CTOAM
CANCER TREATMENT
OPTIONS & MANAGEMENT INC.

Why You NEED a PET/CT Scan

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Why You NEED a PET/CT Scan

CT scans are a standard part of cancer care because they give doctors more, and different, information about what is going on inside a patient's body than they could gather just from blood tests and other non-invasive diagnostics. And with cancer, the more information you can have about where it is and how it's progressing, the better your chances for a long lasting, cancer free life.

But CT scans have some significant limitations in contrast to another type of scan that is available in Canada, the PET/CT scan. PET/CT scans provide you and your doctor with significantly better insight into your cancer than a CT scan can: Information such as which masses are cancerous and which are not (CT scans cannot differentiate), and a more accurate locating of tumours for more precise surgeries and radiation placement, is provided by PET/CT.

However, these scans are rarely recommended by Canadian cancer doctors, due to factors that are completely unrelated to the PET/CT's proven superiority as a diagnostic tool. A PET/CT scan can give you and your cancer care team, including your oncologist, surgeon and radiologist, vital information about your cancer that will benefit every element of your cancer care. And you have the power to ensure you get one! Read on.

How is Cancer Currently Diagnosed in Public Healthcare?

Imaging is a significant part of the standard diagnostic and treatment process for cancer.

The general protocol that General Practitioners and Specialists are asked to follow for diagnosing cancer in Canada is as follows:

1. Patient self-report and/or noticeable symptoms;
2. Blood test; and / or
3. Ultrasound/x-ray
4. CT scan;
5. Surgery (for tissue biopsy)/Pathology testing = Diagnosis Confirmed;
6. Referral to Oncologist for confirmation of diagnosis and treatment plan.

These steps are most often taken by the patient's GP, as, in most cases, a referral to an oncologist doesn't take place until cancer is confirmed.

So ironically, you could say it's your GP, and not your oncologist, who needs to understand the most about precision oncology, because they will determine how fast and how precise your initial diagnosis is. And that has a profound impact on every aspect of cancer care.

What's the Difference Between CT and PET/CT?

CT scans are used routinely for diagnosis and treatment monitoring in Canada for a number of illnesses. The scan provides your doctor with a 3D image of the inside of the body to detect any abnormalities, such as masses that aren't supposed to be where they are.

A PET scan (Positron Emission Tomography), works in a different way. It shows biological activity at the molecular level and it's not just telling us something is there, it's also telling us how active it is. This means that a PET scan can tell us when a mass is benign or malignant, CT scans cannot. A PET scan allows us to detect changes in body tissue before they are visible to a CT scan, thus providing patients with a more precise diagnosis, much earlier than with CT.

A PET/CT scan is a breakthrough for cancer patients because it combines both CT and PET technologies and as such, can show a) where there is a mass AND b) if it is cancerous or not, not just one or the other.

This is why PET/CT's are able to detect cancer in the earliest stages, with greater precision and certainty than CT scans can.

PET/CT's produce highly detailed images of all tumours in your body. They show exactly where the cancer is in your body, which means that your surgery will be more precise and thorough.

Radiation therapy based on PET/CT, is more precise too, which reduces the amount of radiation required and leads to a more successful outcome.

PET/CT's can also be used for treatment monitoring, for visible proof that your treatment is working.

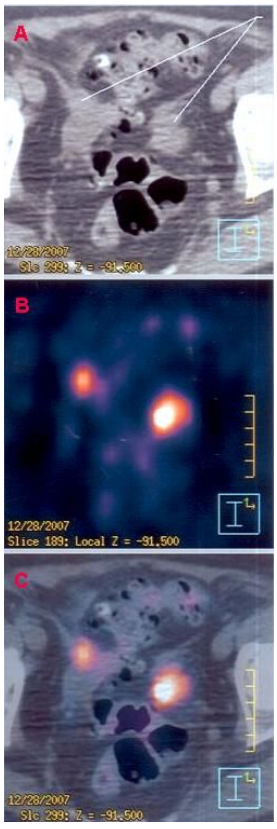
How Does a PET/CT Scan Work?

PET/CT scans are used throughout the world for many types of cancer and are shown to be more accurate in diagnosing cancer than CT scans or PET scans alone.

With PET/CT, patients are injected with a radioactive glucose solution.

Since cancer cells utilize glucose for their rapid growth, they quickly uptake a significant amount of the solution and glow when imaged. The more aggressive tumours take up more of the solution and glow even brighter. This allows us to identify the exact size and location and aggressiveness of tumours, anywhere in your body. Which in turn gives your doctors much more precise information from which to make their next treatment suggestions, and improves all aspects of your cancer care significantly.

CT vs PET vs PET/CT



The image to the left shows three different imaging scans.

