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19 **Short Running Title:** A Common Trunk of the Middle Lobe Vein

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21 **Guarantor of Submission:** The corresponding author is the guarantor of  
22 submission.

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### 35 **CASE REPORT**

36 We herein report a rare surgical case of the right middle lobe vein (RMV) draining  
37 into the inferior pulmonary vein (IPV). A 49-year-old woman was incidentally found to  
38 have a 15-mm pure ground glass nodule in the right lower lobe on chest computed  
39 tomography (CT). Primary lung cancer with a clinical stage of T1aN0M0 stage IA  
40 was suspected. Thoracoscopic right lower wedge resection was performed, followed  
41 by right lower lobectomy and lymph node dissection. During surgery, it was observed  
42 that the RMV emptied into the inferior pulmonary vein (Figure 1). After the anterior  
43 part of the major fissure was divided, we carefully ligated and divided the inferior  
44 pulmonary vein using a vascular stapling device without injuring the middle  
45 pulmonary vein. Pathological examination of the resected specimen resulted in a  
46 diagnosis of T1aN1M0 stage IIB adenocarcinoma. Retrospectively, variation of the  
47 middle lobe vein drainage was evident on chest CT (Figure 2).

48

### 49 **DISCUSSION**

50 Normally, the middle lobe vein unites to form the superior pulmonary vein, whereas  
51 in this case, the right middle lobe vein drained into the inferior pulmonary vein.  
52 Variations of pulmonary veins have been reported [1, 2]. If these abnormalities are  
53 not considered, life-threatening complications such as uncontrolled bleeding, severe  
54 lung edema, or a greater extent of lung resection than expected may occur [3, 4].  
55 The efficacy of preoperative assessment of pulmonary vessels has been reported  
56 using three-dimensional CT for better understanding of the anatomical structure [5].

57

### 58 **CONCLUSION**

59 We highlight that surgeons must be aware of any variation in the pulmonary vessels,  
60 and preoperative assessment of pulmonary venous anomalies is important during  
61 pulmonary surgery, especially lobectomy.

62

63 **Keywords:** Lung cancer, pulmonary vein, anatomical anomaly, common trunk

64

65 **CONFLICT OF INTEREST**

66 None

67

68 **AUTHOR'S CONTRIBUTIONS**

69 Yuriko Terada

70 Group1 - Conception and design, Acquisition of data

71 Group 2 - Drafting the article

72 Group 3 - Final approval of the version to be published

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74 Yoshiaki Furuhashi

75 Group1 - Analysis and interpretation of data

76 Group 2 - Critical revision of the article

77 Group 3 - Final approval of the version to be published

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110 **ABBREVIATIONS:**

111 RMV: right middle lobe vein,

112 IPV: inferior pulmonary vein,

113 CT: computed tomography

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115 **FIGURE LEGENDS**

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117 Figure 1: Chest computed tomography showing right middle pulmonary vein draining  
118 into the inferior pulmonary vein.

119

120 Figure 2: In surgery, the right middle pulmonary vein was confirmed to drain into the  
121 inferior pulmonary vein. (RML: right middle lobe, RLL: right lower lobe, RMV: right  
122 middle pulmonary vein, RLV: right lower pulmonary vein)

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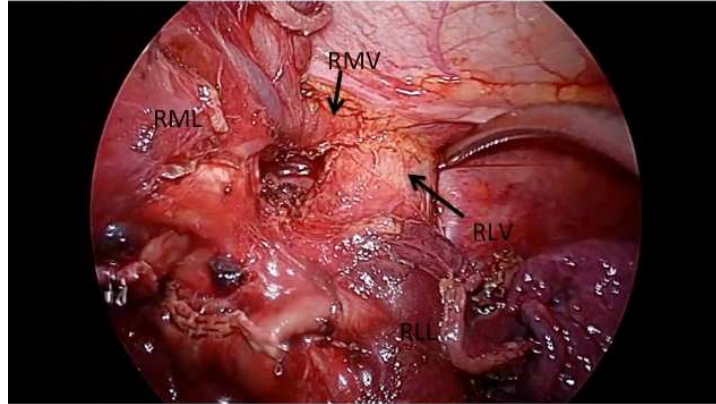
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129 **FIGURES**

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133 Figure 1: Chest computed tomography showing right middle pulmonary vein draining  
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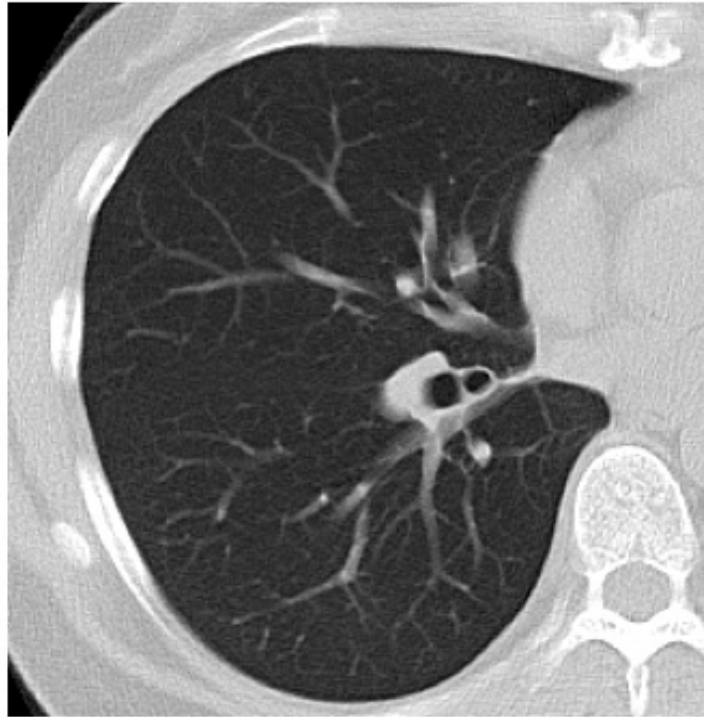
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