Case scenarios of pediatric nephrology

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Covid-19 and acute kidney injury in hospital: summary of NICE guidelines Acute kidney injury (AKI), a sudden reduction in kidney function, is seen in some people with covid-19 infection.A subset of patients develop severe AKI and require renal replacement therapy (RRT). As in many settings, the development of AKI is associated with an increased risk of mortality.

Although our understanding is incomplete, a picture is emerging from case reports and autopsy series of covid-19 specific causes of AKI. Intrinsic renal pathology including thrombotic vascular processes, viral mediated tubular cell injury, and glomerulonephritis have been reported, as well as AKI resulting from extrinsic factors such as fluid depletion, multi-organ failure, and rhabdomyolysis

Anecdotal reports have emerged of proximal tubular injury with Fanconi syndrome that manifests as hypokalaemia, hypophosphataemia, normal anion gap metabolic acidosis, and hypovolaemia from salt wasting. Importantly, AKI can occur at all stages of covid-19 infection, so clinical vigilance and consideration of risk factors for AKI alongside early detection and diagnosis are essential components of general supportive care. Fluid management is central to this.

1. Communicating with patients

Communicate effectively with patients, their families, and carers, and support their mental wellbeing to help alleviate any anxiety they may have about covid-19. Signpost to charities and UK government guidance on the mental health and wellbeing aspects of covid-19

2. Minimising risk for patients and healthcare workers

All healthcare workers involved in receiving, assessing, and caring for patients who have known or suspected covid-19 should follow UK government guidance for infection prevention and control. If covid-19 is later diagnosed in a patient not isolated from admission or presentation, follow UK government guidance on management of exposed healthcare workers and patients in hospital settings.

3. Planning treatment and care

Discuss the risks, benefits, and likely outcomes of treatment options with patients with covid-19, and their families and carers. This will help them make informed decisions about their treatment goals and wishes, including treatment escalation plans where appropriate

Find out if patients have advance care plans or advance decisions to refuse treatment, including "do not attempt cardiopulmonary resuscitation" decisions, and take account of these in planning care. Monitor patients for the development or progression of chronic kidney disease (CKD) after AKI. Guidance on care after hospital discharge produced jointly by Think Kidneys and the Royal College of General Practitioners is designed to support safer transitions of care and post-discharge monitoring, and is of relevance to both hospital and general practice team.

4. Assessing for AKI in patients with suspected or confirmed covid-19

Be aware that, in patients with covid-19, AKI may be common, but prevalence is uncertain and depends on clinical setting; the Intensive Care National Audit and Research Centre's report on covid-19 in critical care reported that 31% of patients on ventilators and 4% not on ventilators needed renal replacement therapy for AKI Is associated with an increased risk of dying

Can develop at any time before or during hospital admission Causes may include volume depletion (hypovolaemia), haemodynamic changes, viral infection leading directly to kidney tubular injury,

thrombotic vascular processes, glomerular pathology, or rhabdomyolysis.May be associated with haematuria, proteinuria, and abnormal serum electrolyte levels (both increased and decreased serum sodium and potassium). Maintaining optimal fluid status (euvolaemia) is critical in reducing the incidence of AKI, but this can be hard to achieve

Treatments being used to manage covid-19 may increase the risk of AKI—for example, diuretics if they have caused volume depletion (hypovolaemia) Fever and increased respiratory rate increase insensible fluid loss. Dehydration (often needing correction with intravenous fluids) is common on admission to hospital and may also develop later risk of coagulopathy is increased.

On hospital admission or transfer, assess for AKI in all patients Record medical history and comorbidities, including factors that further increase the risk of AKI (such as CKD, heart failure, liver disease, diabetes, history of AKI) Fluid status by clinical examination (for example, peripheral perfusion, capillary refill, pulse rate, blood pressure, postural hypotension, jugular venous pressure, or pulmonary or peripheral oedema) fluid status by fluid balance (fluid intake, urine output, and weight).

5. Detecting and investigating AKI in patients with suspected or confirmedcovid-19

Detect AKI using NHS England's AKI algorithm or any of the following criteria: an increase in serum creatinine of ≥26 μmol/L in 48 hours an increase of ≥50% in serum creatinine, known or presumed to have occurred in the past seven days a fall in urine output to ≤0.5 mL/kg/hour for more than six hours. Do urinalysis for blood, protein, and glucose to help identify the cause of AKI. Record the results and take action if these are abnormal (including referral if needed; see section below on referral in patients with suspected or confirmed covid-19).Perform imaging if urinary tract obstruction is suspected

6. Managing fluid status in patients with suspected or confirmed covid-19

Aim to achieve and maintain optimal fluid status (euvolaemia) in all patients.

If there is volume depletion (hypovolaemia) and fluid needs cannot be met orally or eternally, give patients intravenous fluids as part of a protocol to restore and maintain optimal fluid status (euvolaemia).Ensure patients have an intravenous fluid management plan that is reviewed daily. Base choice of fluids on biochemistry results and fluid status.

Can you identify patients with covid-19 who are at particular risk of sustaining AKI?

Do you know which patients with covid-19 associated AKI should be referred for specialist advice, and do you know your local referral pathway? How patients who have sustained covid-19 associated AKI should be followed up in primary care, and do you know where to find RCGP guidance on AKI care after hospital discharge?

Biography

Riham has completed her PhD at the age of 25 years at Mansoura University then worked as visitor resident at MUCH for 2 years. Then completed master degree of pediatrics from Al Azhar University, and worked there at Al azhar University hospital as pediatric specialist, then completed a pediatric nephrology diploma from Cambridge University, then worked as pediatric nephrology specialist at MUCH, then she is now the head of pediatric department at Alsoliman specialized hospital.

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