

informedhealthonline.org
INDEPENDENT, OBJECTIVE AND EVIDENCE-BASED

Diagnostics: Why doing more is not always better

Tests are often done to find the cause of certain symptoms. There are several reasons why it can be important to have as accurate a diagnosis as possible: It helps doctors find out whether symptoms are a sign of a (serious) disease and how the disease might progress. Knowing what is causing the symptoms can also make it easier to find an appropriate treatment. On the other hand, not all symptoms can be linked to certain causes. And sometimes the tests themselves can become a problem and do more harm than good. This text is about what kinds of tests there are, and why it is not always a good idea to do all the examinations that are possible.

What tests are there?

Interview and physical examinations

When someone consults a doctor because of symptoms, doctors often get many clues from the physical examinations and the medical history. For example, if a 60-year-old man who has high blood pressure and smokes goes to the doctor and complains of severe pain behind his breastbone, he is rather likely to have coronary heart disease – a narrowing of the coronary arteries.

More information on this topic in our feature (URL: <http://www.informedhealthonline.org/index.584.en.html>) . Taking a medical history will include more detailed questions about the symptoms: How often do they come up and how long do they last? How severe are they? Do you experience them when you do certain activities? If the doctor suspects coronary heart disease, you might also be asked whether any close relatives already have had a heart attack, for example. Answers to this kind of questions can confirm a suspicion. Because some diseases have a higher probability if you have already had them before or if there is a family risk.

A physical examination may include:

- an examination with the naked eye or a device like a magnifying glass, for example to detect a skin problem or an inflammation of the auditory canal (inspection)
- feeling tissue, for example to detect a bone fracture or an enlarged liver (palpation)
- listening to heart sounds or the lungs, for example to find signs of a problem with the heart valves (auscultation)
- tapping cavities in the body, for example to find signs of fluid in the lungs (percussion)

With a physical examination alone, the doctor can detect many diseases. Conditions like neurodermatitis or conjunctivitis, for example, can often be recognized at first sight.

Some diseases can also be recognized with great certainty by the people who have them. Women who have already had a urinary tract infection are good at recognizing another urinary tract infection when they get the symptoms, for example.

Laboratory tests

Doctors often take blood, saliva or tissue samples, or ask you for a stool or urine sample to have them tested in a laboratory. These tests can find germs like bacteria or fungi, for example, or measure substances called biomarkers. Enzymes, hormones or antibodies found in the blood or urine can all be taken as biomarkers, for example. After a heart attack, for example, the damaged heart muscle releases certain enzymes that can be detected in the blood. To read more about these kinds of medical tests click here (URL: <http://www.informedhealthonline.org/medical-tests.858.56.en.htm>) .

Not all samples need to be tested in a laboratory. Doctors can sometimes use rapid tests, which they can read immediately.

Imaging techniques

Imaging techniques include x-ray and ultrasound examinations, computed tomography (CT) and magnetic resonance tomography (MRT). These imaging techniques make anatomical changes in the body visible so that the doctor can see things like broken bones, cancer or internal injuries. Some imaging techniques like scintigraphy or positron emission tomography (PET) are used to show certain metabolic processes in the body, for example to find signs of inflamed tissue or cancer. You can read more about this here (URL: <http://www.informedhealthonline.org/index.743.en.html>) .

Measuring electrical activity in the body

Some tests measure electrical activity in the body, which is then recorded on a graph. Examples include the electrocardiogram (ECG or EKG) for recording the electrical activity of the heart muscle, and the electroencephalogram (EEG) for recording electrical

activity in the brain. Conditions like heart attacks can lead to visible changes in the ECG. An abnormal EEG can indicate epilepsy, for example.

Other diagnostic strategies

Besides the methods mentioned, other strategies can also be used to find out what causes certain symptoms. Sometimes a treatment attempt can help in making the right diagnosis: Narrowed airways are one example. If a doctor wants to find out whether someone has an obstructive airway disease, a medication to widen the airways can be used. If symptoms get better after taking the medication, this may be a sign that the person does have an airway disease.

Sometimes surgery is needed to reliably diagnose a disease. A surgical intervention like endoscopy or taking a tissue sample can also have risks, though. Examples include the endoscopic examination of the abdomen, where the doctor inserts a small camera into the abdominal cavity through a cut near the belly button. Another example is taking tissue samples from the prostate, which involves sticking thin hollow needles into it. Some of these interventions require general anesthesia.

