

Chest Ultrasound vs. Chest X-ray in Pediatric Patients after Congenital Cardiac Surgery - A Comparative Study

Menzel C. (1), Bangen U. (1), Schneider M. (2), Trieschmann U. (2)

Department of Paediatric Cardiology, University Hospital of Cologne - Heart Center, Cologne / Germany (1); Department of Anaesthesiology and Intensive Care Medicine, University Hospital of Cologne, Cologne / Germany (2)

Introduction: Postoperative management of patients with congenital heart disease requires imaging techniques to recognize complications like pleural effusions, pneumothoraces, pneumonia, atelectases or pulmonary venous congestion. Imaging techniques are as well used for verification of correct positions of chest tubes, central venous lines and endotracheal tubes. The most common technique to identify intrathoracic pathologies is chest X-ray, but particularly in pediatric patients radiation exposure is detrimental. Chest ultrasound is fast, repeatable and harmless, and has been increasingly used in pediatric patients in the last years. Yet it is unknown if ultrasound, for selected indications, is equivalent to chest X-ray. Prospective studies concerning this topic on pediatric patients following congenital heart surgery are still missing.

Methods: Prospective, blinded study on 50 pediatric patients following congenital cardiac surgery since May 2013. Evaluation of the chest ultrasound examination on first postoperative morning not knowing the corresponding, routinely performed, chest X-ray. Analysis of the findings of both imaging techniques according to the question whether the pathologies diagnosed by X-ray can adequately be seen by ultrasound. Purpose of our study is to find out if the number of X-ray images and thus radiation exposure to the patients may be reduced by the use of ultrasound.

Results: Yet 42 of 50 patients are completed. Expected end of our study will be in February 2014, final results will be presented on the AEPC meeting. Preliminary results: 19 pts. with atelectases (2 not diagnosed by ultrasound, 13 not diagnosed by X-ray), 16 pts. with pleural effusions (all diagnosed by ultrasound, 14 not diagnosed by X-ray), 2 pts. with minor pneumothoraces (none diagnosed by ultrasound, all by X-ray), 24 pts. with mild pulmonary venous congestion and 2 pts. with pulmonary infiltrations.

Conclusions: Preliminary findings show that major postoperative problems as atelectases and pleural effusions were more frequently diagnosed by ultrasound than by X-ray. Diagnosis of pulmonary venous congestion and pneumonia require chest X-ray, but correspond to clinical symptoms if relevant. Chest ultrasound should be daily routine after congenital cardiac surgery. Chest X-ray should be considered for special indications, if clinical symptoms appear.