Renal and urinary system

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Acute kidney injury Renal failure occurring during the perioperative period is associated with considerable mortality and morbidity . About one-quarter of cases of hospital-acquired renal failure occur in the perioperative period and are associated with high mortality , especially after cardiac and major vascular surgery . Several definitions of acute kidney injury have been proposed that use changes in serum creatinine and urine output to stage kidney injury . One of the more recent examples is KDIGO (Kidney Disease: Improving Global Outcomes), which is shown in Table 24.3 . Certain groups of patients with comorbidities such as dia - betes or those undergoing emergency surgery or certain high- risk procedures such as cardiac/transplantation surgeries are more susceptible. Table 24.4 lists the causes of perioperative acute kidne y injury . To prevent acute kidney injury in the perioperative period it is important to identify patients who are more susceptible to it. Normo volaemia and normal blood pressure should be main - tained during surgery . Avoiding nephrotoxic agents and unnec - essary blood transfusions and treating infections promptly will also help to avoid acute kidney injury . Urine output is reduced during surgery and does not correlate with r enal function. Fluids should not be given excessively to treat oliguria.

TABLE 24.3 KDIGO: Kidney Disease: Improving Global Outcomes. Stage 1 Increased sCr × 1.5–1.9 of baseline that is known or presumed to have occurred within the preceding 7 days or sCr increase ≥ 0.3 /uni00A0 mg/dL within 48 hours or Urine output <0.5 /uni00A0 mL/kg/h for 6–12 hours Stage 2 Increased sCr × 2–2.9 of baseline or Urine output <0.5 /uni00A0 mL/kg/h for ≥ 12 hours Stage 3 Increased sCr × 3 of baseline or sCr ≥ 4 /uni00A0 mg/dL or initiation of RRT 2 or GFR decrease to <35 /uni00A0 mL/min/1.73 /uni00A0 m in patients <18 years old or Urine output <0.3 /uni00A0 mL/kg/h for ≥ 24 hours or anuria for ≥ 12 hours GFR, glomerular /f_i ltration rate; RRT, renal replacement therapy; sCr, serum creatinine.

/uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF Urinary retention Inability to void after surgery is common after anaesthesia and surgery with the incidence ranging from 5% to 70%. Risk factors include age >50 years, male sex, certain surgeries such as hernia, anorectal and pelvic surgery , a history of benign prostatic hypertrophy and neurological disease. Neuraxial anaesthesia and certain drugs given during anaesthesia such as anticholinergic medications, α -/ β -blockers, sedatives and fluids increase the risk. The diagnosis of retention may be confirmed by clinical examination and by using ultrasound imaging. Urinary retention needs treatment as it can cause not only discomfort but also long-term bladder dysfunction. Catheterisation should be performed prophylactically when an operation is expected to last 3 hours or longer, or when large volumes of fluid are administered. Urinary infection Urinary infection is one of the most commonly acquired infections in the postoperative period. Patients may present with dysuria and/or pyrexia. Immunocompromised patients, patients with diabetes and those with a history of urinary retention are known to be at higher risk. Treatment involves adequate hydration, proper bladder drainage and antibiotics depending on the sensitivity of the microorganisms. Summary box 24.4 Renal and urinary complications /uni25CF /uni25CF /uni25CF James Parkinson , 1755–1824, general practitioner of Shoreditch, London, UK, published Thomas Addison , 1795–1860, physician, Guy's Hospital, London, UK, described the e ff ects of disease of the suprarenal capsules in 1849. Postoperative delirium and postoperative cognitive dysfunction Postoperative delirium (POD) is characterised by a reduced awareness of the environment and a disturbance in attention accompanied by either hallucinations or disorientation or temporary memory loss. Postoperative cognitive dysfunction (POCD) refers to dete - rioration in cognition temporally associated with surgery . POD can occur during recovery from anaesthesia or a few days after surgery . The overall incidence of POD is 5–50%. It occurs more frequently in elderly orthopaedic patients and those undergoing emergency surgical procedur es. Delirium is associated with increased all-cause morbidity , mortality and discharge to a nursing home. There are two types of delir - ium: hyperactive (restlessness, incoherent speech, agitation, hallucinations) and hypoactive (withdrawn, poorly responsive to the environment, depressed). Preoperative risk factor s for POD include pre-existing cognitive impairment, dementia, frailty , Parkinson's disease, severe illness, renal impairment and depression. Precipitating factors include surgery , intraoperative administration of narcotics and benzodiazepines, change of medications, electrolyte and fluid abnormalities, constipation, catheterisation and an unfamiliar environment (Table 24.5). Correcting any reversible cause, involving relatives or friends whom the patient knows and pain control can all con - tribute to reducing the impact and duration of delirium. As a last option, haloperidol may be given in titrated doses accord - ing to local protocols. /uni25CF An essay on the shaking palsy in 1817.

Prerenal Hypovolaemia due to third space losses and bleeding Sepsis Cardiac failure Low cardiac output due to anaesthesia and cardiopulmonary bypass Increased intra-abdominal pressure Cirrhosis, hepatorenal syndrome Aortic cross-clamp Renal In /f_l ammation and sepsis Chronic kidney disease and comorbidities, e.g. diabetes, obesity Endogenous (e.g. myoglobin) and exogenous (e.g. radiocontrast dyes) toxins Blood transfusions Chloride-rich solution and hydroxyethyl starch Post renal Surgery Tumour Benign prostatic hypertrophy Neurogenic bladder Postoperative renal failure is associated with high mortality Prophylactic measures to prevent renal failure should be taken in high-risk cases Urinary retention and infection are common problems postoperatively TABLE 24.5 Causes of delirium. Renal Renal failure/uraemia Hyponatraemia and electrolyte disorders Urinary tract infection Urinary retention Respiratory Hypoxia, e.g. chest infection Atelectasis Cardiovascular Pulmonary embolism Dehydration Septic shock Myocardial infarction Chronic heart failure Arrhythmia Drugs Opiates including heroin Hypnotics Cocaine Alcohol withdrawal Hypoglycaemia Neurological Epilepsy Encephalopathy Head injury Cerebrovascular accident Idiopathic (rare) Hypothyroidism Hyperthyroidism Addison's disease

Stroke is a recognised complication of carotid endarterectomy surgery both early (secondary to emboli) and later (secondary to cerebral hyperperfusion syndrome). It is also a recognised consequence of both hypotension and hypertension. Throm bolysis may be indicated but the neurology and surgical teams must discuss together the risks and benefits of such a treatment plan. Seizures These are uncommon except in those patients with known poorly controlled epilepsy . They may occur as a complication of neurosurgery . Renal and urinary system

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