

Fever Can Be A Symptom of Many Diseases

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ABSTRACT

Fever is a condition of elevated temperature in the human body above normal levels. It is caused by the stimulation of the thermoregulatory center in the brain, and represents the body's defensive reaction to the cause of the disease. The symptoms associated with fever may be: rapid heartbeat, rapid breathing, dry skin, changes in the composition of urine, and in severe forms of fever may occur auditory or visual hallucinations. Fever is not a disease, but it is a symptom of the disease. It usually is an infection that is often harmless and goes away on its own.

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Introduction

The clinical history is a critical initial step in the evaluation [1]. As is the case in any interaction between individuals, this requires the physician to establish a relationship with the patient that facilitates the accurate verbal transmission of information. This is a two-way street. The patient must feel enabled to present his or her history both fully and accurately. The physician must be able to elicit such information and accurately interpret it without prejudice or bias (either scientific or social). This is often called a patient-centered approach to the history. Acquiring such interviewing skill is an early and essential part of the training of a medical student. To facilitate obtaining and recording an accurate, organized, patient history, a standard approach is generally used on an initial encounter, although it may be modified on subsequent visits.

This is often considered to be the center of the patient-physician encounter and consists of a body system-oriented, head to toe-review of all presenting symptoms in an organized manner. The review may disclose additional symptoms not initially reported by the patient that are important to the diagnosis. A physician investigating the presenting symptom of back pain may elicit the additional symptom of pain on urination during the review, which suggests potential urinary tract disease. The experienced physician often will undertake this review as part of the physical examination.

Travel History

Pain, swelling, warmth, tenderness and immobility are the five cardinal signs of acute inflammation [2]. The differential diagnosis could include cellulitis, soft tissue abscess, septic arthritis of the knee, osteomyelitis, malignancy of either bone or soft tissue, severe destructive osteoarthritis, ruptured Baker's cyst, and deep vein thrombosis. The recent longdistance travel history is an

important risk factor for the latter.

The raised white cells and inflammatory markers (CRP) do not accurately distinguish between infective and inflammatory conditions (including malignancy). The very high white blood cell count is suggestive of an abscess.

Given the symptoms, signs, results and travel history it is crucial to consider both travel-related and non-travel-related infections [2]. In this case malaria, typhoid, hepatitis, dengue, yellow fever, schistosomiasis and meningococcal disease should be considered in the differential diagnosis, as well as urinary tract infection (UTI). Acute HIV seroconversion illness should always be considered as a differential in sexually active people.

Relevant investigations include:

- Full blood count and clotting screen, as bleeding can occur in the haemorrhagic fevers (Dengue and yellow fever), meningococcal sepsis, malaria (owing to low platelets) and hepatitis (if severe liver dysfunction occurs).
- Liver function tests, as jaundice may occur in malaria, typhoid, hepatitis, dengue, yellow fever, schistosomiasis and meningococcal disease if there is severe sepsis.
- Abdominal pain and tenderness, fever, nausea, raised bilirubin, abnormal liver function tests require hepatitis studies.
- Further specimens and tests suggested.
- Urine MC&S for lower abdominal pain, fever, and frequency to rule out a UTI.
- Travel plus fever requires blood cultures to exclude typhoid (abdominal pain, endemic area, fever, low platelets, low white blood cells), and meningococcal disease (endemic area, fever, low platelets).
- Abdominal pain and tenderness, anaemia, and raised bilirubin requires a stool sample for bacterial, viral and parasitic pathogens.
- Travel to endemic area associated with fever, low platelets,

low white blood cells and a raised LDH necessitate a malaria film. In this case microscopy of thick and thin blood smear displays multiple ring-form trophozoites inhabiting a single, normal-sized erythrocyte, consistent with *Plasmodium falciparum* infection.

- Serum analysis for dengue was negative but is an important test because of the endemic area, fever, low platelets, and low white blood cells.

Appendicitis

The pathologic process begins on the mucosal surface of the appendix, and there is often an element of obstruction of the appendicular lumen by a fecalith [3]. This may lead to pressure necrosis of the mucosa and invasion of the appendicular wall by bacteria. Common causes of obstruction include elongation or kinking of the appendix, adhesions, and neoplasias such as carcinoma and carcinoid tumors, both of which are rare. Some cases spontaneously resolve, but more commonly, infection of the wall of the appendix progresses, leading to impairment of its blood supply. When the pathologic process has extended throughout the wall of the appendix to involve the parietal peritoneum, the pain and tenderness are classically over the McBurney point at the site of the appendix. The pathologic process may continue and produce gangrene, perforation, and more generalized peritonitis. Once perforation has occurred, the advancing bacteria may be controlled by the ability of the omentum to wall off the inflammation; alternatively, the peritonitis may become more widespread. In advanced appendicitis, a mass may develop; alternatively, generalized peritonitis may lead to the septic inflammatory response syndrome (SIRS), ultimately with the development of multiple organ failure and death.

The site of the pain in appendicitis may vary. When the appendix is retrocecal in position, somatic pain may be perceived in the flank and loin rather than in the right lower quadrant. Anorexia is an almost invariable symptom in association with appendicitis. The presence of hunger usually eliminates this diagnosis. In association with anorexia, nausea is common and tends to proceed to vomiting. Diarrhea sometimes occurs and may be a result of the appendix lying in a pelvic position.

