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Title: Rehabilitation after lung transplantation with extracorporal membrane oxygenation

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Body: Extracorporal membrane oxygenation (ECMO) is applied in respiratory failure before lung transplantation (LTx). The success of pulmonary rehabilitation (PR) following LTx with ECMO is unknown. Hypothesis: a 3-week inpatient PR in ECMO-treated patients is as efficient as in conventional transplanted. Methods: patients were divided in 2 groups (ECMO vs. nonECMO). Vital capacity (VC%predicted), forced expiratory volume (FEV1%predicted), peak work rate (PWR, Watt), maximum oxygen uptake (VO2max%predicted), 6-min. walk distance (6-MWD [m]), activity of daily life (ADL, Barthel's Index)) and health related quality of life (HRQoL, Short Form 36 questionnaire (SF36)) were assessed at baseline (BL) and completion of PR. Results: 465 patients (ECMO: 54, nonECMO: 411) were included. Overall improvement in each analyzed parameter was significant ($p < 0.01$). Differences at BL (ECMO vs. nonECMO, median) in VC (55 vs. 61%, p=0.01), FEV1 (52 vs. 62%, p<0.01), PWR: (36 vs. 44 Watt, p<0.01), 6-MWD (260 vs. 355m, p<0.01), SF36 physical functioning (PF) (20 vs. 30, $p < 0.01$) persisted at completion (VC: 66 vs. 70% (p=0.01), FEV1: 59 vs.71%, (p<0.01), PWR: 50 vs. 55 Watt (p=0.01), 6-MWD: 387 vs. 463m (p<0.01), SF36 PF: 50 vs. 65 ($p < 0.01$)). Differences in ADL ($p < 0.01$) and SF36 role physical (p=0.02) were compensated (p=0.7 respectively 0.6). VO2max and SF36 domains bodily pain, general health perception, social functioning, role emotional and mental health did not differ anytime. Conclusion: barriers after respiratory failure treated with ECMO and LTx are overcome in 3-week inpatient PR. Physical functioning in conventional transplanted is superior. ADL and HRQOL are similar in both groups and remarkable high.