Why do doctors not always do all the tests that are possible?

Sometimes it is relatively easy to make a diagnosis, and physical examination alone is enough. This is the case with skin diseases like acne or neurodermatitis, for example.

If the symptoms are very general and not particularly severe it may be best to wait and watch how the symptoms develop before starting quite involved and possibly risky tests. This is also called watchful waiting. After a few days or weeks it often becomes clearer whether there really is a problem. This approach makes sense for problems like simple back pain or general symptoms like headache or high temperature, for example. Doctors often do not find out what causes symptoms like these. But they often go away with time because the body copes with many of these problems on its own. The important thing in watchful waiting is to take seriously any symptoms that do get worse or that worry you.

In addition, it is not always necessary to know precisely what causes the symptoms in order to decide for or against a treatment. Whether a case of conjunctivitis is caused by viruses or bacteria cannot be determined without doing

special tests. For these tests, the doctor would have to take a swab and send it to a laboratory. But it is often not worth doing the test because the body's defense system usually copes with conditions like conjunctivitis very quickly and successfully on its own. By the time the doctor had the results from the swab back, the illness would have already gone away. Treatment is not absolutely necessary. Because conjunctivitis is often caused by bacteria, some doctors prescribe antibiotic ointments or eye drops without any further diagnosis.

Even if there are suspicious findings in a test this does not automatically mean that it is clear what is causing the symptoms. Imaging techniques like x-rays or computed tomographies (CT) usually do not tell a lot about the causes of simple low back pain. Abnormalities can also be found in the bones or spinal discs of people who do not have back problems. So it is possible for an imaging technique to detect a supposed cause of low back pain that in fact has nothing to do with the symptoms. Too much diagnostics can then be misleading. This is the reason why today imaging techniques are no longer routinely used in low back pain.

What adverse effects can tests have?

One important reason to carefully consider what kind of diagnostics makes sense is that tests can also have adverse effects. These include, on the one hand, direct disadvantages: a test can be inconvenient (and cost money). Special tests are often only offered in certain hospitals so that a lot of travel is involved. Endoscopic examinations of the stomach or bowel, for example, can be unpleasant or painful, and have certain risks themselves. Radiation is an issue when using imaging techniques like x-ray and computed tomography.

On the other hand, test results can also do harm. Even when done by the best doctors, diagnostic procedures are never a hundred percent accurate. So a finding may simply be wrong, even though the doctor was very thorough. One possible mistake is overlooking existing abnormalities in an examination. Then further useful tests or treatments might not be done, or are delayed. The other mistake is that findings that are in fact normal or harmless appear to be a serious abnormality. This can lead to unnecessary or wrong treatments.

We describe these limits of the methods in more detail using screening tests as an example here (URL: <http://www.informedhealthonline.org/index.552.en.html>).

Diagnosis – and then what?

A diagnosis usually only has a benefit when this knowledge offers the possibility to take specific measures. A test may even be harmful when it detects a disease that cannot be treated. Diagnosing an incurable disease early can cause someone to start worrying sooner, permanently affecting quality of life – possibly without the chance of being able to better treat the disease. The doctor needs to give the person a very clear idea of what will happen before doing such a test.

It is also possible that the doctor finds abnormalities in a test that seem alarming, but that would not have caused any health problems in the person's life. This kind of finding is called overdiagnosis – if it is detected and treated, the person puts up with the adverse effects of a therapy, without having a benefit.

Wait? Or have a test?

If you have new symptoms that worry you, it makes sense to have a doctor examine you to rule out serious health problems and, if it is a good idea, to find an appropriate treatment. On the other hand, general symptoms like nausea or headache often get better after a short time on their own even without examination and treatment, and tests can also be harmful.

It is not always easy to decide in an individual case whether special tests make sense or are even necessary for new symptoms, or whether it is better to wait. If you are unsure and would like to consult a doctor, your family doctor is a good starting point to decide what makes sense to do next.

