

Lung ultrasound in the pediatric patient with postoperative congenital heart disease. Towards the new frontier.

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Introduction: Post-operative recovery of children with heart disease is still encumbered by pulmonary complications like pneumothorax (PNX), pleural effusion (PLE), interstitial edema and pulmonary consolidation (PC). The gold standard for diagnosis of those complications is chest CT which is not feasible in routine clinical care thus chest x-ray is routinely preferred. Recently lung ultrasound (LUS) has become an important diagnostic tool for evaluation of pulmonary diseases in the pediatric context, especially in the emergency and intensive care setting. LUS is accurate in differentiating pleural and parenchymal diseases, it allows for dynamic imaging and is useful in the unstable patient being a bedside examination. Few data in literature support the use in the congenital heart disease pediatric patient, as the method has been developed for the study of pulmonary disease.

Objectives: To evaluate LUS accuracy in the identification of PNX, PLE and PC in a pediatric population of patients with congenital heart disease who underwent heart surgery

Methods: 3 patients aged 0-17 years who underwent cardiac surgery were evaluated in the postoperative period by chest x-ray and LUS at the same time. The exams were executed by two examiners unknown of the other result. The methods were compared for recognition of PNX, PLE and PC. Datas were analyzed for agreement with Cohen's K. Relative sensitivity was then compared with McNemar test. **Results:** LUS shows good agreement for PNX and moderate agreement for both PLE and PC. LUS shows also a significantly superior relative sensitivity than chest x-ray for PC and a significantly inferior relative sensitivity for PNX. It also shows a tendency to a better relative sensibility (just over the limits for statistical significance). Complete data analysis in table

Conclusions: This study confirms that LUS has a sufficient agreement rate with the current clinical standard (chest x-ray). The test shows a poor result only in recognition of PNX but the unrecognized PNXs were all minimal (less than 5 mm). Non inferiority of LUS in the diagnosis associated with the practicality of bedside performing and absence of radiation recommend its routine use in our population

	Pleural effusion	Pneumothorax	Pulmonary consolidation
Chest x-ray diagnosis	14	7	21
Lung ultrasound diagnosis	20	5	28
Agreement	K 0,40 (moderate)	K 0,63 (good)	K 0,51 (moderate)
Relative sensitivity	83% (eco) vs 58% (x-ray) p 0,060	62% (eco) vs 87% (x-ray) p 0,003	90% (eco) vs 68% (x-ray) p 0,048