Prostate Cancer MRI
Accurate Diagnosis and Treatment

PET/CT Scan
18F- Fluorocholine (18F-FCH)
(Radiopharmaceutical)

To read all the educational pamphlets from Prostate Cancer MRI 2016 go to pcamri.com

for patients and curious doctors

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18F-Fluorocholine PET/CT Scan

Positron Emission Tomography Imaging
- Characterizes and localizes prostate cancer
- Distinguishes tissues according to metabolism rather than structure as seen on CT Scan and MRI

Five Evolving Indications
- Define dominant cancer nodule for targeted biopsy and focal therapy
- Initial local and distant cancer staging in select patients
- Restaging of recurrent cancer and castrate resistant cancer
- Selection of men for salvage therapy with suspected local recurrence
- Treatment monitoring after radiation and medical oncology therapy

How does it do it?
- Prostate cancer cells have increased choline uptake and metabolism compared to normal tissue
- 18F-FCH is a radioactive choline derivative
- 18F-FCH is injected intravenously and accumulates in cancer cells
- PET/CT detects foci of the radiopharmaceutical indicating cancer

Accuracy
- High sensitivity in detecting local cancer and cancer recurrence
- Excellent specificity in detecting cancer in lymph nodes
- Excellent accuracy for metastatic bone disease
- More likely to show recurrent cancer if PSA is higher than 2 ng/ml and Gleason score is ≥ 7

Drawbacks
- In Canada only available under research protocol
- Dosage of radiation comparable to full body CT
- An expensive test to be used selectively
- 1 ½ hour exam requiring an intravenous and barium drink
Local Recurrence on FCH PET/CT

Bone Metastasis on FCH PET/CT
False positives

- Prostatitis
- Myelofibrosis in bones
- Other cancers such as pulmonary and colon

False negatives

- Very small cancers
- Cancers with low choline uptake
- Liver (has high normal choline uptake)
- Patient on Androgen Deprivation Therapy

Prostate Cancer Staging 2017

- **Local staging** (below aortic bifurcation)
  Prostate MRI, 18F-FCH PET/CT scan
- **Distant staging** (above aortic bifurcation)
  18F-FCH PET/CT scan, Bone scan, CT abdomen

Fluorinated choline radiopharmaceuticals are commonly used tracers in the USA and Europe. Their safety is well established. Because 18F-FCH is not Health Canada approved the Canadian experience is limited.

References

1. Bauman et al. in *Prostate Cancer Prostatic Dis.* 2012 Mar vol. 15 no. 1 pp.45-55
4. Turbey et al. *AJR* June 2009 vol. 192 no. 6 pp. 1471-1480

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