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Number of Thoracotomies Predicts Impairment in Lung Function and Exercise Capacity but not survival in Patients with Congenital Heart Disease

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Objective: Almost all of the patients with congenital heart disease (CHD) require open heart surgery to ensure survival into adulthood. History of previous thoracotomy is associated with respiratory muscle weakness, impairments in chest wall compliance and moderately to severely impaired lung function. This study aimed on the functional outcome of patients with CHD with regard to the number of thoracotomies.

Patients and Methods: In total 1372 adolescents and adults with various CHD (624 female, 32.4 ± 11.5 years) undergone lung function testing and accompanied cardiopulmonary exercise testing in our institution from January 2010 to August 2015.

Results: After adjusting for confounding variables, with every thoracotomy the risk for a restrictive lung pattern increased by 1.8-fold (CI: 1.606 - 2.050; p<.001) and the risk of impaired exercise capacity by 1.2-fold (CI: 1.054 - 1.346; p=.005). There is a strong correlation of forced vital capacity and peak oxygen uptake (r=.464, p<.001). In 1066 patients surgically treated, thoracotomy during the first year of life was associated with a 1.5-fold increased risk (CI: 1.118 – 1.984; p=.007) impaired lung pattern but not with exercise capacity. During follow-up 21 patients died. Survival increased by 6.6% (CI: 1.035 – 1.098; p<.001) for every percentage increase in peak oxygen uptake (%predicted). Thoracotomies (p=.522), cyanosis (p=.612) and forced vital capacity (p=.389), were not predictive for survival.

Conclusions: Independent for CHD complexity, multiple thoracotomies lead to limitations in lung capacity yielding to further limitations in exercise capacity which is still the strongest predictor for survival in multivariable analysis.