



Case report

Detachment and recovery of an X-ray opaque tip of a disposable guide sheath kit: A rare complication of endobronchial ultrasound-guided transbronchial biopsy



Naoya Yasokawa^{*}, Noboru Yorizumi, Koji Kurose, Masaaki Abe, Toru Oga

Kawasaki Medical School, 577 Matsushima, Kurashiki, Okayama, 701-0192, Japan

ARTICLE INFO

Keywords:

Endobronchial ultrasound with a guide sheath (EBUS-GS)
X-ray opaque tip
Peripheral pulmonary lesions

ABSTRACT

Endobronchial ultrasound with a guide sheath (EBUS-GS)-guided transbronchial biopsy offers advantages and is frequently used for the diagnosis of peripheral pulmonary lesions. A previously healthy 75-year-old man was hospitalized to undergo bronchoscopy for the diagnosis of a mass with a diameter of about 40 mm in right S³ area. The mass was detected during a regular medical check-up, and lung cancer was suspected. EBUS-GS guided transbronchial biopsy was performed through the right B³. Following the bronchoscopic procedure and removal of the GS, we observed that an X-ray opaque tip attached to the point of the GS was missing. We examined the lung field through X-ray fluoroscopy and found that the detached opaque tip was located in the right middle lung field. We re-inserted the bronchoscope, and successfully recovered it using transbronchial biopsy forceps. The rate of complications in EBUS-GS is low, and the complication presented in this report is rare. Physicians should exercise caution when performing this procedure and carefully check the condition of the kit to reduce the risk of such complications.

1. Introduction

The detection rate of peripheral pulmonary lesions continues to increase with the widespread application of medical checkups and computed tomography (CT) examinations. In addition, the use of transbronchial biopsy for the diagnosis of such lesions is increasing. As a diagnostic modality, endobronchial ultrasound with a guide sheath (EBUS-GS)-guided transbronchial biopsy is frequently used, offering advantages versus previous methods [1,2]. Utilization of an ultrasound probe reliably enables us to reach an identified spot. Subsequently, we can accurately and repeatedly approach the target spot using a fixed GS. Moreover, these procedures are characterized by diagnostic accuracy and less invasiveness to patients.

Herein, we report a rare case of detachment of an X-ray opaque tip of the GS during the transbronchial biopsy procedure, which was successfully recovered.

1.1. Case report

The patient was a previously healthy 75-year-old man. An abnormal

chest X-ray was noted during a regular medical check-up. Consequently, he visited our university hospital for further examination in 2018. He did not present specific subjective symptoms, and had a past smoking history of 30 cigarettes per day from 24 to 61 years of age. The patient had experienced left pneumothorax at the age of 55 years. The findings of the physical examination are described below. His height and weight were 156.4 cm and 48.5 kg, respectively. Vital signs included a heart rate of 66 beats/min, SpO₂ of 97%, and a body temperature of 36.5 °C. Chest examination did not reveal abnormal heart and breath sounds. Other systemic examinations were normal. Blood examinations for cell counts and biochemistry were normal, except a slight elevation in the levels of the serum tumor marker of squamous cell carcinoma (2.4 ng/mL).

Chest X-ray examination revealed a shadow in the right upper lung field (Fig. 1a). Chest CT confirmed the presence of a mass in the right S³ area (size: 41 × 36 mm) in the background of multiple large and small lucencies, indicating centrilobular pulmonary emphysema (Fig. 1b).

Following admission, bronchoscopy was performed based on suspicion of lung cancer. We conducted EBUS (UM-S20-17S, Olympus, Tokyo, Japan) with a disposable GS (K-203 SG-201C, Olympus, Tokyo,

^{*} Corresponding author. Department of Respiratory Medicine, Kawasaki Medical School, 577 Matsushima, Kurashiki, Okayama, 701-0192, Japan. Tel.: 086 462 1111.

E-mail address: naoya.y@med.kawasaki-m.ac.jp (N. Yasokawa).

<https://doi.org/10.1016/j.rmcr.2020.101030>

Received 28 January 2020; Received in revised form 14 February 2020; Accepted 20 February 2020

Available online 23 February 2020

2213-0071/© 2020 The Authors.

Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

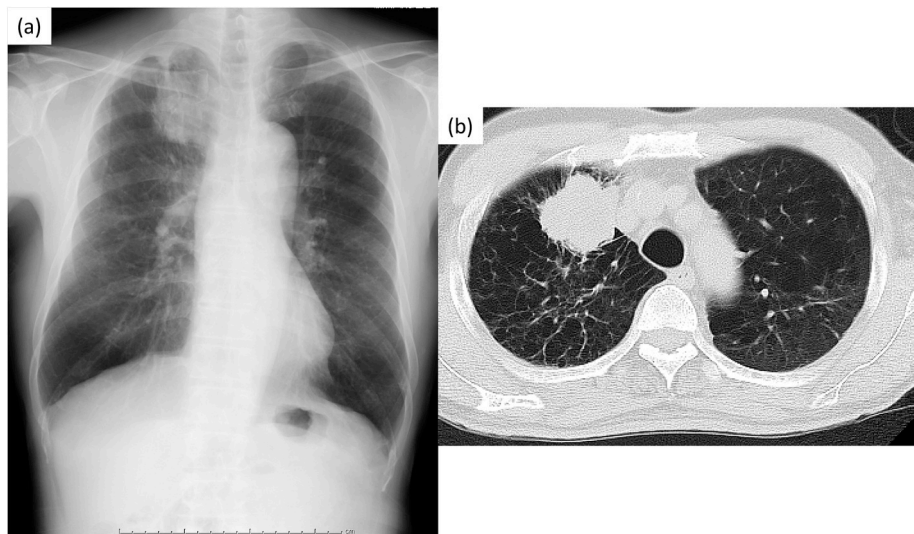


Fig. 1. (a) Chest radiograph and (b) CT images at the initial medical examination. CT, computed tomography.



Fig. 2. EBUS-GS kit (K-203 SG-201C, Olympus, Tokyo, Japan). A white arrow indicates the X-ray opaque tip. EBUS-GS, endobronchial ultrasound with a guide sheath.

Japan) (Fig. 2) through the right B³, confirmed the tumor lesion, and performed transbronchial biopsy. Six biopsies were performed for this lesion. After the completion of the biopsy, we initially removed the transbronchial biopsy forceps, followed by the GS. We noticed that the X-ray opaque tip was missing from the point of the GS (Fig. 3). We subsequently examined the lung field using an X-ray fluoroscopy and found that the missing opaque tip was located in the right middle lung

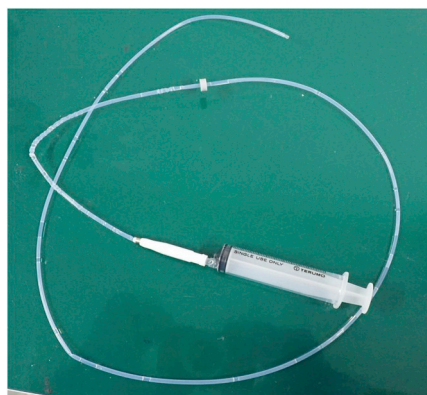


Fig. 3. EBUS-GS kit without an X-ray opaque tip. EBUS-GS, endobronchial ultrasound with a guide sheath.

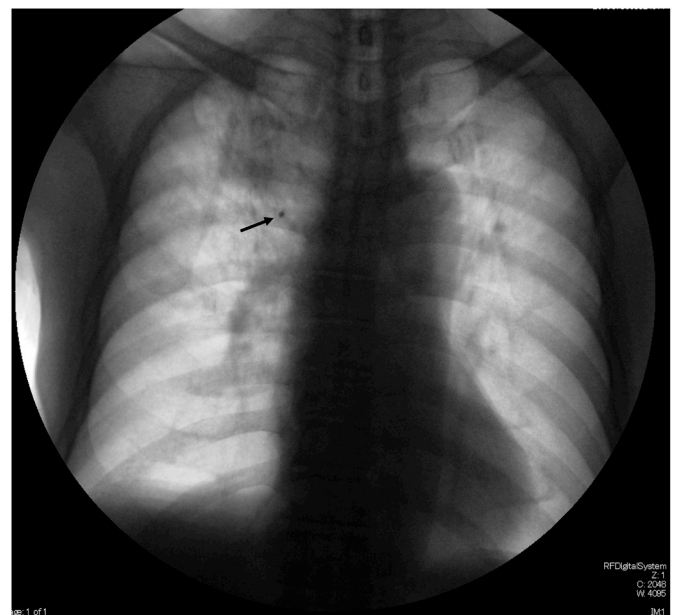


Fig. 4. Chest radiograph after removal of the GS, indicating the detachment of the X-ray opaque tip (arrow). GS, guide sheath.



field (Fig. 4). We re-inserted a bronchoscope (BF-1T260, Olympus, Tokyo, Japan), and confirmed that the tip remained on the inside of the right B². We attempted to recover the tip using transbronchial biopsy forceps; however, we were unable to reach it as the curve of the bronchus was relatively sharp. We replaced the bronchoscope with another device (BF-260, Olympus, Tokyo, Japan) and succeeded in retrieving the tip.

