

Nuclear medicine: Better disease diagnosis and detection

The Power of Possibilities

Heart disease is a common and often life-threatening condition. Traditionally, the challenge for doctors has been to find out just what – if anything – is wrong with a patient's heart quickly, accurately, and with minimal impact on the patient.

The tool that Dr. Terry Ruddy of the Ottawa Heart Institute uses to do just that is nuclear medicine. If he's treating you, he'll most likely ask you to run hard on a treadmill, and then inject you with a very small amount of radioactive solution.

This state-of-the-art nuclear medicine diagnostic procedure gives Dr. Ruddy – and cardiologists like him around the world – invaluable information about a patient's heart rhythm, blood flow, and overall health. By using this nuclear medicine technique, the accuracy of diagnosing heart disease has improved by 30 - 40 percent. This means avoiding unnecessary invasive surgery, providing faster and more appropriate treatment where needed, and improving the overall care and prognosis for patients. It's such a useful tool, in fact, the Heart Institute alone carries out over 8,000 such procedures a year. Says Dr. Ruddy, "It lets us see which patients are good candidates for an angiogram, and we can even sometimes tell whether they are a candidate for bypass surgery."

How does it work? The solution used contains a small amount of radioactive material called radioisotopes, which are produced by a nuclear reactor, specifically a research reactor. These radioisotopes are bonded to a drug or other compound that migrates to a specific area or organ of the body - in this case, the heart. This gives doctors an exact picture of which parts of the heart are not getting enough blood.

Just as importantly, a nuclear medicine image provides different information than an x-ray. "An x-ray will only tell you what something looks like, not how it's working," says Beth MacGillivray, a nuclear medicine technologist who now

works in product development with IS2 Research Inc. of Ottawa. "What makes nuclear imaging useful is it tells you how something is functioning."

And harnessing nuclear technology for diagnosis isn't limited to heart disease. Cancers, blood disorders, and thyroid disease, among many other illnesses, can all be detected and assessed quickly and efficiently with nuclear medicine scans. They can also often pick up problems much earlier than other methods of detection, says Dr. Helen Nadel, Head of Nuclear Medicine, B.C.'s Children's Hospital, Vancouver. For example, left unchecked, infection in bones can quickly lead to everything from fractures to arthritis. Yet an infection can easily go undetected by an x-ray for seven to ten days. By comparison, says Dr. Nadel, "Nuclear medicine tests can confirm an infection in less than 48 hours after a child starts experiencing fever and pain in their bones."

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IS2 Research Inc.

And nuclear medicine can do all this with only a trace amount of radiation, says Dr. Nadel. "In most instances the radiation would be far less than what you would be exposed to just living in Vancouver for a year." Radiation is a fact of life. We are all exposed to radiation from natural sources every day.

With so many benefits, it's not surprising the role nuclear medicine plays in health care is dramatically expanding. "On the world stage, nuclear medicine is a rapidly increasing specialty," says Dr. Al Driedger, Acting Chief Nuclear Medicine, London Health Centre.

And that means a bigger role for Canada. About half of the world's reactor-based radioisotopes are

produced at a facility operated by Atomic Energy of Canada Limited. This is the source of many of the medical isotopes used by Ottawa-based MDS Nordion. They

supply products for over 12 million nuclear medicine scans a year worldwide – that's about 34,000 nuclear medicine procedures every day!

The bottom line? Nuclear medicine lets doctors safely detect diseases earlier on, with fewer side effects, and make more informed choices about the course of treatment, says

Dr. Nadel, "And that means better health care for patients."

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