Podocyturia is a marker of preeclampsia

Preeclampsia is characterized by hypertension and proteinuria after 20 weeks gestation. Endothelial dysfunction is thought to have a central role in the pathogenesis of preeclampsia, but no attention had been directed towards the involvement of podocytes in this disease. Garovic *et al.* propose that shedding of podocytes—glomerular epithelial cells—into urine (podocyturia) might contribute to proteinuria in preeclampsia.

Of 67 recruited women, 33 had preeclampsia and 11 had HELLP syndrome, a severe form of preeclampsia. The urine of 31 patients was collected at delivery and evaluated for the presence of antibodies to four podocyte proteins—podocin, podocalyxin, nephrin and synaptopodin. Podocin proved the most accurate diagnostic marker, with podocin-positive cells present in the urine of all 15 patients with preeclampsia/HELLP, and none of the 16 normotensive healthy controls. Furthermore, the severity of podocyturia determined by podocin staining was significantly correlated with the degree of proteinuria ($P=0.04$). The authors hypothesize that podocyte loss disrupts the glomerular filtration barrier, leading to proteinuria.

Several potential angiogenic markers of preeclampsia were also assessed; podocyturia had a greater positive predictive value for preeclampsia than any of these factors, which included the soluble VEGF receptor sFlt-1. In an additional evaluation, no podocin-positive cells were detected in the urine of 11 controls with gestational hypertension, essential hypertension or proteinuria not associated with preeclampsia.

The authors conclude that podocyturia is a highly sensitive and specific marker of preeclampsia at the time of delivery. To determine its utility as a screening test for preeclampsia in early pregnancy, they plan to test whether podocyturia develops before proteinuria.

Original article Garovic VD *et al.* (2007) Urinary podocyte excretion as a marker for preeclampsia. *Am J Obstet Gynecol* **196:** 320.e1–320.e7

A new dialysis system for premature babies with low birth weight

Conventional dialysis modalities are often unsuitable for small babies born prematurely. A paper reports the successful use of a new automated hemodialysis system in such infants. The author concludes that such a system is the best treatment option for premature babies with acute renal failure or metabolic disorders when peritoneal dialysis is contraindicated.

Unlike conventional dialysis equipment, the new system does not require continuous vascular access. Instead, a small fixed quantity of blood is taken from the patient via a single venous catheter. This blood is passed repeatedly through a dialyzer until the required levels of clearance and ultrafiltration are achieved, after which the blood is returned to the patient. In this way, clearance and ultrafiltration rates can be controlled directly, and are not dependent on the rate of blood flow from the patient—which is necessarily low in premature babies. As the volume needed to prime the system is very small (as little as 6.8 ml for the smallest infants), donated blood is not necessary.

When tested on whole adult blood, the system reliably achieved target ultrafiltration rates (accurate to within 4.5%); the maximum ultrafiltration rate was 50 ml/h. Biochemical assays determined that, at birth weights of ≤0.8 kg (≤1.8 lb), clearance was comparable to the glomerular filtration rate of healthy kidney; the maximum clearance rate was 2 ml/min. Mechanical damage to red blood cells caused by the system (a maximum hemoglobin loss of 0.36%) was well within acceptable clinical limits.

Original article Everdell NL (2007) A haemodialysis system for the treatment of acute renal failure and metabolic disorders in neonates. *Med Eng Phys* **29:** 516–524

pRIFLE: categorizing AKI in critically ill children

The task of improving the outcomes of pediatric acute kidney injury (AKI) is hampered by the lack of a standard staging system. Akcan-Arikan and colleagues have modified the adult RIFLE criteria to generate a pediatric version, which they studied prospectively in 150 critically ill children (mean age 6.4 ± 6.4 years) admitted to a pediatric intensive care unit.

According to pRIFLE criteria (Risk, decrease in estimated creatinine clearance [ECC] from baseline of 25% or urine output <0.5 ml/kg/h for 8 h; Injury, 50% ECC decrease or urine output <0.5 ml/kg/h for 16 h; Failure, 75% ECC decrease or ECC <35 ml/min/1.73 m^2 or urine