

**Title:**

Airway Pressure Release Ventilation for a small child with elevated intraabdominal pressure after living donor-related kidney transplantation.

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**ABSTRACT BODY:**

**Case Presentation:** A 23-month old, 9.3kg boy with polycystic kidney disease was referred to our hospital for living donor-related kidney transplantation. His abnormality was pointed out by ultrasound in the prenatal period. He presented respiratory insufficiency soon after birth and required mechanical ventilation as well as peritoneal dialysis. His abdominal CT scan revealed the kidneys as well as the liver that were significantly enlarged due to the multiple cystic lesions and those organs occupied most part of the abdominal space. His left and right kidneys were resected at the 2nd and the 3rd month old, respectively. Hemodialysis was introduced at 13th month old since he had repeated episodes of fluid overload.

The patient underwent living donor-related kidney transplantation from his mother. General anesthesia was employed with midazolam, fentanyl, and isoflurane. A 4mm, cuffed endotracheal tube was intubated with the cuff deflated. The patient was ventilated by pressure-controlled mode with conventional settings.

Intraoperative course was uneventful until the adult-sized graft kidney was implanted in the right retroperitoneal space. The mass-effect of the graft kidney and the enlarged liver caused significant rise in airway pressure, hypoxemia and hemodynamic instability. Bronchoscopy confirmed that the endotracheal tube was properly placed. The abdominal wall was unable to be closed due to the respiratory and hemodynamic deterioration. The lungs were manually ventilated meantime applying high airway pressure. The patient was transferred to the ICU with the abdomen opened.

In the ICU, we employed Airway Pressure Release Ventilation (APRV; PEEP high/low = 24/0 cmH<sub>2</sub>O, Time high/low = 2.8/0.2 second) in order to maintain the lung volume counteracting against the elevated abdominal pressure. Spontaneous breathing was preserved. He tolerated with this respiratory support well and his oxygenation, hemodynamics, and graft kidney function were all well preserved.

On the postoperative day 2, the patient was brought to the operating room with the same ventilator settings and his abdomen was successfully closed. He was extubated on the next day and was discharged from the ICU on the 4th postoperative day.

**Discussion:** It has been reported that APRV with spontaneous breathing has advantages over conventional mechanical ventilation not only on oxygenation but also on hemodynamics and splanchnic perfusion [1] - [3]. In our case, conventional mechanical ventilation was not sufficient to achieve an optimal respiratory or hemodynamic status due to the increased intraabdominal pressure. APRV in this situation played a crucial role in maintaining adequate oxygenation and organ perfusion. Consequently, we consider that APRV can be successfully applied to perioperative management for pediatric abdominal organ transplantation.

**References:** 1. Hering R. et al., Intensive Care Med 2002  
2. Habashi N.M., Crit Care Med 2005  
3. Putensen C. et al., Am J Respir Crit Care Med 1999