Sepsis

Bacteremia is the presence of bacteria in the blood, as evidenced by positive blood cultures [4]. Sepsis is a toxic condition resulting from the spread of a microbial organism or its products from a focus of infection. Those with sepsis typically have fever or hyperthermia, tachypnea, and tachycardia. Overwhelming systemic microbial infection can lead to septic shock and hypothermia. Most commonly, this is due to gram-negative bacterial infections that elaborate endotoxin (endotoxin shock), but may also be due to gram-positive bacteria and fungi. Septic shock is characterized by peripheral vasodilation, endothelial injury, disseminated intravascular coagulation, and the activation of cytokines. The etiology of sepsis and septic shock is varied.

Influenza

Influenza infections are transmitted from person-to-person via contact and large particle respiratory droplets [5]. There is a one to four day incubation period and the virus is shed the day before symptoms begin through five to 10 days after illness onset. The signs and symptoms of influenza infection may include fever, myalgia, headache, malaise, nonproductive cough, sore throat, rhinitis, otitis media, nausea, and vomiting. Uncomplicated illness typically resolves in three to seven days, though cough and malaise can persist for more than two weeks. Complications

include primary influenza pneumonia, exacerbation of underlying medical conditions, and secondary bacterial pneumonia. The complications are typically highest in those over the age of 65, young children, and patients with underlying disease. Seasonal influenza infections cause significant morbidity and mortality, on average 225,000 hospitalizations and 36,000 deaths per respiratory virus season in the United States. Pandemic influenza has the potential to cause an even greater burden of disease.

HIV

HIV-1 viral load testing also has proven useful in the diagnosis of acute HIV-1 infection, although the Food and Drug Administration (FDA) has not approved the assays for this indication [6]. Acute HIV-1 infection, also referred to as acute retroviral syndrome, is defined as the “window period” after exposure to the virus prior to seroconversion, when the ELISA and western blot tests are negative or indeterminate. In this “window period,” patients often are symptomatic with a mononucleosis-type syndrome, which may include fever, fatigue, rash, lymphadenopathy, and oral ulcers. During acute HIV-1 infection, the level of RNA is very high, usually 105 to 107 copies/ml of plasma, making viral load measurement a very useful diagnostic tool. A recent study compared the utility of p24 antigen and viral load testing for identifying patients with acute HIV-1 infection. Viral load testing was found to be more sensitive, while p24 antigen testing was more specific. However, the majority of viral load testing in the study was done using the Versant HIV-1 RNA assay (Bayer Diagnostics Corporation, Tarrytown, NY), a signal amplification method, which is known to have a lower specificity compared to target amplification methods. There were no false positives when the Amplicor reverse transcription–polymerase chain reaction (RT-PCR) assay (Roche Diagnostics, Indianapolis, IN) was used, although the sample size was small. When molecular assays for the diagnosis of HIV-1 infection are used, the possibility of a false-positive result must be considered. Patients must be educated about the limitations of these tests and must give informed consent prior to testing. To minimize the likelihood of reporting a false-positive result, an HIV1/2 ELISA should be obtained at the time of viral load testing, and repeat viral load testing should be done on all positive specimens. It is critical to remember that patients with acute retroviral syndrome should have very high levels of HIV-1 RNA. Requiring laboratory approval for HIV-1 diagnostic testing is a prudent approach to ensure that the patient has signs and symptoms consistent with acute HIV-1 infection prior to testing.

Coronavirus

Coronaviruses are ribonucleic acid (RNA) viruses that received their name from the crownlike spikes projecting from the viruses as seen by electron microscopy (corona = crown) [1]. There are three major groups of coronaviruses that cause disease in animals and humans. Previously, most of the infections in humans caused by coronaviruses were common colds, not lower respiratory tract infections. The SARS (severe acute respiratory syndrome) and MERS (Middle Eastern respiratory syndrome) associated viruses, however, are unique in that they are the first ones known to cause severe, potentially lethal disease in people. Precautions to prevent infection when dealing with patients include gloves, gowns, masks, and eye protection.

The illness begins with chills and fever, sometimes mild respiratory symptoms, and occasionally diarrhea. After three to seven days, manifestations of lower respiratory tract infection appear: cough, shortness of breath, and evidence of pneumonia demonstrated by chest x-ray examination. The severity of the illness is quite variable. The lungs of severely affected patients show the

characteristic features of adult respiratory distress syndrome, and patients require mechanical ventilation using an increased oxygen concentration to improve the diffusion of oxygen across the thickened edematous alveolar septa, as well as other measures to improve pulmonary function. Although current cases in the recent outbreak of MERS are a result of human-to-human spread, animal reservoirs for the virus are likely. The disease started in the Middle East and has spread to Korea. Bats and camels are suspected to harbor the MERS virus; bats, civet cats, and possibly other small mammals harbor SARS.

Conclusion

Fever is a sign that something unusual is happening in the body. Fever can be uncomfortable, but you should know that it is not dangerous until it exceeds the limit of normal body temperature. The degree of fever does not necessarily indicate the severity of the situation. A minor illness can cause a high temperature, and also a serious illness does not have to raise the body temperature at all. The fever usually passes within a few days.

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