MAQUET
GETINGE GROUP

PATIENT CASE REPORT. CATEGORY: INFANT

PREMATURE INFANT WEIGHING 393 g (13.86 oz), ANESTHETIZED AND VENTILATED WITH FLOW-i

Clinical background and situation:

Originally this was a twin pregnancy following IVF. The twin sibling had trisomy 18 and was found dead *in utero* at GA 23 weeks + 0/7. Due to worsening of the CTG and falling heart rate, the patient, a female, was delivered at GA 23 weeks + 3/7 by caesarean section, weighing 355 g (12.52 oz) at birth.

Following resuscitation with intubation and ventilation (tube I.D. 2.0 mm) the patient was stable in terms of hemodynamics and respiration. She was sedated with midazolam (supplemented with morphine later in the course of treatment) and transferred to the neonatal intensive care ward.

The follow-up examination showed a vital, premature infant with anal atresia with rectovaginal/vestibular fistula. The remaining organ screening was otherwise unremarkable.

Intervention and course of therapy:

It was possible to probe the anal stula with a stomach tube to Fr. 6, and meconium was deposited.

On the 11th day, the patient did not deposit any more feces through the probe. The clinical investigation revealed an abdomen that was sensitive to the touch, raised and stretched, with bowel rigidity. An abdominal x-ray showed a massively expanded loop in the right lower abdomen but still no indication of perforation. Increasing leukocyte values were found in the laboratory examination. Hemodynamically, the child was stable and repeated cranial sonographies were unremarkable; in particular there was no indication of intracerebral hemorrhages.

After surveying the findings, and with the patient's general condition worsening, it was decided that an exploratory laparotomy should be done and the patient was transferred to the operating room.

Anesthesia process and result:

During transport, the patient was hemodynamically stable without requiring any treatment to support circulation. Prior to surgery, she was sedated with midazolam and morphine, intubated and ventilated with SIMV (PIP 22 mbar, PEEP 4 mbar, RR 28/min, I:E 1:2.4, TV 2.9 mL, MV 0.08 L/min, FiO_2 0.35; with cap. pH 7.4, pCO_2 47 mmHg, pO_2 29 mmHg, HCO_3 27.1 mmol/L, BE +4.2, HCT 40%; O_2 sat. measured by pulse oximetry 82%–94%).

During the operation the patient received fentanyl (4 µg/kg BW bolus, 3 µg/kg BW/h perfusor), Ketanest S (2 mg/kg BW, 4 mg/kg BW/h perfusor). Inhalation anesthesia was performed with sevoflurane (et Sevo 1.8–2 vol%). The intensive care respiratory parameters were transferred to the FLOW-i during PCV ventilation. However, PIP and FiO_2 were already significantly reduced before the skin incision (see table). No neuromuscular blocking agent was administered.

	PIP (mbar)	PEEP (mbar)	MV (L/min)	RR (/min)	TV (mL)	FiO_2	pH	$pcapO_2$ (mmHg)	$pcapCO_2$ (mmHg)	HCO_3- (mmol/L)	BE	$petCO_2$ (mmHg)
Intensive care respirator (preoperative)	22	4	0.08	28	2.9	0.35	7.4	30	47	27.1	4.2	n.m.
FLOW-i (intraoperative)	14	4	0.07	24	3	0.31	7.35	48.9	46	26	0.4	34

PIP: Peak Inspiratory Pressure; MV: Minute Volume; RR: Respiratory Rate; TV: Tidal Volume; BE: Base Excess; cap.: capillary; et: end tidal; n.m.: not measured.

Measurement of even the smallest breath volumes was very reliable and reproducible over the course of the entire operation, and there were no false alarms over the course of the entire operation after the ventilation parameter alarm limits were adjusted. With limited leakage from the tube, there was good agreement between measurements of end tidal and capillary CO_2.

After placement of an ileostoma, the patient was transferred to the neonatal intensive care ward, still intubated and ventilated. The postoperative course brought good news: in the most recent follow-up observation, on her 74th day, the patient weighed 955 g (2 lb 1.68 oz). The infant was awake and alert, and repeated cranial sonographies showed no pathological abnormalities. Invasive ventilation had already ended, NIV pauses of >8 hours per day were tolerated in ambient air, enteral nutritional buildup had been concluded, the stoma developed, and the bougienages of the fistula were continued, with the goal of performing the corrective operation after the patient had gained additional weight.

Summary:

FLOW-i helped provide trouble-free, non-problematic, pressure-controlled ventilation of an extremely small premature infant weighing 393 g (13.86 oz) during an emergency exploratory laparotomy.

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