

Dear reviewers and editors:

We appreciate the reviewers and editors for their thoughtful comments and suggestions, which have improved the manuscript effectively. We have included almost all of their comments and tried our best to revise the manuscript. Our responses to the comments are presented below.

Comments to Reviewer 1

The suggestions you recommended to us were very valuable and helpful for revising and improving our paper.

1. This patient was a 53-years-old man, ASA II, admitted for rupture of spleen by falling accidents. The time from injury to surgery was about 5 hours.

2. Focused assessment with sonography in trauma (FAST) has been extensively utilized and studied in blunt and penetrating trauma for the past 3 decades. Prior to FAST, invasive procedures such as diagnostic peritoneal lavage and exploratory laparotomy were commonly utilized to diagnose intraabdominal injury. Today the FAST examination has evolved into a more comprehensive study of the abdomen, heart, chest, and inferior vena cava, and many variations in technique, protocols, and interpretation exist. According to the FAST protocol, the organ damage in the corresponding parts of the patient can be quickly evaluated by free fluid in the chest cavity, abdominal cavity and pelvic cavity of the patient. In this case, preoperative emergency ultrasound examinations including heart, chest and abdomen were performed, and it was found that spleen had been ruptured accompanied with active bleeding, complicated with progressive hemochrome reduction, which was also the main reason for the patient to undergo emergency surgery. Preoperative ultrasound showed no abnormalities in the heart or chest.

3. The patient did not complain of dyspnea preoperatively, and preoperative CT showed no hemothorax or pneumothorax (Figure 1). There was no evidence to diagnose pneumothorax before operation.

4. Intraoperative high airway pressure and hypoxemia can be caused by many complications, such as sputum bolt blockage, severe bronchospasm and stiffness of chest wall after the administration of sufentanil. It was found by auscultation that the right breath sounds were clear, while the left breath sounds were hardly to be heard. The complications above could be excluded. According to the BLUE protocol of lung ultrasound (LUS), the pleural slide sign disappeared in the recommended area of the left lung, and in M mode, obvious parallel line sign and lung points could be seen below the pleura (Figure 2B). The left pneumothorax was diagnosed by above signs and ultrasonography.

5. Firstly, the diagnosis of pneumothorax was confirmed by the patient's signs and results of ultrasound scanning. Secondly, the pneumothorax developed quickly under mechanical positive pressure ventilation, requiring rapid and effective managements to improve symptoms. Finally, the placement of a closed thoracic drainage tube was more effective than needle aspiration in improving the pathophysiology of patients with pneumothorax.

Comments to Reviewer 2

Thanks for your sincere advices for our manuscript. To make it easily to be understood, we have read the literature you recommended. The article was very practical and concluded that blunt traumatic pneumothoraces were mainly located at the parasternal regions especially in pneumothorax with small volume ((Anatomical locations of air for rapid diagnosis of pneumothorax in blunt trauma patients. Hefny AF, Kunhivalappil FT, Paul M, Almansoori TM, Zoubeidi T, Abu-Zidan FM. World J Emerg Surg. 2019 Sep 2;14:44. doi: 10.1186/s13017-019-0263-0. eCollection 2019).). This paper provided an important basis for the rapid localization of pneumothorax diagnosed by ultrasound. At the same time, it was also consistent with the BLUE protocol, which recommended the rapid localization of the upper and lower BLUE dots (adjacent to the sternum) to diagnose this complication (Lichtenstein D. Novel approaches to ultrasonography of the lung and pleural space:Where are we now?[J]. Breathe, 2017,13(2):100-111. DOI:10.1183/20734735.004717.).

Comments to Reviewer 3

Thanks for your sincere advice. The application of ultrasound in the diagnosis of pulmonary related diseases such as pneumothorax has been widely accepted by doctors of ICU and emergency department. For anesthesiologists, the prevalence of this technology is not high, and it is rarely mentioned in the literature. This manuscript is the first successful case to be diagnosed and treated by anesthesiologists with ultrasound in our medical center. The perioperative pneumothorax was successfully and rapidly diagnosed according to the recommendation of BLUE protocol. We believe that our case report will promote the population of pulmonary ultrasound in the diagnosis of pneumothorax.

Comments to Reviewer 4

Thank you for your recognition to this manuscript. Chest CT examination is the gold standard for the diagnosis of lung diseases, but patients need long transportation, which is risky and not suitable for intubation patients under general anesthesia. Lung ultrasound is a useful method for evaluating dyspnea in critically ill patients, especially bedside lung ultrasound in emergency (BLUE), which has been reported by a large number of studies with high practical value for the diagnosis of lung-related diseases. This protocol is now widely accepted by doctors in ICU and emergency department, but there have been few reports of pulmonary diseases diagnosed by anesthesiologists with ultrasound.

(Lichtenstein D. Lung ultrasound in the critically ill[J]. Annals of IntensiveCare,2014,17(1):315-322.DOI:10.1186/2110-5820-4-1.)

(LICHTENSTEIN D A.BLUE-protocol and FALLS-protocol: two applications of lung ultrasound in the critically ill[J].Chest,2015,147(6):1659-167)

(Lichtenstein D. Novel approaches to ultrasonography of the lung and pleural space:Where are we now?[J]. Breathe, 2017,13(2):100-111. DOI:10.1183/20734735.004717.)

(Lichtenstein DA, Mezière GA. Relevance of lung ultrasound in the diagnosis of acute respiratory failure:the BLUE protocol[J].Chest, 2008,134(1):117-125. 0.)