Introduction: After bidirectional cavo-pulmonary anastomosis (BCPA), severe life threatening, therapy resistant hypoxemia is rare and affected patients need ECMO or surgical rescue therapy. Data about incidence and outcome of those therapeutic bail-out strategies, however, are rare and clinical pathways not published. We analyzed the results of our way out strategies in failing BCPA.

Method: We screened the patient records of all 219 patients who underwent BCPA between 2006 and 2014 at our institution and selected those who suffered from severe therapy resistant hypoxemia, defined as repeated arterial oxygen saturations below 55 % with consecutive lactate acidosis. We report the therapeutic strategy and the outcome of these patients with a special focus on partial take down surgery by an additional unilateral systemic-pulmonary shunt and functional separation of the right and left pulmonary arteries by ligation or clip.

Results: Out of 219 patients after BCPA, eleven (5%) showed severe therapy resistant hypoxemia. In 4 patients severe hypoxemia developed early after the end of bypass (median 2.8 h; 0.5 – 6 h) and in 7 patients late after surgery (median 19 d; 4 – 63 d). In 6 of the 11 affected patients, severe hypoxemia led to ECMO, in 2 cases the patients died in multi-organ failure without further surgical treatment. Thus, in total, 9 of 11 patients received a partial take down. Six of these 9 patients survived but 3 remained respirator dependent and died after 16, 90, and 150 days, respectively. These three patients had developed severe hypoxemia late after BCPA. Thus, 6 of 9 patients (67 %) with partial take down survived until discharge at home. Fontan completion was performed in 2 patients successfully, 3 patients are waiting for completion but one further patient died at home with tracheostoma and intermittent respiratory support 3 years after surgery.

Conclusion: Partial take down by unilateral Glenn and systemic-pulmonary shunt as a way out strategy in severe therapy resistant hypoxemia after BCPA, is possible in selected patients. The overall mortality in failing BCPA, however, is considerable.