

## Risk and Prediction of Clinically Relevant Pericardial Effusion after Pediatric Heart Surgery

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**Introduction:** Pericardial effusion (PE) after pediatric cardiac surgery is common. Research on PE is hampered by the lack of a uniform classification of the presence and severity of PE. Therefore, we focused on PE altering clinical management: ie requiring additional echocardiograms, start or continuation of medication or pericardiocentesis: clinically relevant PE (crPE). The aim was to investigate risk factors for crPE and to create a prediction model.

**Methods:** Pediatric patients who underwent cardiac surgery at the center for congenital heart disease Amsterdam-Leiden between January 2010 and December 2014 were selected and followed until 1 month after surgery. Preoperative variables, such as age, gender and type of heart defect were studied in the complete cohort using independent t-tests, chi-square tests, and logistic regression. Perioperative and postoperative variables were studied in a case-control manner. Each patient with crPE was matched to one without crPE. Matching was based on age, gender and diagnosis severity. Matched logistic regression was used to determine the effect sizes. To create the prediction model, the important preoperative variables were determined in the complete cohort and then the additional effect of perioperative and postoperative variables was determined in the case-control data. Inverse probability weighting was used for data of the controls

**Results:** 1214 surgical episodes of 1039 patients were included. CrPE developed in 134 (11.0%) of these episodes and 31 (2.6%) required pericardiocentesis. No deaths were caused by PE. Older age at surgery, use of cardiopulmonary bypass (CPB) and longer duration of CPAP increased the risk of crPE, whereas a previous operation decreased the risk of crPE. The final model consisted of age, history of previous operation, CPB usage, duration of CPAP postoperatively and the amount of thoracic drain output. The area under the curve of the model was 0.71.

**Discussion:** PE incidence corresponds with those in previous studies. Most of the observed risk factors were known from adult literature and are demonstrated to also apply to crPE in children, whereas CPB use was newly identified as a risk factor for crPE after pediatric cardiac surgery. The model can identify high-risk patients for crPE and may improve patient care.