

## JPND “PETMETPAT” CENTERS: PRACTICAL REALITY

*An anonymous summary of comments or deviations from standard protocol  
(from the JPND survey passed out after the Madrid workshop)*

Participating centers from: Århus, Amsterdam, Cologne, Groningen, Ljubljana, Madrid, Milan, Namur, Turku, & Wisconsin

### GENERAL COMMENTS:

- PET brain data acquisitions are conducted under the standard scanning protocol in our department. So far, there are not divergences between scanning protocol and routine clinical practice.
- Most examinations stick to the standard scanning protocol in our department.

### UPTAKE TIME VARIATION:

- For FDG, there is almost no discrepancy between intended and actual uptake time, as far as I can tell. We did not specifically look at this, however.
- Uptake time varies about 10 min. Not precisely measured. Scan actually starts approximately 5 minutes (voiding, transfer, setup) after the patient leaves the waiting room where the time interval is measured.
- Uptake time: was before 15 min, now 10 min. It is always precise unless the patient get a panic attack or similar
- Always uptake time of 40-45 minutes from i.v. injection (it was reported in literature no difference for 30 up to 45 minutes uptake).
- Uptake times are usually between 40 and 45 minutes.
- Patient waits 40 minutes after injection, and then PET emission scan is acquired between 40-60 minutes after injection with no variation in scan duration.
- In a previous research study, uptake times were all within a 50-70 minute time window, with an average of  $61 \pm 1$  min.

### SCAN DURATION VARIATION:

- No variation in scan duration.
- Scan duration is always the same.
- No variation in scan duration (set automatically by the scanner. Possible variation in seconds).
- Scan duration is always 15 minutes (both Static and List mode according to the specific protocols).
- There is minimal variation in scanning time.
- The actual scanning times corresponds very well. Deviations in less than 5% of scans. Scan duration may also be occasionally shorter in scientific studies if the patient cannot tolerate the dynamic 60 min scan (more advanced patients with Alzheimer's disease)
- Actual scan start time is usually within  $\pm 2$  minutes
- We only have one PET scanner; for obvious reasons sometimes the scan is acquired later than requested, but we do know the actual time the acquisition started.

### INJECTED ACTIVITY VARIATION:

- Injected activity according to the patient's weight (MBq 3.7 kg). Injected activity is usually constant: 200 MBq delivered by Trasys device, and the effective injected activity is controlled “manually” in an activimeter before injection.
- Injected activity is 5 mCi. The effective injected activity is controlled in an activimeter before injection.
- Variations dominated by (automatic) FDG injector reliability. Observed to be within 5 % extreme (max/min) deviation from the prescribed value.
- There is some variation in injected activity.
- Injected activity may occasionally be lower.
- Injected dose: 190-210 MBq
- 10% variation from 200 MBq injected activity is allowed (180-220).
- 20% deviations from ideal injected activity are allowed.

- Uptake times and corresponding information (deviations, injected activity, etc) are available in the patient's file and can be retrieved.
- All acquisition data regarding activity injected, uptake time, scan duration are kept in the patient's file. So evaluation of this kind of data can be easily retrieved.

#### **CLOCK SYNCHRONIZATION:**

- Yes, clocks are synchronized.
- Yes, clocks are synchronized.
- Clocks are synchronized.
- Clocks are synchronized.
- Clocks are synchronized every day.
- Clocks checked/synchronized daily.
- Clocks are synchronized between the delivery system and the PET/MRI scanner.
- Clocks are synchronized between the FDG Trasys delivery device and the PET-CT acquisition console.
- Clocks (injector/scanner) synchronized rarely. As much as 2 minutes offset possible. At the moment synchronized to less than 10 seconds. Synchronized 2 months ago because mismatch was noticeable.
- Which clocks?

#### **GLUCOSE VALUES / DIABETICS:**

- Blood glucose according to the international criteria (below 140 mg/dl) (7.8 mmol/l).
- Diabetic patients are scanned when blood glucose is controlled (rule is up to 140 mg/dL (7.8 mmol/l), but we accept 160 mg/dL (8.9 mmol/l)).
- Range of glucose values used. Extreme cases (>10, <3 mmol/l) (>180, <55 mg/dl) rejected.
- Glucose levels above 11 mmol/l (>~200 mg/dl) are rejected.
- Yes we scan. We measure glucose level and refrain from scanning if values are high.
- There is a lot of variation (also outside the recommended cut-offs) for glucose.
- Of course there will be variation in glucose values, because we are scanning humans.
- Glucose values are not routinely taken for brain examination, but this can of course be implemented with respect to the harmonization procedures.
- So far we have not studied diabetic patients, and the protocol for controlling glucose levels has not been implemented. This can be implemented with respect to the harmonization procedures.
- Yes we scan DM pts, and we do have a protocol for these patients (in practice this works quite well).
- Diabetic patients: non-insulin dependent: regular medication, fasted for 6 hours, insulin dependent: 6 hours fasted after regular breakfast and insulin injection.
- We scan diabetic patients. Insulin-dependent diabetics take a light breakfast and their regular insulin, and we scan them approx. at 1100-1200 o'clock. Type 2 diabetics are scanned fasting in the morning.
- Yes, we scan diabetics. No diabetes medications allowed 6 hrs before scan.
- Diabetics are scanned, but IV Insulin injection protocols are mainly implemented for oncology patients.
- We have special protocols for DM types 1 and 2.
- We do scan diabetic pts. Will report protocol soon.

#### **HEAD IMMOBILIZATION:**

- We have an head holder, but also motion correction algorithms.
- We immobilize the patients' heads, and there is also correction for head motion.
- We just use head strap. We can use frame to frame movement correction.
- We use head restraint with tape. In the clinics we usually do not correct for head motion, but rescan immediately if there is head motion. In most cases there is minimal motion.
- Head motion: fixation of the head with a ribbon. No head motion correction.
- Relatively loose head rest. No corrections applied.
- Head holders used for immobilization.
- We immobilize pts using a typical head holder, and we are using tape as well.
- Contention methods are routinely used for the immobilization of the patient's head.
- Immobilization methods of the patient's head are routinely used in the PET/MRI scanner.

**REASONS FOR RESCANNING:**

- Re-scanning was never required, as far as I can tell.
- No cases of rescanning as far as we know.
- Re-scanning is rare. Out of approximately 1000 patients, one was found to have a repeated scan.
- Head movements requiring scan restart are rare.
- We rarely perform rescans. If we do it is mostly due to head motion.
- Some subjects require re-scanning after case-by-case analysis. The reasons for repeating the study include patient motion or noncooperation and low scan quality.
- Sometimes rescanning if scanner failure during acquisition or extravenuous injection of the tracer (very rare).
- Patient non-cooperation.
- In case of patient motion or low scan quality, re-scanning is systematic for all neuro or oncology examinations.
- Sure, we experienced many breakdown problems with our scanner, but it will be replaced within 3 months.