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Title: Rehabilitation success after bridging to lung transplantation with extracorporeal membrane oxygenation and mechanical ventilation

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Body: Extracorporeal membrane oxygenation (ECMO) and mechanical ventilation (MV) are used in end stage lung disease as a bridge to lung transplantation (LTx). The success of pulmonary rehabilitation (PR) after ECMO and MV is unknown. Hypothesis: 3-week inpatient PR improves physical functioning (PF) and health related quality (HRQOL) after MV and ECMO as efficient as in non supported (NS) patients (pts.). Methods: pts. were divided in 3 groups (ECMO/MV/NS). Vital capacity (VC), forced expiratory volume (FEV1, % predicted), peak work rate (PWR), 6-min. walk distance (6-MWD) and HRQOL (Short Form 36 questionnaire (SF36)) were assessed at baseline (BL) and completion of PR. Results: 440 pts. (ECMO 21, MV 26, NS 393) were included. Overall and intra-group improvement in each parameter was significant ($p < 0.01$). At BL differences (ECMO/MV/NS, median) in VC (60/53/61 %), FEV1 (52/46/61%), PWR (32/33/44 Watt), 6-MWD (260/223/360 m) existed between NS and ECMO/MV in PWR and 6-MWD (p 0.008/0.001 resp. p 0.01/0.001) and comparing NS with MV in VC, FEV1 (p 0.001), SF 36 PF (p 0.02), bodily pain (BP, p 0.04) and general health perception (GHP, p 0.04). At completion (VC 65/61/71%; FEV1 61/53/70%; PWR 46/44/55 Watt; 6-MWD 348/385/466 m) differences in PF between MV and NS persisted in VC (p 0.001), FEV1 (p 0.02), 6-MWD (p 0.04), NS and ECMO differed in FEV1 (p 0.03) and 6-MWD (p 0.04). PWR was insignificant. SF36: MV and NS differed in PF (p 0.02), GHP (p 0.04) and vitality (p 0.04), ECMO and MV in GHP (p 0.02). Conclusion: barriers after bridging with ECMO and MV are overcome in PR partially. PF and HRQOL in NS are superior, while ECMO and MV reveal comparable results.