The patient was discharged from the hospital the following day without any specific complications, and diagnosed with squamous cell lung cancer.

2. Discussion

Presently, EBUS-GS is widely used for the examination of peripheral pulmonary lesions. This procedure is characterized by a lower rate of complications compared with those reported for biopsy through chest CT guidance [3]. According to Hayama et al. [4], the complication rate of EBUS-GS is 1.3% (13/965 cases), accounting for eight cases of pneumothorax and five cases of respiratory infection. The EBUS-GS device was damaged in four cases; however, all of these cases involved an EBUS probe. Therefore, the present case of detachment of the opaque tip due to a damaged GS is extremely rare. A detached tip may not be easily recoverable depending on its location.

We recommend the following actions to reduce the risk of tip detachment. Firstly, we should confirm the condition of the X-ray opaque tip, namely, whether it is not loosened or deformed. Secondly, physicians should exercise caution when performing the procedure. For example, during the procedure using a forceps or brush, we should not pull the GS using excessive force when resistance is felt during the procedure (using a forceps or brush), we should not pull the GS with excessive force. Although we are not certain whether the number of biopsy procedures influenced the condition of the GS, a low number of biopsies would be desirable. Thirdly, we recommend to remove the GS while using an X-ray fluoroscope. Fourthly, although we used a thick GS for the lesion at the apex of the lung. However, a narrow scope and a thin GS, or biopsy without a GS may have been more effective in avoiding the damage of the GS. This should be considered during the procedure. Fifthly, although we did not use an inductor in this case, such a device could damage a tip; this should also be taken into consideration. Finally,

we should be prepared to cope with such unexpected situations. In the present case, we consider that the tip of the GS may have been defective, as the bronchoscopy procedure itself was performed without any problems as usual.

Recently, a new disposable GS kit mixed with contrast agent at the point (Olympus GuideSheath kit2; K-401,402; SG-400C, 403,404; SG-401C) rather than an X-ray opaque tip was developed. This may be useful in reducing the risk of detachment of an X-ray opaque tip.

In conclusion, we experienced detachment of an X-ray opaque tip of EBUS-GS during bronchoscopy, which was successfully recovered. Physicians should exercise caution during the procedure and carefully check the condition of the kit before and during bronchoscopy with an EBUS-GS to reduce the risk of such complications.

Funding

None. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.rmcr.2020.101030>.

References

- [1] N. Kurimoto, T. Miyazawa, S. Okimasa, A. Maeda, H. Oiwa, Y. Miyazu, M. Murayama, Endobronchial ultrasonography using a guide sheath increases the ability to diagnose peripheral pulmonary lesions endoscopically, *Chest* 126 (3) (2004) 959–965.
- [2] M. Yoshikawa, N. Sukoh, K. Yamazaki, K. Kanazawa, S. Fukumoto, M. Harada, E. Kikuchi, M. Munakata, M. Nishimura, H. Isobe, Diagnostic value of endobronchial ultrasonography with a guide sheath for peripheral pulmonary lesions without X-ray fluoroscopy, *Chest* 131 (6) (2007) 1788–1793.
- [3] D.I. Fielding, C. Chia, P. Nguyen, F. Bashirzadeh, J. Hundloe, I.G. Brown, K. Steinke, Prospective randomised trial of endobronchial ultrasound-guide sheath versus computed tomography-guided percutaneous core biopsies for peripheral lung lesions, *Intern. Med. J.* 42 (8) (2012) 894–900.
- [4] M. Hayama, T. Izumo, Y. Matsumoto, C. Chavez, T. Tsuchida, S. Sasada, Complications with endobronchial ultrasound with a guide sheath for the diagnosis of peripheral pulmonary lesions, *Respiration* 90 (2) (2015) 129–135.