



# PATIENT INFORMATION POSITRON EMISSION TOMOGRAPHY (PET) WITH COMPUTED TOMOGRAPHY (CT)

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## *PET/CT tomograph in our Hospital*



### ***WHAT IS PET/CT?***

PET (Positron Emission Tomography) is a diagnostic imaging technique based on the study of metabolic-functional processes. This exam allows the study of pathophysiological processes through the identification of functional alterations of proteins, receptors or enzymes. Some molecules involved in the various metabolic pathways are conjugated with weakly radioactive atoms emitting positron in order to trace the biodistribution of these molecules within the human body and visualize the pathological processes using the PET tomograph. The most widely used radiopharmaceutical is  $^{18}\text{F}$ -FDG (fludeoxyglucose) which has the characteristic of being used by cells in the same way as glucose,

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typically increased in cancer cells. Other radiopharmaceuticals are available (for example:  $^{18}\text{F}$ -DOPA and  $^{18}\text{F}$ -Choline) whose mechanism of action is different, but which provide similar methods of examination. The PET/CT equipment provides better quality fusion images because CT allows to improve the reconstruction of the functional images produced by PET and to accurately localize the site of metabolic alterations.

The main clinical applications concern different fields of medicine with main use in oncology, neurology and cardiology.

In the **oncology field**, this investigation makes it possible to evaluate the morpho-functional characteristics of various tumour pathologies, analyse the response to therapies, identify any post-treatment relapses, as well as obtain useful parameters for prognosis and the assessment of biological aggression.

In the **neurological field**, this method is used for the study of the main neurological degenerative diseases and the evaluation of tumour lesions in the staging phase (as a guide to surgery) and post-treatment.

In the **cardiology field**, PET-CT is currently used to search for vital myocardium.

## ***HOW IS PET/CT PERFORMED?***

The PET-CT investigation is divided into several phases:

**EXAMINATION BOOKING:** the examination can be booked by a hospital, directly by the patient with a prescription from a specialist doctor or a general practitioner; the doctor who prescribes the exam will fill in a PET/CT booking form (downloadable from the ASUGI Intranet and/or Internet website); this form is essential to plan the investigation in the best possible way and to provide the nuclear doctor with maximum clinical information.

## In order to carry out the investigation correctly:

- I) fast for at least 6 hours before the exam, it is recommended to drink water but not sugary drinks, also avoid chewing gum or candies.
- II) limit physical exertion in the days prior to the investigation, especially in the previous 24 hours.

### **III) for the diabetic patient undergoing PET/CT with $^{18}\text{F}$ FDG (this procedure is not needed for other radiopharmaceuticals):**

1. fast on the day of the investigation if you take oral hypoglycaemic agents, and the hypoglycaemic agent must not be taken until the end of the examination.
2. in case of insulin therapy, on the day of the examination have a light breakfast 4 hours before and take the planned insulin therapy at the same time.

If you have any doubt, contact the secretariat (040-399 3379 / 040-399 3380) or nursing secretariat (040-399 3375) of the Nuclear Medicine department from 9 am to 1:30 pm.

- IV) only in case of PET/CT scan of the brain with  $^{18}\text{F}$ FDG it is advisable to refrain from the use of coffee, tea and chocolate (xanthines) from the evening before the exam.
- V) arrive at the time communicated by the nursing secretariat, absolute punctuality is recommended.
- VI) you will spend about 2-3 hours at the Nuclear Medicine Department.

VII) bring with you all the clinical documentation (discharge letters,

photocopies of medical records, CT and MRI reports with relative images (if performed in other facilities than ASUGI radiological services, ultrasound reports)

VIII) avoid being accompanied by minors or pregnant women.

IX) if you suffer from claustrophobia, inform the nursing secretariat.

X) there are no particular interferences with pharmacological therapies, however, for the possible suspension of drugs, you will be instructed by the Secretariat and/or Nursing staff. However, please bring the list of medications that have been prescribed for you and that you are taking.

XI) in the event of the unforeseen impossibility of carrying out the investigation, the facility or the patient are must imperatively cancel the appointment by telephone at least four (4) days in advance in order to allow another patient to undergo the examination.

