

bone marrow  
transplant: renal  
complications  
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### general

- Prevalence of acute renal failure following HSCT varies between 9% and 53%.
- The presence of acute renal failure significantly affects the mortality of HSCT recipients. Between 5% and 33% of these patients require renal replacement therapy. Mortality in those requiring hemodialysis is high, with ranges between 84% and 100%.

### tumour lysis syndrome

- General:
- Tumor lysis syndrome is due to the breakdown of tumor cells following radiochemotherapy.
  - The syndrome is rarely seen following HSCT because the underlying malignancy is usually in remission or partial relapse at the time of transplantation, so the burden of tumor cells is rarely high.
- Clinical features:
- When tumor lysis syndrome develops, it usually occurs in the first few days following chemotherapy and is characterized by hyperuricemia, hyperkalemia, hyperphosphatemia, hypocalcemia, and oliguric renal failure.
- Treatment:
- This syndrome is usually reversible by adequate intravenous hydration and alkalization of the urine.
  - Allopurinol, hydration, alkalization of urine, and oral phosphate binding antacids 1-2 days before chemotherapy are effective in preventing this syndrome.

### Infusion of stem cells

- Infusion of stem cells may result in acute renal failure due to hemolysis, which leads to hemoglobinuria and proximal acute tubular necrosis.
- The infusion of hematopoietic stem cells cryopreserved with dimethyl sulfoxide probably contributes to intravascular hemolysis.
- Factors that increase the risk of acute renal failure in this situation are hypovolemia and acidosis.
- Adequate hydration and alkalization of the urine with adequate urine output protects against this complication.

### haemorrhagic cystitis

- Epidemiology
- Hemorrhagic cystitis develops in 25% of allogeneic HSCT recipients.
- Causes:
- The condition is precipitated by cyclophosphamide metabolites, busulfan, or irradiation.
  - Hemorrhagic cystitis may also develop later (median, 40-80 days) following HSCT secondary to BK virus, adenovirus, or CMV infections.
- Prevention:
- Hemorrhagic cystitis is prevented by intravenous hydration, diuresis, irrigation of the urinary bladder, and the use of mesna.

### venoocclusive renal disease

- Epidemiology
- VOD is the most common cause of acute renal failure in the first 10-21 days following HSCT
- Clinical features:
- VOD is associated with a hepatorenal syndrome characterized by sodium retention, weight gain, and edema and ascites.
  - This is followed by azotemia.
- Risk factors:
- The main risk factors for acute renal failure in patients with VOD are:
    - mismatched graft,
    - age of > 25 yrs,
    - high baseline creatinine,
    - sepsis, and
    - the use of amphotericin B

### Drug nephrotoxicity

- Causes:
- Cyclosporine A causes intense afferent arteriolar vasoconstriction and nephrotoxicity, which is associated with hyperkalemia, metabolic acidosis, hyperuricemia, and hypomagnesemia
  - Other drugs that lead to acute renal failure following HSCT include cytotoxic agents such as nitrosourea, methotrexate, and cyclophosphamide; antibiotics such as amphotericin B, acyclovir, foscarnet, and aminoglycosides; and immunosuppressive agents such as tacrolimus.

### electrolyte disturbances

- Electrolyte abnormalities are common following HSCT.
- These include hyponatremia, hypokalemia, and hypomagnesemia, and are related to intravenous fluids, diarrhea, total parenteral nutrition, renal insufficiency, and drugs such as diuretics, cyclophosphamide, amphotericin B, and cyclosporine A.
- Severe hyponatremia (serum Na <125mEq/L) is reported in 19% of HSCT recipients a median of 19 days following transplantation.
- The most common causes of severe hyponatremia are SIADH, infections, diarrhea, GVHD, VOD, acute renal failure, and the effect of medications and intravenous fluids

- General:
- is an important cause of acute renal failure and should be considered anytime following HSCT.