Fever, Neutropenic Fever, and their Relationship to Chemotherapy

Fever and Chemotherapy

Fever is an abnormally high body temperature. Usually defined by 3 oral temperatures greater than 38°C or 100.4°F in a 24-hour period, or one temperature greater than 38.5°C or 101.3°F. Fever is the body's response to infection. However, only in about half of all patients with cancer, who develop a fever, can a definite source of the infection be found.

Fever is particularly concerning if it occurs at a time when the white blood count level is known or expected to be low (at the nadir). During this time the body's normal defenses against infections are down, and fever needs to be further evaluated immediately.

Chemotherapy and fever are sometimes related because fever can also be present in patients who are receiving chemo treatments and biologic therapy as part of the "flu-like syndrome (FLS)." The fevers associated with FLS usually peak at 40°C or 104°F and often spike after a severe chill. This can mimic the clinical picture of sepsis (an infection in the blood), so it is important that patients who are receiving biologic therapy to be aware of the usual course of fever after treatment.

How Is Fever Evaluated?

Physical exam and history of symptoms:

- Questions as to whether there are any other signs of infection, redness, swelling, pain, pus, productive cough, color of phlegm, breaks in the skin, presence of an IV line, mouth sores.
- Questions as to when last chemotherapy was given and what type of chemotherapy was given. This gives the health care professional an idea whether the patient is likely to be neutropenic.

Characteristics and symptoms of neutropenic fever:

- When a person is neutropenic (has low white blood cells or neutrophils) the usual signs of infection (redness, swelling and pus formation) are absent. Pain and tenderness may be the only other indicators of infection.
- If a patient is taking biologic therapy where fever is a likely side effect of the treatment knowing the timing of the fever and its association with the treatment will help to evaluate if infection may also be present.

Lab tests:

- *Complete blood count* (CBC) may be checked to see if a patient is neutropenic (low white blood cell count) and at higher risk of infection.
- If a patient has a fever and low neutrophil count (less than 500/mm3) (*febrile neutropenia*) they are at risk for infection they may be hospitalized, monitored and receive antibiotics. The concern is that an infection can develop in the blood and lead to a life-threatening condition - sepsis. So the patient is admitted to receive antibiotics until the fever resolves, and neutrophils increase to safe levels - if no source of infection is found.
- *Cultures* to try to determine the source of infection from:
- Blood
- Urine
- Throat
- Drainage from catheter or draining wound.
- If diarrhea is present in a neutropenic patient a sample may be checked.

Chest X-ray (CXR):

- This is a quick and painless procedure where a picture, or an x-ray, will be taken to look at the internal structures of your chest. The chest x-ray will look specifically at your lungs, heart, and ribs.
- When infection is suspected CXR are often repeated to compare one to another. Sometimes this is more helpful to detect subtle changes especially in patients with prolonged neutropenia (low neutrophil counts).

Things You Can Do To Minimize the Effects of Fever:

Fever related to febrile neutropenia/infection:

- Notify your health care professional immediately if you have a fever greater than 38°C or 100.4°F.
- Know what chemotherapy drugs you are receiving (write them down) and if they are likely to cause low white blood cell counts. This will help if you develop a fever on an

evening or weekend and need to talk to a health professional who is not familiar with your case.
- If you are receiving chemotherapy that is likely to decrease your white blood cell count, check your temperature twice a day if you feel warm.

Fever related to flu-like syndrome:

- Take a lukewarm (tepid) bath if you have a fever. Also, you can use cold or ice packs on your body for comfort. Some patients find it comforting to have a cool, moist wash cloth on their foreheads or on the back of their necks.
- When you have a fever, you lose water and can become dehydrated. Therefore, it is important to drink lots of (non-alcoholic and non-caffeinated) fluid during these times.
- Take medication to control fever as recommended.

Drugs That May Be Prescribed By Your Doctor for Fever:

Fever related to febrile neutropenia/infection:

- *Antibiotics*: In a patient who has febrile neutropenia - neutropenic fever - >broad spectrum antibiotics will be started in the hospital, once it is safe to be discharged from the hospital oral antibiotics may be continued.
- *Colony Stimulating Factors*: Such as filgastrim (G-CSF) or sargramostim (GM-CSF), these drugs may be given to boost a person's white blood cell count. These can be given intravenously (IV) or as a subcutaneous injection (subQ).
- *Anti-pyretics*: Once the source of the fever is found or antibiotics are started medication to help relieve the fever itself may be used to make you feel better.
- *Over-the-counter medications* such as acetaminophen (Tylenol®) are used to treat fever related to flu-like syndrome. This may be prescribed to be taken around the clock, or prior to when expected fever may occur. Do not take more than the recommended amount of acetaminophen in a 24 hour time frame. No more than 4 grams (gm) of acetaminophen should be taken. Higher doses may lead to toxicity to the liver. Check the bottle for the milligram dose (mg) of each pill, 1000mg = 1gram. If you are taking medications that have acetaminophen as one of the ingredients, this needs to be taken into account of the total dose for the day. For example: Percocet® and Darvocet® each contain 325mg of acetaminophen per pill. It is important to review all of the medications you are taking with your health care professional.
- If you have a bleeding disorder, you should avoid non-steroidal anti-inflammatory (NSAID) drugs, as well as aspirin, because these drugs may interfere with blood platelets, and prolong bleeding. Use of such drugs to treat fever should be discussed first with your healthcare professional.

Fever related to flu-like syndrome:

- *Anti-pyretics* - If the source of the fever is related to flu-like syndrome associated with biologic or certain types of chemotherapy and not infection. Medication to help relieve the fever itself may be used to make you feel better.
- *Over-the-counter medications* such as acetaminophen (Tylenol®) are used to treat fever related to flu-like syndrome. This may be prescribed to be taken around the clock, or prior to when expected fever may occur. Do not take more than the recommended amount of acetaminophen in a 24 hour time frame. No more than 4 grams (gm) of acetaminophen should be taken. Higher doses may lead to toxicity to the liver. Check the bottle for the milligram dose (mg) of each pill, 1000mg = 1gram. If you are taking medications that have acetaminophen as one of the ingredients, this needs to be taken into account of the total dose for the day. For example: Percocet® and Darvocet® each contain 325mg of acetaminophen per pill. It is important to review all of the medications you are taking with your health care professional.
- If you have a bleeding disorder, you should avoid non-steroidal anti-inflammatory (NSAID) drugs, as well as aspirin, because these drugs may interfere with blood platelets, and prolong bleeding. Use of such drugs to treat fever should be discussed first with your healthcare professional.

When to Contact Your Doctor or Health Care Provider:

Contact your health care provider immediately, day or night, if you should experience any of the following symptoms:

- Fever of 100.4° F (38° C) or higher, chills (possible signs of infection)

If fever may be related to flu-like syndrome:

*Keep in mind flu-like symptoms, especially fevers, may represent a serious infection, therefore it is important to seek medical attention if:

- You have a fever greater than 100.4°F (38°C) that is new and not associated with the expected fever related to your medication notify your health care professional.

Always inform your health care provider if you experience any unusual symptoms.

Note: We strongly encourage you to talk with your health care professional about your specific medical condition and treatments. The information contained in this website is meant to be helpful and educational, but is not a substitute for medical advice.