Acute kidney injury in neonates

Maternal and environmental risk factors for neonatal AKI and its long-term consequences

A review of the perinatal and postnatal risk factors that increase the risk of AKI among neonates.

- Intrauterine growth restriction, preterm birth and low birth weight are increasingly recognized as key determinants of AKI in critically ill neonates and CKD sequelae in later life.
- Neonates who survive AKI might experience long-term renal dysfunction and should be monitored and screened periodically for chronic kidney disease throughout childhood and young-adult life.

Perico N, Askenazi D, Cortinovis M, Remuzzi G. Maternal and environmental risk factors for neonatal AKI and its long-term consequences. Nature Reviews Nephrology. 2018;14:688–703 *https://www.nature.com/articles/s41581-018-0054-y*

Incidence and outcomes of neonatal acute kidney injury (AWAKEN): a multicentre, multinational, observational cohort study

- The overall incidence of AKI in neonates enrolled in the AWAKEN study was 30%.
- Infants with AKI had four-times higher independent odds of death and longer independent hospital length of stay than those without AKI.
- Growing evidence on the developmental origin of kidney disease highlights how neonates born premature, small for gestational age, and of low birthweight are at risk of chronic kidney disease because of low nephron number at birth.

Jetton JG, Boohaker LJ, Sethi SK, Wazir S, et al. Incidence and outcomes of neonatal acute kidney injury (AWAKEN): a multicentre, multinational, observational cohort study. Lancet Child Adolesc Health. 2017;1(3):184-194.

Nephrotoxic medications and associated acute kidney injury in very low birth weight infants

- AKI occurred in 9% of infants and was associated with exposure to a nephrotoxic medication.
- VLBW infants are at high risk for developing nephrotoxic medication associated AKI beyond the risk posed by prematurity; higher birth weight was protective for developing AKI.
- The odds of AKI increased by 1.83 times for each additional nephrotoxic medication added to the treatment regimen.

Barhight M, Altaye M, Gist KM, Isemann B, Goldstein SL, Akinbi H. Nephrotoxic medications and associated acute kidney injury in very low birth weight infants. J Clin Nephrol Res. 2017;4(4):1070.

Urinary markers of acute kidney injury in newborns with perinatal asphyxia

- uNGAL and uIL-18 on the first day of life may have an important diagnostic role as a noninvasive biomarker to independently predict AKI development in newborns with PA.

Oncel MK, Canpolat FE, Arayici S, Dizdar EA, et al. Urinary markers of acute kidney injury in newborns with perinatal asphyxia. Renal Failure. 2016;38(6):882-888 https://doi.org/10.3109/0886022X.2016.1165070.

Neutrophil gelatinase-associated lipocalin as predictor of acute kidney injury in neonates with perinatal asphyxia: a systematic review and meta-analysis

- Serum and urinary NGAL represent candidate biomarkers with high performance in the prediction of acute kidney injury in newborns with perinatal asphyxia.
- Regarding urinary NGAL, pooled sensitivity was calculated at 0.897 (95% CI [0.829, 0.940]), specificity at 0.729 (95% CI [0.561, 0.850]), and area under the curve at 0.899.

Bellos I, Fitrou G, Daskalakis G3 Perrea DN, Pergialiotis V. Neutrophil gelatinase-associated lipocalin as predictor of acute kidney injury in neonates with perinatal asphyxia: a systematic review and meta-analysis. Eur J Pediatr. 2018;177(10):1425-1434. doi: 10.1007/s00431-018-3221-z.V

Neonatal acute kidney injury – Severity and recovery prediction and the role of serum and urinary biomarkers

A review of the aetiology of neonatal AKI and the merits of serum and urinary biomarker in the context of the common causes of neonatal AKI: perinatal asphyxia (PA), sepsis, congenital heart disease (CHD) surgery, prematurity, nephrotoxicity and respiratory failure requiring extracorporeal membrane oxygenation (ECMO).

Sweetman DU. Neonatal acute kidney injury – Severity and recovery prediction and the role of serum and urinary biomarkers. Early Human Development. 2017;105:57-61 https://doi.org/10.1016/j.earlhumdev.2016.12.006