Supplementary file. Recommendations

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Neonatology

Supplementary file Recommendations

2010	2015
Prenatal management and delivery	
Following prenatal diagnosis, the absolute and O/E LHR and the position of the liver should be evaluated*	Following prenatal diagnosis, disease severity should be assessed at an experienced center. This will involve high resolution genetic testing, determination of the O/E LHR and position of the liver *
Planned vaginal delivery or caesarean section after a gestational age of 37 weeks in a high-volume tertiary center should be pursued*	Delivery after a gestational age of 39 weeks in a high-volume tertiary center, should be planned*
In case of preterm labor prior to 34 weeks of gestation, antenatal steroids should be given*	Unchanged
Delivery room management and treatment in a very early phase	
After delivery, the infant should be intubated immediately without bag and mask ventilation*	Unchanged
The goal of treatment in the delivery room is achieving acceptable preductal saturations levels between 80 and 95%*	Unchanged
Ventilation in the delivery room may be done by conventional ventilator or ventilation bag with a peak pressure as low as possible, preferably below 25 cm H_2O*	Unchanged
An oro- or nasogastric tube with continuous or intermittent suction should be placed*	Unchanged
Arterial blood pressure has to be maintained at a normal level for gestational age. In case of hypotension and/ or poor perfusion, 10- 20 ml/kg NaCl 0.9% should be administered 2 times*	Unchanged
Sedatives and analgesics should be given*	Neuromuscular blocking agents should be avoided during initial treatment in the labour ward*
	In CDH infants who are predicted to have good lung development based on their prenatal assessment (e.g. left sided, O/E LHR > 50%, and liver down), spontaneous breathing could be considered*
No routine use of surfactant in either term or preterm infants with CDH*	Unchanged

	In cases of persistent hypotension after administration of NaCl 0.9%, inotropic and vasopressor agents should be considered*
	Premedication should be given before intubation if possible*
Ventilation management in the Intensive Care Unit	
Adapt treatment to reach a preductal saturation between 85 and 95% and a postductal saturation above 70%*	Adapt treatment to reach a preductal saturation between 80 and 95% and a postductal saturation above 70%*
In individual cases, preductal saturation above 80% might be acceptable, as long as organs are well perfused*	Unchanged
The target $PaCO_2$ range should be between 45 and 60 mmHg*	The target $PaCO_2$ should be between 50 and 70 mm Hg (6.9- 9.3 kPa)*
Pressure-controlled ventilation initial settings are a PIP of 20-25 cm H_2O and a PEEP of 2-5 cm H_2O; ventilator rate of 40- 60/min*	Pressure controlled ventilation: initial settings are a PIP of <25 cm H_2O and a PEEP of 3- 5 cm H_2O; ventilator rate of 40- 60/ min
HFOV: initial setting mean airway pressure 13-17 cm H_2O, frequency 10 Hz, ΔP 30-50 cm H_2O depending on chest wall vibration*	High-frequency oscillatory ventilation can be used as rescue therapy if conventional mechanical ventilation fails*
After stabilization, the FiO_2 should be decreased if preductal saturation is above 95%*	Unchanged
	Conventional mechanical ventilation is the optimal *initial* ventilation strategy**
Further management in the Intensive Care Unit	
Infants should be sedated and be monitored using validated analgesia and sedation scoring systems*	Unchanged (however in 2010, this recommendation was presented in a separate section).
Neuromuscular blocking agents should be avoided if possible*	Unchanged (however in 2010, this recommendation was presented in a separate section).
If symptoms of poor perfusion and/or blood pressure below the normal level for gestational age occur and are associated with preductal saturation below 80%, echocardiographic assessment should be performed*	Unchanged
In case of hypovolemia, isotonic fluid therapy 10-20 ml/kg NaCl 0.9% up to 3 times during the first 2 hours may be given and inotropics should be considered*	In case of hypovolemia, fluid therapy (10-20 ml/kg NaCl 0.9% or lactated Ringers) up to two times during the first two hours may be given and followed if necessary, by administration of inotropic and/ or vasopressor agents should be considered*
Pulmonary hypertension	
Perform echocardiography within the first 24 h after birth*	Perform echocardiography within the first 24 hours after birth to rule out structural cardiac anomalies
Blood pressure support should be given to	Unchanged

maintain arterial blood pressure levels at normal levels for gestational age*	
iNO should be considered if there is evidence of extrapulmonary right-to-left shunting and the oxygenation index is above 20 and/or the saturation difference is more than 10%*	iNO administration for at least one hour in a dose of 10- 20 ppm should be considered if there is evidence of extrapulmonary right-to-left shunting and the oxygenation index is above 20 and/or the saturation difference is more than 10%.
	In non-responders iNO should be stopped. iNO responders are defined as follows: decline of 10- 20% in the pre-postductal saturation difference, or increase of 10- 20% of PaO_2, or improvement in hemodynamic parameters meaning a 10% increase in mean blood pressure, or decrease of lactate levels*
	Intravenous sildenafil should be considered in CDH patients with severe pulmonary hypertension*
In case of suprasystemic pulmonary artery pressure and right-to-left shunting through the foramen ovale, i.v. prostaglandin E1 has to be considered*	Unchanged
Extracorporeal membrane oxygenation (ECMO)	
Criteria for ECMO*: -Inability to maintain preductal saturations >85% or postductal saturations >70%. -Increased $PaCO_2$ and respiratory acidosis with pH <7.15 despite optimization of ventilatory management. -Peak inspiratory pressure >28 cm H_2O or mean airway pressure >17 cm H_2O is required to achieve saturation >85%. -Inadequate oxygen delivery with metabolic acidosis as measured by elevated lactate ≥5 mmol/l and pH <7.15. -Systemic hypotension, resistant to fluid and inotropic therapy, resulting in urine output <0.5 ml/kg/h for at least 12- 24 hours -Oxygenation index (mean airway pressure x FiO_2 x 100/PaO_2) ≥40 consistently present	Criteria for ECMO*: Unchanged Unchanged Unchanged Unchanged Unchanged Oxygenation index (mean airway pressure x FiO_2 x 100/$PaCO_2$) ≥40 at least three hours present*
Surgical repair	
Surgical repair of the diaphragmatic defect should be performed after physiological stabilization, defined as follows* *Mean arterial blood pressure normal for gestation;	Surgical repair of the diaphragmatic defect should be performed after physiological stabilization, defined as follows* *Unchanged

*Preductal saturation levels of 85- 95% on fractional inspired oxygen below 50%; *Lactate below 3 mmol/ l; *Urine output more than 2 ml/kg/h	*Unchanged *Unchanged *Urine output more than 1 ml/kg/h
No routine chest tube placement*	Unchanged
Repair can be performed while the patient is on ECMO*	Unchanged
Fluid management, parenteral feeding, entering enteral feeding and gastroesophageal reflux	
40 ml/kg/day including medication for the first 24 hours after birth, increase intake thereafter*	Unchanged
Diuretics should be considered in case of persisting positive fluid balance, aim for diuresis 1- 2 ml/kg/hour*	Diuretics should be considered in case of persisting positive fluid balance, aim for a diuresis >1 ml/kg/hour*
Preventive antireflux therapy should be started in combination with enteral feeding*	Unchanged
	Pre-operatively, patients should only receive parenteral nutrition*
**Grade of recommendation = D. ** Grade of recommendation = C.*	