Infections in Cancer Patients with Solid Tumors: A Review

Solid tumors

- Carcinomas
- Lymphomas
- Sarcomas

Solid tumors

- 1,685,210 new cases of cancer will be diagnosed in the United States in 2016
- more than 14 million new cases worldwide
- cancers of the breast, lungs and bronchus, prostate, colon and rectum, and urinary bladder being the most common
- leukemias 4% of new cases

Infections in Cancer Patients with Solid Tumors

- Infections in patients with solid tumors have not been studied as well as in patients with hematologic malignancies
- Most patients with solid tumors are not significantly immunosuppressed and do not experience prolonged periods of neutropenia
- Infections are the most common complications seen in cancer patients
- Result of the underlying malignancy and of the various modalities used for treatment

Risk factor(s)[a]	Additional explanatory comments
Neutropenia	Chemotherapy, radiation therapy, bone marrow infiltration with tumor, drugs (e.g., ganciclovir)
Disruption of anatomic barriers (e.g., skin, mucosal surfaces)	Chemotherapy (mucositis), radiation therapy, vascular access catheters, urinary catheters, percutaneous endoscopic gastrostomy tubes and other medical devices, surgical/diagnostic procedures
Obstruction due to primary or metastatic tumor	Airways: post-obstructive pneumonia, lung abscess, empyema, fistula formation (e.g., broncho-pleural or trachea-esophogeal)
	Biliary tract: ascending cholangitis, hepatic and pancreatic abscess
	Bowel: bowel obstruction, necrosis, perforation, peritonitis, hemorrhage
	Urinary tract: urinary tract infection, renal abscess, prostatitis or prostatic abscess
Procedure and devices	Diagnostic/therapeutic surgery: surgical site infections, wound dehiscence, abscess formation
	Shunts: disseminated infection (bacteremia) shunt-related infections such as meningitis/ventriculitis, hepato-biliary infections, complicated urinary tract infections
	Prosthetic devices: infected prosthesis, osteomyelitis and/or septic arthritis, local abscess formation, disseminated infection
Miscellaneous factors	Age, nutritional status, prior antibiotic exposure, loss of gag reflex

Clinical syndrome	Comments
Post-obstructive pneumonia	Frequent in patients with primary or metastatic lung lesions. Sometimes the initial manifestation of malignancy. Complications include lung abscess, fistula formation, or empyema. Treatment failures common
Obstructive uropathy	Common in patients with genitourinary and prostatic tumors. Complicated urinary tract infections and multidrug-resistant organisms are frequent
Reactivation of viral infections	Hepatitis B virus and hepatitis C virus, usually following chemotherapy or immunosuppressive therapy. Screening for all patients scheduled to receive chemotherapy is recommended as is HBV prophylaxis for patients with HBV infection
Clostridium difficile associated disease	Multiple risk factors (antibiotics, chemotherapy, local anatomical factors). Recurrent infections/relapses common. Newer therapies (fidaxomicin, fecal microbiota transplantation) have been developed
Neutropenic enterocolitis	Associated with taxanes (docetaxel and paclitaxel), vinorelbine, and other agents producing severe mucositis

Epidemiology of Infections in Cancer Patients with Solid Tumors

- Most infections in patients with solid tumors are caused by the individual patients' resident microflora
- The distribution of causative organisms mirrors the normal microflora at a particular site of infection
- Acquisition of nosocomial or healthcare-associated pathogens generally occurs several days after hospitalization
- The site of care has shifted to a great extent to clinics and out-patient oncology centers, wherein healthcare-associated infections are also commonplace
- Prolonged or multiple antibiotic exposure, which often occurs in solid tumor patients, leads to the selection of resistant organisms
- Geographic and local (institutional) differences in microbiology and susceptibility/resistance patterns are not infrequent and must always be taken into account when choosing empiric treatment regiments