KSN 2019
Seoul, Korea · May 23 - 26

Abstract Submission No. : IL-9091

Acute Kidney Injury in the Patient with Cancer

Mitchell Rosner
University of Virginia Health System, United States

Lecture Notes
Mitchell H. Rosner, MD MACP
Acute Kidney Injury in the Patient with Cancer

Patients with cancer are at high risk for infections, sepsis, tumor lysis syndrome (TLS), drug-associated toxicities and other comorbidities that significantly increase the likelihood of developing acute kidney injury (AKI). The development of AKI in these patients represents a significant event that increases mortality and morbidity and can limit the effectiveness and use of chemotherapeutic regimens. Unfortunately, no effective therapies for AKI exist and thus prevention is critically important. Prevention of AKI rests on the recognition of patient- and cancer-specific risk factors that can be intervened upon to lower the likelihood of this event occurring.

Two recent studies have documented overall one-year incidences of AKI in cancer patients between 11 and 20% with higher risks in those patients with hematological cancers. Most recently, a study from China that surveyed over 7 million patients demonstrated an incidence of AKI (defined as at least a 50% increase in baseline serum creatinine) at 14 to 20% depending upon the hospital type (community v. academic respectively). Malignancies with the highest 5-year AKI incidence were myeloma (26.0%), bladder (19.0%), and leukemia (15.4%). AKI in the cancer patient has numerous deleterious consequences including: increased mortality (especially for those with higher stages of AKI, post-HSCT or requiring RRT), increased hospital length of stay, and in one study, a lower rate of complete cancer remission.

Patients with hematological malignancies (including leukemia, lymphoma and multiple myeloma) are at the highest risk for the development of AKI in most case series. AKI may be due to the direct effects of the malignancy such as with the development of light chain cast nephropathy in patients with multiple myeloma or may be due to downstream effects of therapy such as with sepsis associated with immunosuppression and neutropenia. The findings of proteinuria, microscopic hematuria or red blood cell casts should prompt consideration of a cancer-related glomerulonephritis such as membranoproliferative glomerulonephritis or amyloidosis. Patients with multiple myeloma represent an important subclass of patients with hematological malignancies that are prone to develop AKI. The etiologies of AKI in these patients are protean and diverse. AKI is quite common in these patients, complicating the course of myeloma in up to 20 to 50% of cases. The most common cause of AKI in multiple myeloma is cast nephropathy. Treatment of cast nephropathy has evolved considerably in the last decade and centers on provision of adequate hydration to augment tubular flow and treat pre-existing volume depletion ("flushing out the tubular casts") along with chemotherapy to rapidly reduce FLC levels. Given that a rapid reduction in the serum concentration of free light chains is critical in leading to improvement in kidney function, there is continued interest in the use of extracorporeal therapies to rapidly remove free light chains while more definitive chemotherapy is being implemented. Thus, the use of therapeutic plasma exchange or high-cutoff hemodialysis (using large pore dialysis membranes to facilitate FLC removal) remains of great interest and also of great controversy.

Hematopoietic stem cell transplantation (HSCT) is an important and possibly curative treatment for cancer patients, especially those with hematological malignancies. However, AKI may complicate HSCT as a result of conditioning chemotherapy, radiation exposure, sepsis, sinusoidal obstruction syndrome (SOS), thrombotic microangiopathy (TMA), graft-versus-host disease (GVHD), or nephrotoxic medications. The incidence of HSCT-associated AKI ranges from 15-73% depending on whether allogenic or autologous transplants are performed and high-dose or reduced intensity

chemotherapeutic conditioning regimens are employed.
Tumor lysis syndrome (TLS) is a medical emergency and a common cause of cancer-induced AKI. Risk factors for the development of TLS include: highly chemosensitive malignancies such as lymphomas and leukemias, large tumor burden, effective cytolytic chemotherapeutic agents, elevated lactate dehydrogenase levels (> 1500 IU) and underlying kidney disease. Prophylaxis against TLS is recommended for all patients with hematological malignancies undergoing chemotherapy. Prophylaxis also recommended for all high and moderate risk patients such as those with large tumor burdens, reduced GFR, and highly chemosensitive tumors. However, the exact regimen for prophylaxis should be tailored to the clinical circumstances and includes a combination of: decreasing uric acid levels, ensuring adequate hydration and tubular urine flow rate and management of abnormal electrolyte levels.
Drug-induced AKI occurs primarily from acute tubular injury (ATI), acute interstitial nephritis (AIN), and a variety of glomerular and vascular injuries. Given the explosion of novel agents to treat cancer, it is imperative that nephrologists stay up to date with the toxicities of these drugs. Broadly, chemotherapy-associated AKI can be separated into 3 broad drug classes: 1) conventional chemotherapy, 2) targeted therapies and 3) novel immunotherapies.

REFERENCE: Rosner MH, Perazella MA. Acute kidney injury in patients with cancer. N Engl J Med 201; 376: 1770-1781