- A) is from a CT scan;
- B) is from a PET scan; and
- C) is from a PET/CT scan.

These are PET/CT clinical images from a 69-year-old woman with colon carcinoma. In both the PET and PET/CT scan (B & C), you can see two bright red and yellow-ish masses. These show the hypermetabolic areas of the pelvis with metastases of a previous, surgically removed colon carcinoma. One of the spots is located near the sigmoid colon and the other in a lymphatic node (to the left of the image).
Image courtesy of Wikimedia Commons.

A Word About Radiation

It is all well and good to talk about the value of PET/CT in terms of how it helps with cancer diagnosis and treatment, but what about the amount of radiation from the test itself? Can it be harmful?

One study from The American Cancer Society indicates the following levels of radiation for X-ray, CT Scan and PET/CT.*

- A lower GI series using x-rays of the large intestine exposes a person to about 8 mSv, or about the amount a person can expect to naturally be exposed to over about 3 years.

- A CT scan of the abdomen (belly) and pelvis exposes a person to about 10 mSv. (Cancer patients in Canada have a minimum of 2 CT Scans for standard diagnostic protocol, and a few more during treatment.)

- A PET/CT exposes you to about 25 mSv of radiation. This is equal to about 8 years of average background radiation exposure. (Note: One PET/CT scan, in conjunction with genetic testing and liquid biopsy monitoring, can replace the need for CT scans in most cancer care.)

**These are estimates for an average-sized adult. Studies have found that the amount of radiation you get can vary a great deal.*

Some people are reluctant to have a PET/CT scan because they believe that the amount of radiation they will receive could be more harmful to their bodies than the value of the information they'll miss out on by not having one.

Current scientific data shows the old assumptions about how much radiation is safe are wrong.

In fact, there is a new understanding among the medical community regarding how the human body absorbs and processes radiation. We now know that the body is a far more efficient radiation processing machine than we gave it credit for. Your body can safely process more radiation than we had thought. That's important and reassuring to know!

Fewer Scans Needed

Another benefit of PET/CT is that because of the precision of the PET/CT scan, if a patient is using targeted therapies and liquid biopsies (CT/DNA blood test)) for treatment monitoring, fewer CT scans will be needed for routine monitoring. With PET/CT you will reduce the amount of radiation exposure you receive from CT scans, and reduce the number of extra screening appointments you have to attend, *and* you'll have more precise data. Win-Win.

Here's the Data

Now that we know PET/CT's are safe, let's look more deeply at why a PET/CT scan is going to be better than a CT scan for cancer diagnosis and care. Or as we like to say: Where's the data!

Let's start with a little background.

A Little PET/CT History

CT scans were invented in 1972 and have been in use in Canadian cancer care for many years. Our medical practices, and particularly our cancer diagnostic protocols, have grown around the use of CT scans.

Doctors are very familiar with them. We have the infrastructure to provide literally millions of these scans each year. In fact approximately 5.28 million CT scans were performed in Canada in 2015. That works out to 147 CT scans for every 1000 people versus about 77,000 PET/CT scans, or 2 for every 1000 people.

And, whether we wish it did or not, money matters: CT scans are fairly low cost ($700.00 – $2,000.00 CAD depending on the amount of area of your body you are scanning).

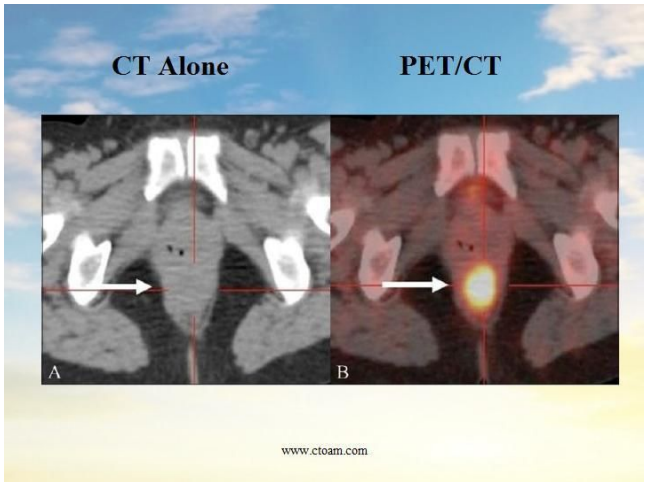
PET/CT, on the other hand, was invented in 2001, and came to market more than 30 years after many millions of dollars had been spent and CT scans had found their place in standard care. Also, even if there were already the same number of PET/CT machines to CT scans in Canada, PET/CT scans would still cost a bit more. This is because PET/CT's require a sensitive and expensive radioactive isotope to bond with your cancer cells and make them visible.

