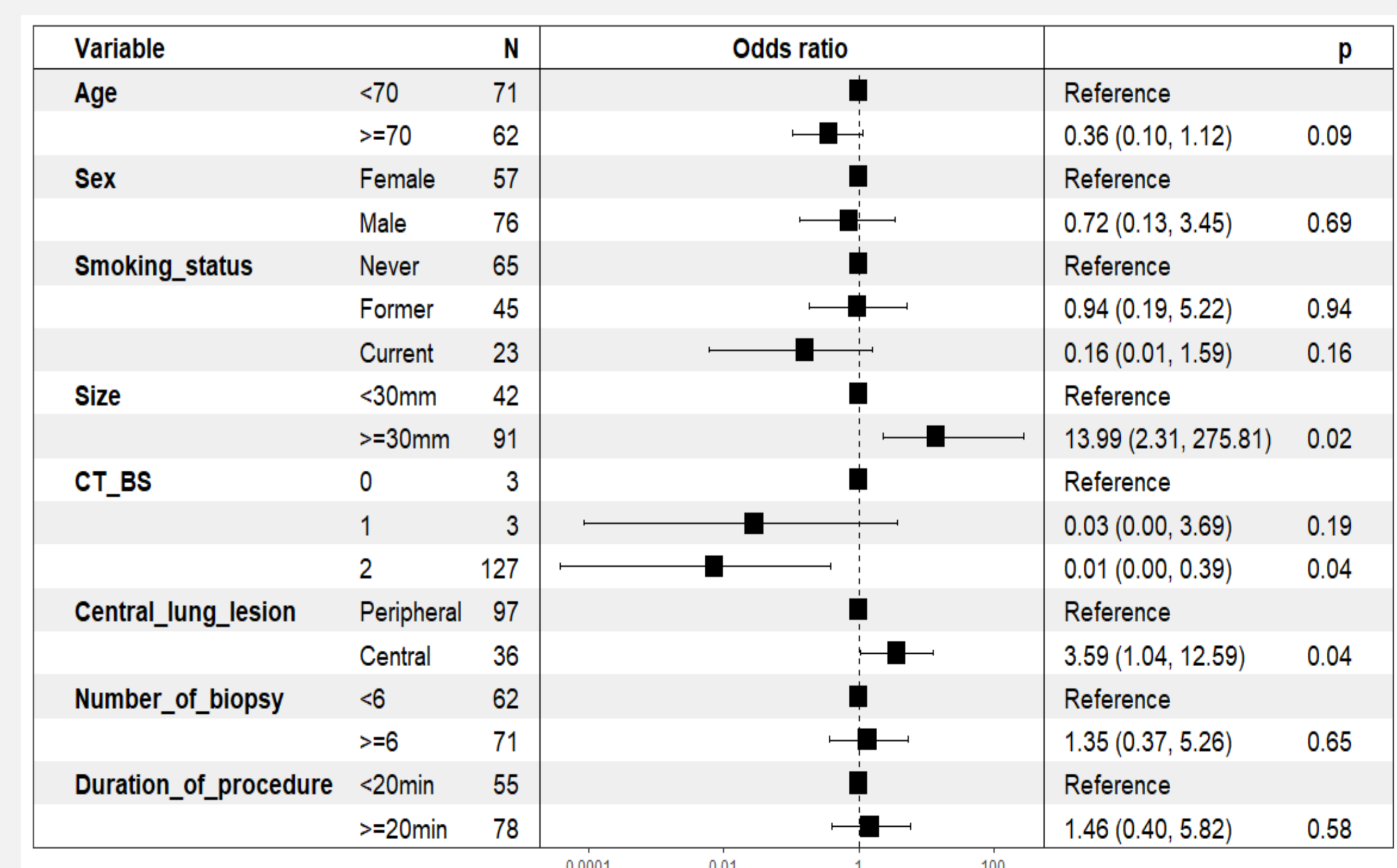
Of a total of 133 patients (mean age, 67.9 years; men 57.1%), outpatients accounted for 30.8%. The diagnostic accuracy, sensitivity, and specificity for malignancy were 76.1% (86/113), 71.0% (66/93), and 100% (20/20), respectively. Twenty eight patients (20.3) developed complications (pneumothorax, 3; pneumonia, 6; complicated pleural effusion, 2; bleeding event grade 2 or higher, 21) (Table 1). Among the 41 outpatients, only 2 patients developed complications (pneumothorax without intervention, 1; grade 2 bleeding event, 1). Of the 21 patients (15.8) with procedure-related bleeding events, 18 patients had grade 2, and only 3 had grade 3 bleeding complications. In a multivariable analysis, large size of lung lesion over 30mm (adjusted odds ratio (OR) 13.99,  $P=0.018$ ) and the central lung lesion (adjusted OR 3.59,  $P=0.041$ ) were significantly associated with the risk of grade 2 or higher bleeding events. The risk of bleeding was significantly reduced when airway directly lead to the pulmonary lesion (computed tomography (CT) bronchus sign 2) (adjusted OR 0.01,  $P=0.042$ ) (Figure 1).

Table 1. Post-procedural complications

Characteristic	Total (n=133)
All complications	27 (20.3)
Bleeding	21 (15.8)
Delphi grade 2	18 (13.5)
Delphi grade 3	3 (2.3)
Pneumonia	5 (3.8)
Pneumothorax	3 (2.3)
CTCAE grade 1	1 (0.8)
CTCAE grade 2	2 (1.5)
CTCAE grade 3	0
Complicated pleural effusion	2 (1.5)
Chest tube or PCD insertion	2 (1.5)
Use of epinephrine	19 (14.3)
Use of balloon blocker	1 (0.8)
Premature interruption	2 (1.5)

**Definition of abbreviations:** CTCAE = common terminology criteria for adverse events, PCD = percutaneous cath drainage, Data are presented as n (%)

Figure 1. Risk factors for bleeding complications after radial EBUS-guided TBLB



## 4. Conclusions

Radial EBUS-guided transbronchial lung biopsy is the accurate and safe diagnostic method. Procedure-related bleeding event was associated with central location and large size of lung lesion and CT-bronchus sign.