### **The PET/CT examination procedure:**

acceptance of the patient by the nurses of the PET area, and blood glucose test in case of PET with  $^{18}\text{F}$ -FDG (the presence of high levels of glucose in the blood, for example due to non-observance of the prescribed fast, causes poor quality of the investigation that may not be correctly interpreted)

interview with the Nuclear Doctor

the patient is seated in the examination area, placed at rest on an armchair, and correct venous access is ensured by means of a needle cannula for intravenous saline solution.

a small amount of radiopharmaceutical is administered intravenously through the cannula needle referred to in the previous point.

**The administration of the radiopharmaceutical does not cause any side effects or allergic reactions.**

after the injection, it is necessary to wait an adequate time (on average an hour) for the radiopharmaceutical to be distributed in the tissues.

after this period the patient will be asked to empty the bladder and then the Medical Radiology Technical Healthcare staff will place the patient on the PET-CT bed which will slide slowly inside the machine allowing to detect the distribution of radioactivity in the body and perform CT scan at the same time.

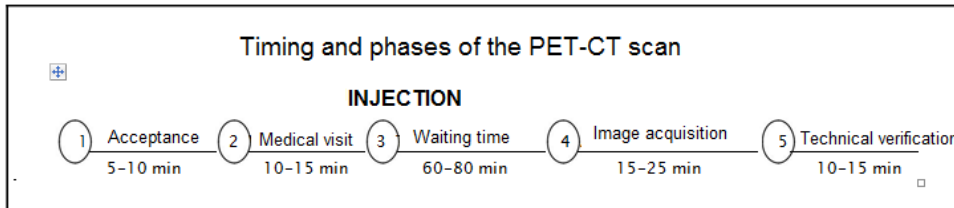
once the scan is complete, the patient will be asked to wait a few more minutes: the doctors will check that there have been no technical problems during image acquisition.

in some cases, on the basis of the diagnostic question, additional late measurements are planned (the patient will be informed of the duration of the investigation, if foreseeable, at the time of administering the radiopharmaceutical).

the staff will advise the patient when to leave the nuclear medicine ward. Before leaving the ward, it is a good idea to empty your bladder again at the Nuclear Medicine service. It is recommended to avoid contact with pregnant women and young children. About 8 hours after the injection, the radioactive effect of the tracer is no longer present.

**Overall, the entire procedure has an average duration of between 2 and 3 hours, based on the clinical question. Overall, the whole**

procedure has an average duration of 2-3 hours, depending on the clinical question.



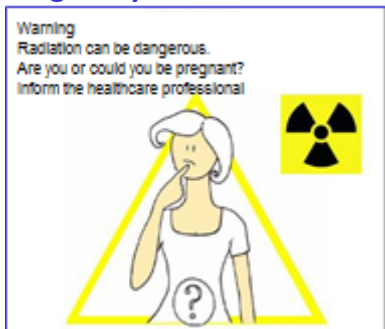
After the PET/CT exam, it is possible to break the fast and carry out normal daily activities.

For privacy reasons, no information will be provided on the result of the PET/CT result by telephone, fax or e-mail.

For any further information, you can contact the nuclear doctor who can be reached through the secretariat of nuclear medicine at the following numbers:

040 399 3379/040 399 3380.

### Pregnancy:



PET/CT examinations are generally not performed during pregnancy. Therefore, women who are pregnant or who have a delayed menstrual cycle must inform the Nuclear Doctor before the injection. In doubtful cases a Beta-HCG dosage will be required. It is important to know that if the pregnancy arises after the PET/CT investigation, even shortly after the examination, there is no problem for the foetus.

**Breastfeeding:**

The nuclear doctor will provide instructions on the period of any interruption of breastfeeding which may vary within a few hours, in relation to the radiopharmaceutical.

**We inform you that the radiopharmaceuticals are produced and supplied daily by an external company; delays in delivery (usually scheduled at 7:30-8:00 am) or production blocks may cause delays in the schedule or make it impossible to carry out the PET/CT scan, beyond our control.**





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**NOTE**

This booklet contains information valid at the time of printing and is periodically updated. However, changes may occur between one edition and the following.





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