As such, a standard PET/CT will cost ($2,000 - $3,500.00 CAD depending on the facility), This, in short, is why, at this time, PET/CT scans are not offered as part of the standard cancer diagnosis protocol in any province in Canada. But that doesn't mean you can't get one. Read on!

See the Difference

For a visual reference of what we're talking about regarding the difference between CT scans and PET/CT, have a look at the image below.

A tumour is completely undetected on the left with a CT scan, but an aggressive tumour is seen when a PET/CT scan is performed. Lives are saved with PET/CT.

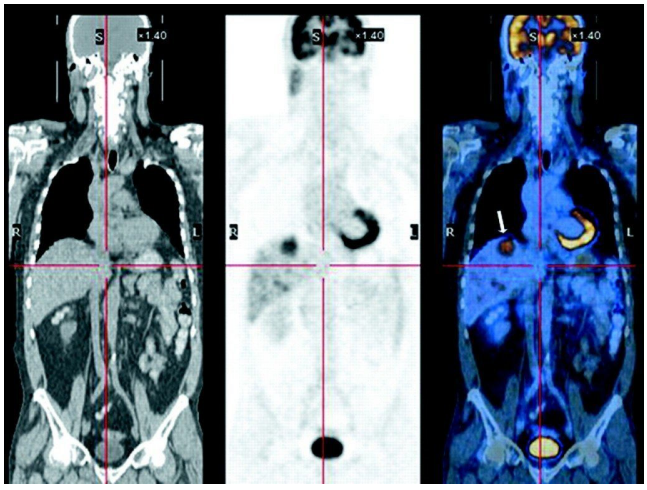


CT vs PET/CT

In this image to the left, the patient was told that they were cancer-free based on the CT scan (left side).

When the patient opted to get a private PET/CT scan (right side), the scan identified a tumour that would have otherwise gone untreated.

This is the importance of getting a PET/CT scan.



This image also shows a CT scan (far left) compared to a PET/CT scan (right-hand side).

In the CT scan on the far left, you can see some questionable masses – but there is no information to tell us whether or not they are cancerous. This is because a CT scan is unable to differentiate malignant (alive) from benign (dead) abnormalities.

Whereas, in the PET/CT scan on the right (in blue), you can see the hypermetabolic areas highlighted by the yellow spots.

Why PET/CT is Highly Accurate

When determining how well a diagnostic test works, medical science uses two main measurements: **Sensitivity and Specificity**.

- **Sensitivity** is the number of positives that are correctly identified as such, also called the 'true positive rate'.

- **Specificity** is the percentage of healthy people who are correctly identified as not having the condition, also called the 'true negative rate'.

In a 2015 study by The Canadian Agency for Drugs and Technologies in Health, or CADTH, the Canadian national organization that provides research and analysis to healthcare decision-makers, they state that across various cancer types, **PET/CT has a sensitivity of 97.4% and specificity of 91.2%**, respectively. While, at best, **CT scans have a sensitivity of 85.9% and specificity of 67.3%** – but this number can be significantly lower depending on the cancer type.

Most Importantly: Time, Time, Time

Also, and perhaps most importantly, there is something very crucial to understand about CT scans.

As mentioned above, CT scans work by showing if there is a mass in your body - they do not indicate if it is growing in size, or even live tissue or dead. Therefore, to use CT as a cancer diagnostic tool, your doctor has to use a time-lapse perspective. In other words, to be able to know if the mass is growing, or the same size or smaller, with CT, the current image has to be contrasted to a previous image.

This means you will need to have a minimum of 2, and usually 3 CT scans, over a minimum 6 month to two-year period, in order for the doctor to have the perspective to be able to say that you might have cancer.

In other words: It takes 3 tests and 6+ months for a doctor using CT scans to tell you what a PET/CT can tell you, and with greater precision and certainty, in one test, in 24 hours.

That's at least 6 months that your cancer won't have to grow. And that's 6 months you can be adding other key elements of precision oncology, like genetic testing and targeted therapies and getting the jump on your cancer.

Some Statistics: The World & PET/CT

- Europe was an early adopter of PET/CT as was the U.K. Studies on the overall value of PET/CT show that it has "clearly demonstrated its effectiveness" over CT scans for cancer diagnosis, and as previously mentioned, in the words of these authors, "**cost effectiveness has been demonstrated only in part.**" (In other words, it's a little more expensive than CT).

- In 2017, **the number of clinical PET and PET/CT scans performed in the U.S**. was estimated at 1.945 million. These scans were performed at approximately **2,400** sites.

- In contrast, **Canadian public health** has **45 PET/CT machines** at 34 sites and we perform approximately 63,000 PET/CT scans a year. There are also 7 private PET/CT clinics across Canada and more on the horizon.

