

TABLE 104-3 INFECTIONS ASSOCIATED WITH SPECIFIC TYPES OF CANCER

Cancer	Underlying Immune Abnormality	Organisms Causing Infection
Multiple myeloma	Hypogammaglobulinemia	<i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> , <i>Neisseria meningitidis</i>
Chronic lymphocytic leukemia	Hypogammaglobulinemia	<i>S. pneumoniae</i> , <i>H. influenzae</i> , <i>N. meningitidis</i>
Acute myeloid or lymphocytic leukemia	Granulocytopenia, skin and mucous membrane lesions	Extracellular gram-positive and gram-negative bacteria, fungi
Hodgkin's disease	Abnormal T cell function	Intracellular pathogens (<i>Mycobacterium tuberculosis</i> , <i>Listeria</i> , <i>Salmonella</i> , <i>Cryptococcus</i> , <i>Mycobacterium avium</i>); herpesviruses
Non-Hodgkin's lymphoma and acute lymphocytic leukemia	Glucocorticoid chemotherapy, T and B cell dysfunction	<i>Pneumocystis</i>
Colon and rectal tumors	Local abnormalities ^a	<i>Streptococcus bovis</i> biotype 1 (bacteremia)
Hairy cell leukemia	Abnormal T cell function	Intracellular pathogens (<i>M. tuberculosis</i> , <i>Listeria</i> , <i>Cryptococcus</i> , <i>M. avium</i>)

^aThe reason for this association is not well defined.

Streptococcus or *Staphylococcus* is common, neutropenic patients—i.e., those with <500 functional polymorphonuclear leukocytes (PMNs)/ μL —and patients with impaired blood or lymphatic drainage may develop infections with unusual organisms. Innocent-looking macules or papules may be the first sign of bacterial or fungal sepsis in immunocompromised patients (Fig. 104-1). In the neutropenic host, a macule progresses rapidly to ecthyma gangrenosum (see Fig. 25e-35), a usually painless, round, necrotic lesion consisting of a central black or gray-black eschar with surrounding erythema. Ecthyma gangrenosum, which is located in nonpressure areas (as distinguished from necrotic lesions associated with lack of circulation), is often associated with *Pseudomonas aeruginosa* bacteremia (Chap. 189) but may be caused by other bacteria.

Candidemia (Chap. 240) is also associated with a variety of skin conditions (see Fig. 25e-38) and commonly presents as a maculopapular rash. Punch biopsy of the skin may be the best method for diagnosis.

TABLE 104-4 ORGANISMS LIKELY TO CAUSE INFECTIONS IN GRANULOCYTOPENIC PATIENTS

Gram-Positive Cocci	
<i>Staphylococcus epidermidis</i>	<i>Staphylococcus aureus</i>
Viridans <i>Streptococcus</i>	<i>Enterococcus faecalis</i>
<i>Streptococcus pneumoniae</i>	
Gram-Negative Bacilli	
<i>Escherichia coli</i>	<i>Serratia</i> spp.
<i>Klebsiella</i> spp.	<i>Acinetobacter</i> spp. ^a
<i>Pseudomonas aeruginosa</i>	<i>Stenotrophomonas</i> spp.
<i>Enterobacter</i> spp.	<i>Citrobacter</i> spp.
Non-aeruginosa <i>Pseudomonas</i> spp. ^a	
Gram-Positive Bacilli	
Diphtheroids	JK bacillus ^a
Fungi	
<i>Candida</i> spp.	<i>Mucor/Rhizopus</i>
<i>Aspergillus</i> spp.	

^aOften associated with intravenous catheters.

Cellulitis, an acute spreading inflammation of the skin, is most often caused by infection with group A *Streptococcus* or *Staphylococcus aureus*, virulent organisms normally found on the skin (Chap. 156). Although cellulitis tends to be circumscribed in normal hosts, it may spread rapidly in neutropenic patients. A tiny break in the skin may lead to spreading cellulitis, which is characterized by pain and erythema; in the affected patients, signs of infection (e.g., purulence) are often lacking. What might be a furuncle in a normal host may require amputation because of uncontrolled infection in a patient presenting with leukemia. A dramatic response to an infection that might be trivial in a normal host can mark the first sign of leukemia. Fortunately, granulocytopenic patients are likely to be infected with certain types of organisms (Table 104-4); thus the selection of an antibiotic regimen is somewhat easier than it might otherwise be (see “Antibacterial Therapy,” below). It is essential to recognize cellulitis early and to treat it aggressively. Patients who are neutropenic or who have previously received antibiotics for other reasons may develop cellulitis with unusual organisms (e.g., *Escherichia coli*, *Pseudomonas*, or fungi). Early treatment, even of innocent-looking lesions, is essential to prevent necrosis and loss of tissue. Debridement to prevent spread may sometimes be necessary early in the course of disease, but it can often be performed after chemotherapy, when the PMN count increases.



A



B

FIGURE 104-1 A. Papules related to *Escherichia coli* bacteremia in a patient with acute lymphocytic leukemia. B. The same lesions on the following day.