

Febrile neutropenia

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Neutropenia

It is the low concentration of neutrophils in the blood (abnormal)

Neutrophils

It is a type of white blood cells (2/3 of WBCs population) that acts as the primary immunological defense against infections and pathogens

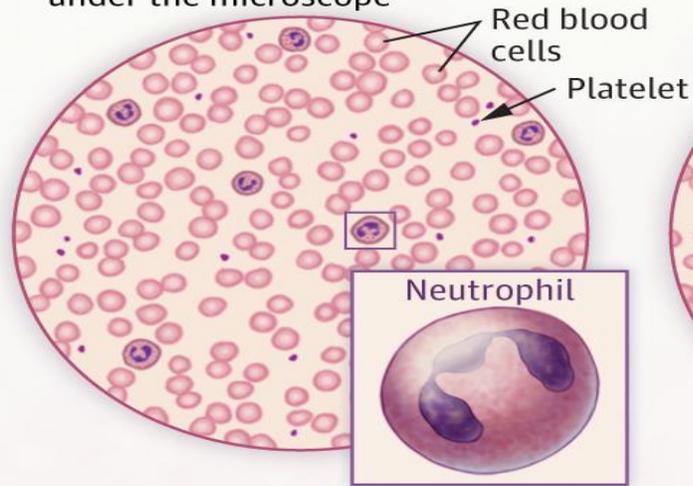
Febrile neutropenia

Febrile neutropenia refers to the occurrence of a fever during a period of significant neutropenia. When a patient has neutropenia, his or her risk of infection may be higher than normal, and the severity of a given infection may be higher also. Infections can result from transmission of infectious agents between people or as a result of organisms that live in the mouth, gut, or on the skin but do not normally cause illness because the healthy immune system keeps them in check.

What is neutropenia?

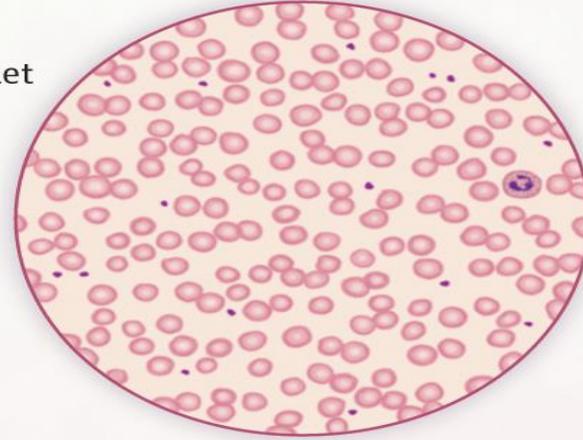
Neutropenia is when there is a low number of neutrophils in the blood.

Normal blood cells
under the microscope



Absolute neutrophil count (ANC)
greater than 1500 per microliter
of blood

Neutropenia
(low neutrophil count)



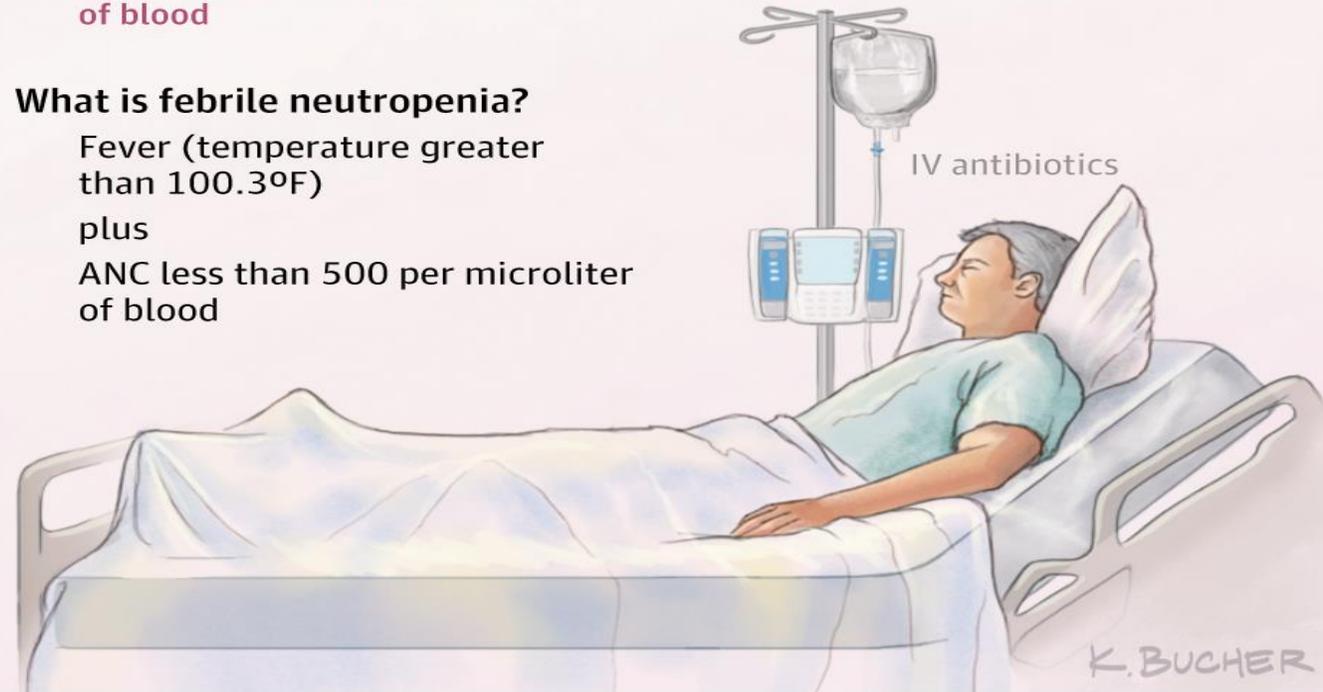
ANC less than 1500 per microliter
of blood