Author: Institute for Quality and Efficiency in Health Care (IQWiG)

Glossary

screening

Screening is a systematic approach to trying to find illnesses among people who do not have symptoms or other obvious signs of disease. An example is screening for breast cancer with mammography.

hormones

“Hormones” is the collective term for different types of messenger substances in the body. They are produced in different organs or tissues and released into the blood or the lymphatic system to be distributed throughout the body. Hormones only have an effect on those parts of the organism that have a corresponding docking site. This is how hormones can have such specific effects. Insulin, estrogens, vasopressin and thyroxine are some well-known hormones. Many medical ingredients imitate the effect of hormones.

bacteria

Bacteria are micro-organisms that, unlike viruses, can exist on their own. Viruses, on the other hand, can only exist inside a living cell. Most bacteria are not harmful to people, and some are actually beneficial. Bowel bacteria support bowel health. However if they get into the urinary system, they can cause an infection there. Doctors prescribe antibiotics for illnesses where bacteria need to be stopped or killed off. Immunisation is also possible against some bacterial infections, such as diphtheria, tetanus or whooping cough.

infection

In medicine, we speak of an infection when a person has caught a germ (an infectious agent). This germ can be a bacterium, a virus, a fungus or a worm. The germ multiplies and then either spreads throughout the body or only attacks one particular organ. As long as there are no signs of a disease, this is called an asymptomatic infection. When the body shows a reaction to the germ in the form of symptoms, this is called a symptomatic infection (an infectious disease). The period between the moment the germs enter the body and the moment the first symptoms of the disease appear, is called the incubation period. It may last a few hours or days, or even many years. An infection does not necessarily have to lead to the onset of a disease.

inflammation

An inflammation is a (defense) reaction of the body to an injury, irritation or infection. More blood is brought to the respective body part to protect the body. This is why this body part feels warmer, becomes swollen and red and is usually more sensitive. If the inflammation affects the mucous membranes, they secrete more fluid than usual. This helps to wash out the germs that have entered.

ultrasound

An ultrasound examination (sonography) is used to visualize the interior parts of the body. In this procedure, the “echoes” of acoustic waves with a frequency above the audible range of human hearing can be turned into images. A special machine sends these waves into the body part to be examined. Depending on the type of tissue, the waves are reflected strongly (e.g. body cavities filled with fluid), weakly, or not at all (e.g. bone tissue). The ultrasound machine turns the echo into an image of the body region examined on a fluorescent screen. Ultrasound examinations are typically done in pregnancy diagnostics, diagnosis of abdominal diseases like gall and kidney problems, or examinations of the thyroid gland and the vessels.

diagnosis

The term diagnosis (from the Greek word *diagnosi*: “distinguishing”) is used to mean the identification and naming of an illness or a disease. A diagnosis is usually made by evaluating the medical history, symptoms and test results. The tests include both comprehensive physical examination and blood tests or examinations using medical instruments such as ultrasound or x-ray.

Sources

Almond SC, Summerton N. Diagnosis in general practice: test of time. *BMJ* 2009; 338: b1878.

Glasziou P, Rose P, Heneghan C, Balla J. Diagnosis using "test of treatment". *BMJ* 2009; 338: b1312.

Heneghan C, Glasziou P, Thompson M, Rose P, Balla J, Lasserson Det al. Diagnostic strategies used in primary care. *BMJ* 2009; 338: b946.

Jones R, Barraclough K, Dowrick C. When no diagnostic label is applied. *BMJ* 2010; 340: c2683.

The German Institute for Quality and Efficiency in Health Care (IQWiG)

The German Institute for Quality and Efficiency in Health Care (IQWiG) was established by legislation to provide evaluations of the effectiveness, quality and efficiency of healthcare services. This includes the assessment of medicines as well as the publication of health information for consumers and patients.

Evidence basis of our health information

Our information is based primarily on systematic reviews of the effects of health care. Systematic reviews are necessary to gain an objective picture of health care. In order to do this, a clear question is formulated. Researchers then find all the relevant studies that could answer this question. They then evaluate those studies.

You can find a list of the evidence and other scientific literature on which this information is based at **www.informedhealthonline.org**

Disclaimer

This information was prepared and published by the German Institute for Quality and Efficiency in Health Care (IQWiG). It is based on the evidence and other scientific literature available at the time of publication. The information is intended for the use of patients in Germany. It is not intended to for use to diagnose illnesses and the information is not intended to substitute for medical advice.