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X-RAY EXAMINATION IN THE DIAGNOSIS OF CANCER

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ANNOTATION

Chest X-rays can be used to diagnose, treat, and cure lung cancer. Using X-rays at low doses, images of structures in the body can be constructed to identify the tumor and carry it out step by step. Using high doses of X-rays helps to destroy cancer cells in the body.

Keywords: X-rays, images, body structures, chest cancer, doses, cancer.

INTRODUCTION

X-rays and other radiographic tests (also known as radiographs, roentgenograms, and contrast studies) help doctors look for cancer in different parts of the body including bones, and organs like the stomach and kidneys.

X-rays are typically fast, painless, and there's no special preparation needed

Diagnosing cancer is a complex process and there's no one best way to do this. Every person is different, and there are many different kinds of cancer that can cause a lot of different symptoms.

If your doctor thinks you have cancer, a complete work-up will be done. It will likely include a physical exam, asking you about your health history and symptoms, a review of your family history of illness, blood tests, special procedures, and/or imaging tests. Many times, a tiny piece (sample) of the changed cells or tumor must be taken out and tested. This is called a biopsy. Sometimes it's the only way to know for sure that you have cancer.

Multiple biomedical imaging techniques are used in all phases of cancer management. Imaging forms an essential part of cancer clinical protocols and is able to furnish morphological, structural, metabolic and functional information. Integration with other diagnostic tools such as in vitro tissue and fluids analysis assists in clinical decision-making. Hybrid imaging techniques are able to supply complementary information for improved staging and therapy planning. Image guided and targeted minimally invasive therapy has the promise to improve outcome and reduce collateral effects. Early detection of cancer through screening based on imaging is probably the major contributor to a reduction in mortality for certain cancers. Targeted imaging of receptors, gene therapy expression and cancer stem cells are research activities that will translate into clinical use in the next decade. Technological developments will increase imaging speed to match that of physiological processes.

Once a cancer is found, more imaging tests might be done to see if and how far the cancer may have grown or spread. This process is called staging. All of this information is used to make the treatment plan that's best for each person.

Imaging is used to make pictures of the inside of your body. It can help find tumors and other changes, show how much disease is there, and help see if treatment is working. Imaging may also be used to do biopsies and other surgical procedures.Here are some of the common imaging tests that may be used for cancer.

CT scan.this scan uses X-rays and a computer to make 3-D images (often called slices) of your body. A CT scan can show any part of your body, including bones, muscles, fat, and organs. CT scans are a lot more detailed than X-rays.

A mammogram is an X-ray exam of the breast. It's used to find and diagnose breast disease in women who have breast problems such as a lump, pain, or nipple discharge. It's also used to check for breast diseases in women who don't have breast problems. (This is called a screening mammogram.)

A mammogram can't prove that a breast change is cancer. But if it shows something that might be cancer, more testing can be done.

Ultrasound (sonography)uses high-energy sound waves and a computer to make images of blood vessels, tissues, and organs. It can be used to look at how well organs are working and to look at blood flow through vessels. Tumors in the belly (abdomen), liver, and kidneys can often be seen with an ultrasound. (It's not useful in the chest because the ribs block the sound waves.)

Ultrasound can also be used through a probe that can be put into body openings, like the anus, vagina, or esophagus. This puts it closer to the certain internal organs, which can give a clearer picture.

An x-ray examination creates images of your internal organs or bones to help diagnose conditions or injuries. A special machine emits (puts out) a small amount of ionising radiation. This radiation passes through your body and is captured on a special device to produce the image.

The dose of radiation you will receive depends on the area of your body being examined. Smaller areas such as the hand receive a lesser dose compared to a larger area such as the spine. On average, the dose of radiation is roughly the same as you would receive from the general environment in about one week.

Tell your doctor if you are pregnant or think you may be pregnant. Another type of test may be recommended.A small amount of ionising radiation is passed through the body. In the past, this went onto a sheet of special film. Nowadays x-ray examinations are more likely to use a device that will capture transmitted x-rays to create an electronic image.

This test is very common. About seven million x-ray examinations are made every year in Australia. Some of the many uses include:

- diagnosis of fractures – detection of broken bones is one of the most common uses of this test
- diagnosis of dislocations – an x-ray examination can reveal if the bones of a joint are abnormally positioned
- as a surgical tool – to help the surgeon accurately perform the operation. For example, x-ray images taken during orthopaedic surgery show if the fracture is aligned or if the implanted device (such as an artificial joint) is in position. X-rays may also be used in other surgical procedures for a similar purpose
- diagnosis of bone or joint conditions – for example, some types of cancer, arthritis or osteoporosis
- diagnosis of chest conditions – such as pneumonia, lung cancer, emphysema or heart failure
- detection of foreign objects – for example, metal fragments or swallowed coins.

The calcium in bones blocks the passage of radiation, so healthy bones show up as white or grey. On the other hand, radiation passes easily through air spaces, so healthy lungs appear black.

MRI uses a strong magnet, radio waves, and a computer to make detailed images of organs and other structures inside your body. An MRI is often used to look at the heart, brain, liver, pancreas, male and female reproductive organs, and other soft tissues. MRI can show even small changes in tissues. It can assess blood flow, detect tumors, and diagnose many forms of cancer, evaluate infections, and assess injuries to bones and joints.

Various pharmaceutical therapies are under development for cancer that are classed as cytotoxic, antihormonal, molecular targeted and immunotherapeutic. The molecular targeted therapies lend themselves to imaging for control of their effectiveness and include signal transduction inhibitors, angiogenesis inhibitors, apoptosis inducers, cell cycle inhibitors, multi-targeted tyrosine kinase inhibitors and epigenetic modulators

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