- **This link presents a clinical study** conducted at the Mayo Clinic in 2010 – and later that year published in the Journal, Archives of Neurology – which concluded: A combination whole-body PET-CT scan is more accurate than CT in detecting cancer. From this study and many others like it, PET/CT scans became an integral part of standard medical diagnosis around the world.

How Come Your Doctor Didn't Mention A PET/CT?

There are a few good reasons your doctor might not have mentioned PET/CT as an option for you.

First and foremost, as mentioned, it's **not a part of the standard protocol** for cancer diagnosis.

Also as mentioned above, it's such new technology in contrast to CT scans. There are 45 PET/CT machines in Canadian public healthcare, versus **538 CT machines** and physicians in Canada literally don't have the same access to PET/CT for their patients as they do the already well established CT scans.

Many doctors in Canada aren't aware of how beneficial PET/CT is to all stages of cancer care, such as:

1. Biopsy (diagnosis for targeted therapies),
2. Surgery (for the most accurate location of tumours and more precise removal),
3. Radiation is more successful when you have a PET/CT image for more precise localized radiation treatment, and for
4. Treatment monitoring.

For example, British Columbia is considered a leading Province in Canadian cancer care and they are. Here is a link to **BC Cancer Agency's website for General Practitioners with guidelines for diagnosing cancers.** Where do you see PET/CT on the list of steps or options? It certainly doesn't appear as a recommended first step or second or third. So we can understand why your doctor might not have mentioned it. But now you can have that conversation and bring along a little more information for you both to consider.

Why Aren't PET/CT's Part of Standard Cancer Care?

The short answer is simply that PET/CT's are new technology and subsequently, they cost more.

The nature of public medicine, like we have in Canada, means that decisions about which tests and treatments get offered to patients are not influenced exclusively by how effective the service would be for a certain patient, though of course that is considered, but by far, the biggest determinants of which tests and treatments are offered the Canadian public are:

1. How much it would cost to implement (to build the infrastructure of a new test or treatment, and to maintain it and staff it etc.);
2. How many Canadians would need this service;
3. How much it would benefit them over the benefit of what is already in place; and
4. Which treatments or tests, currently offered, would have to be removed in order to make room in the budget and in treatment facilities, for this new offering?
5. ...and back around to #1

This article, first published in the Globe and Mail in 2010, addresses these issues pertaining to CT scans, in further detail if you'd like to know a bit more. In short, we are experiencing the same concerns now, 8 years later, with this new technology.

Also, the uptake of PET/CT as a routine procedure for cancer diagnosis would require many 10's of millions of dollars to pay for the machines themselves; and for new facilities to house the machines; for staffing these new facilities; as well as the cost of the radioactive isotopes required to be shipped in daily for each scan.

The cost of a private PET/CT scan varies, depending on the facility, from $1,500.00 - $3,500.00 CAD. This cost per test would naturally reduce if PET/CT's became part of standard care, but it would cost us all a pretty penny over the next decade to make that the case, and that money has to come from somewhere...

It's a dilemma to be sure. But it doesn't have to be an issue for you if you have cancer.

CTOAM is here to make sure you understand your public, and private, health care options for obtaining a PET/CT scan and we'll help as needed to arrange one for you.

PET/CT's Save Lives

By now it should be clear that PET/CT's have shown enough benefit to the outcome of the lives of cancer patients. You can see, for yourself, why precision oncology specialists use PET/CT scans.

And for the use of **targeted therapies**, which is another key element in precision oncology, they simply produce a much better image for your surgeon to take a biopsy from. The better your biopsy the more successful the follow up diagnostic testing can be and that means, the better the likelihood of finding all possible treatment options available to you.

PET/CT Makes a Difference

If you've already had a CT scan, you might still be wondering if it's really necessary to get a PET/CT scan. The answer is, quite simply, 2 questions back to you:

1. **How accurate do you want your diagnosis to be?**
2. **How precise do you want your treatment to be?**

The data is clear that PET/CT makes a positive difference in all aspects of cancer care.

If you'd like more information on PET/CT versus CT scans, see our **PET/CT vs CT comparison** to learn more.

And, **if you would like a second opinion** to make sure you're headed in the right direction in any aspect of your cancer care, register for our **Precision Second Opinion**.

You deserve the peace of mind to know definitively whether you have cancer or not – and to have confidence you know about all your treatment options.

If you'd like us to help arrange for you to get a PET/CT scan, or have any questions about the process, or anything else to do with cancer, please **contact us** today. Let us help you take the next step with confidence.

Get a PET/CT Quickly, Easily, and Affordably!