

Bedside Ultrasound is a Fast and Easy Tool in the Diagnosis of Pleural Effusion After Pediatric Cardiac Surgery

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Received: April 20, 2014; Accepted: April 26, 2014

Keywords: Ultrasonography; Pleural Effusion; Thoracic Surgery; Diagnosis

Dear Editor,

Pleural effusion is defined as the accumulation of fluid between the two membranes of the inner layer (visceral) and the outer layer (parietal) of the pleura. This space has usually an extremely small quantity of fluid, about 10 – 20 mL, to provide lubrication between these two layers. Pleural effusion is a major problem in that it may require pediatric cardiac surgery in over 25% of the cases (1, 2) and lead to increased postoperative morbidity and increased Intensive Care Unit (ICU) and hospital stay. Pleural effusion is principally frequent in the wake of univentricular surgery (palliation operation).

Pleural effusion after cardiac surgery may demonstrate various presentations. More often than not, these patients may be entirely asymptomatic and pleural effusion is an incidental diagnosis on chest X-ray (CXR), depending of course on the amount of pleural effusion. These patients tend to exhibit considerable tachypnea, dyspnea, chest pain, and fever, and larger effusion may lead to hemodynamic instability. Therefore, a high degree of suspicion and rapid diagnosis are essential for the treatment of this group of patients. The diagnostic modalities are comprised of CXR, ultrasonography, and computed tomography (CT). CXR is the most frequently used method to investigate large or small pleural effusions; however, it exposes the patient to radiation and is relatively time-consuming (3). High-resolution computed tomography (HRCT) is considered as “the gold standard” for finding small pleural effusions, but it too exposes the patient to high levels of radiation. HRCT may be an expensive imaging modality in comparison with CXR, but it is equally helpful. Pleural fluid tap or thoracentesis with a needle is another method for the detection and analysis of pleural effusion and its etiology, but it has the disadvantage of being invasive. Bedside ultrasonography is a useful technique for the diagnosis of pleural collections and

differentiation between effusion and lung consolidation or collapse (4). Currently, pulmonary ultrasound (PUS) is considered a helpful, practical, point-of-care technique in the Emergency Room (5). This method can detect small quantities of localized pleural fluid, as little as 3-5 mL, which cannot be recognized by CXR. In contrast to the radiologic technique, PUS enables simple separation of localized pleural fluid and condensed pleura and is a suitable method in analytical thoracentesis even when there is less liquid collection. In the Pediatric ICU and other special postoperative cardiac surgery situations, ultrasound (sonography or echocardiography) is the essential imaging method. In addition to taking medical history and attention to signs or symptoms, emergency ultrasound is a well-known modality for the management and monitoring of patients (8). Recently, PUS was presented as a pocket-size apparatus containing a two-dimensional scanner and, a “cardiac convex” or “micro-convex” transducer; it can, therefore, be employed for the imaging of patients in the sitting, supine, near-supine, and even standing positions. PUS can also help determine acute dyspnea following pulmonary consolidations, pneumothorax, acute respiratory distress syndrome, and cardiogenic pulmonary edema (5, 6). Focused assessed transthoracic echocardiography (FATE) confer parasternal, apical, and subcostal views of the heart from four transthoracic positions in addition to the right and left pleural views, B-lines inside the lung, extravascular lung fluid, and amount and respiratory variation of the inferior vena cava. The image quality of FATE is generally adequate for the rapid early screening of patients in an emergency situation and matches a physical examination in the ICU (7).

In conclusion, bedside ultrasound is a simple, fast, practical, reliable, and easy-to-interpret method for the detection of pleural effusion.

Authors' Contribution

Dr. Evaz Heidarpour suggested the letter's idea and provided related literature review and contributed to the writing and submission of the letter. Dr. Mohsen Ziyaeifard contributed to literature review, wrote the letter text, and contributed to submission.

Financial Disclosure

There is no conflict of interest.

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