What is febrile neutropenia?

Fever (temperature greater
than 100.3°F)

plus

ANC less than 500 per microliter
of blood



Signs and symptoms

- A fever, which is a temperature of 100.5°F (38°C) or higher
- Chills or sweating
- Sore throat, sores in the mouth, or a toothache
- Abdominal pain
- Pain near the anus
- Pain or burning when urinating, or urinating often
- Diarrhea or sores around the anus
- A cough or shortness of breath
- Any redness, swelling, or pain (especially around a cut, wound, or catheter)
- Unusual vaginal discharge or itching

MASCC risk index

The Multinational Association for Supportive Care in Cancer (MASCC) risk index can be used to identify low-risk patients (score ≥ 21 points) for serious complications of febrile neutropenia (including death, intensive care unit admission, confusion, cardiac complications, respiratory failure, kidney failure, low blood pressure, bleeding, and other serious medical complications). The score was developed to select patients for therapeutic strategies that could potentially be more convenient or cost-effective. A prospective trial demonstrated that a modified MASCC score can identify patients with febrile neutropenia at low risk of complications, as well

MASCC risk index

CHARACTERISTIC	WEIGHT
Burden of febrile neutropenia with no or mild Symptoms ¹	5
No hypotension (systolic BP > 90 mm Hg)	5
No chronic obstructive pulmonary disease ²	4
Solid tumor or hematological malignancy with no previous fungal infection ³	4
No dehydration requiring parenteral fluids	3
Burden of febrile neutropenia with moderate Symptoms ⁴	3
Outpatient status	3
Age <60 years	2

Causes

- Several things related to cancer and its treatment can cause a low level of neutrophils, including:
- Some types of chemotherapy
- Cancers that affect the bone marrow directly, such as leukemia, lymphoma, and multiple myeloma
- Cancer that has spread
- Radiation therapy to several parts of the body or to bones in the pelvis, legs, chest, or abdomen
- Some people with cancer are more likely to develop neutropenia, including:
- People who are age 70 or older
- People with a lowered immune system from other causes, such as having HIV or an organ transplant

Chemotherapy and neutrophils

The timing of the drop in neutrophil levels is based on the type or dose of chemotherapy.

- Neutrophil counts generally start to drop about a week after each round of chemotherapy begins.
- Neutrophil levels reach a low point about 7 to 14 days after treatment. This is called the nadir. At this point, you are most likely to develop an infection.
- Your neutrophil count then starts to rise again. This is because your bone marrow restarts normal production of neutrophils. But it may take 3 to 4 weeks to reach a normal level again.
- When your neutrophil level returns to normal, you are ready for the next round of chemotherapy.

Treatment

Patients with febrile neutropenia are treated with empirical antibiotics until the neutrophil count has recovered (absolute neutrophil counts greater than $500/\text{mm}^3$) and the fever has abated; if the neutrophil count does not improve, treatment may need to continue for two weeks or occasionally more. In cases of recurrent or persistent fever, an antifungal agent should be added.

Empirical therapy

Empiric antimicrobial therapy is directed against an anticipated and likely cause of infectious disease. It is used when antimicrobials are given to a person before the specific bacterium or fungus causing an infection is known.

Treatment (cont.)

guidelines were issued by the Infectious Diseases Society of America, recommending use of cefepime, carbapenems (meropenem and imipenem/cilastatin), or piperacillin/tazobactam for high-risk patients and amoxicillin-clavulanic acid and ciprofloxacin for low-risk patients. Patients who do not strictly fulfill the criteria of low-risk patients should be admitted to the hospital and treated as high-risk patients