# Imaging in Myeloma: Fcholine PET

6th International Workshop on PET in lymphoma

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Menton

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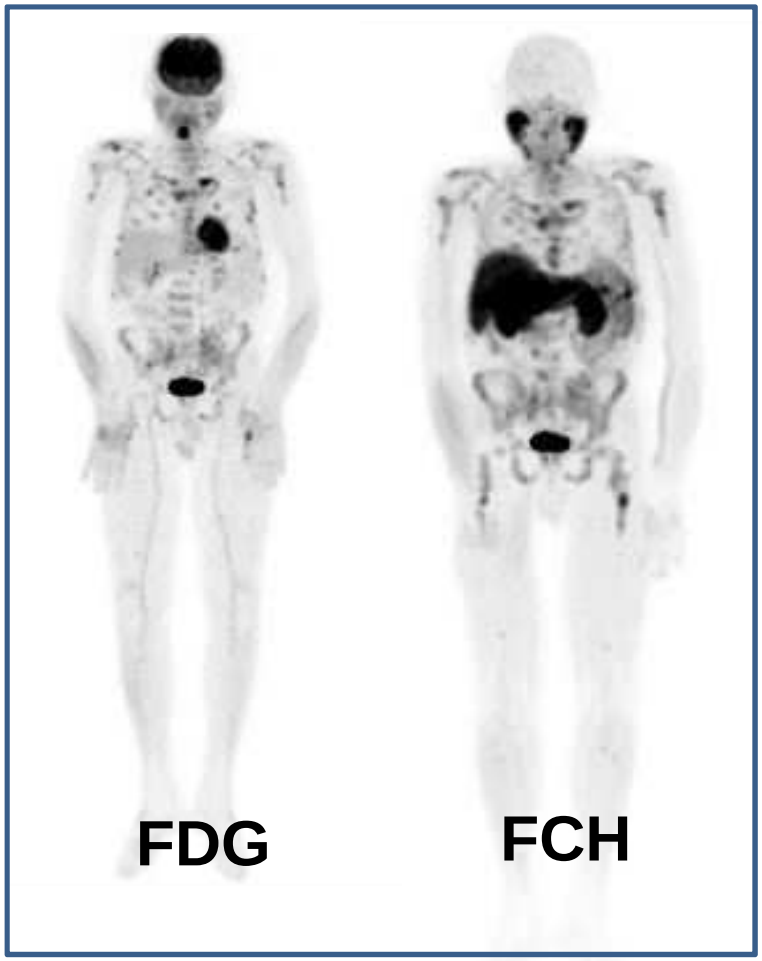
Patient H..

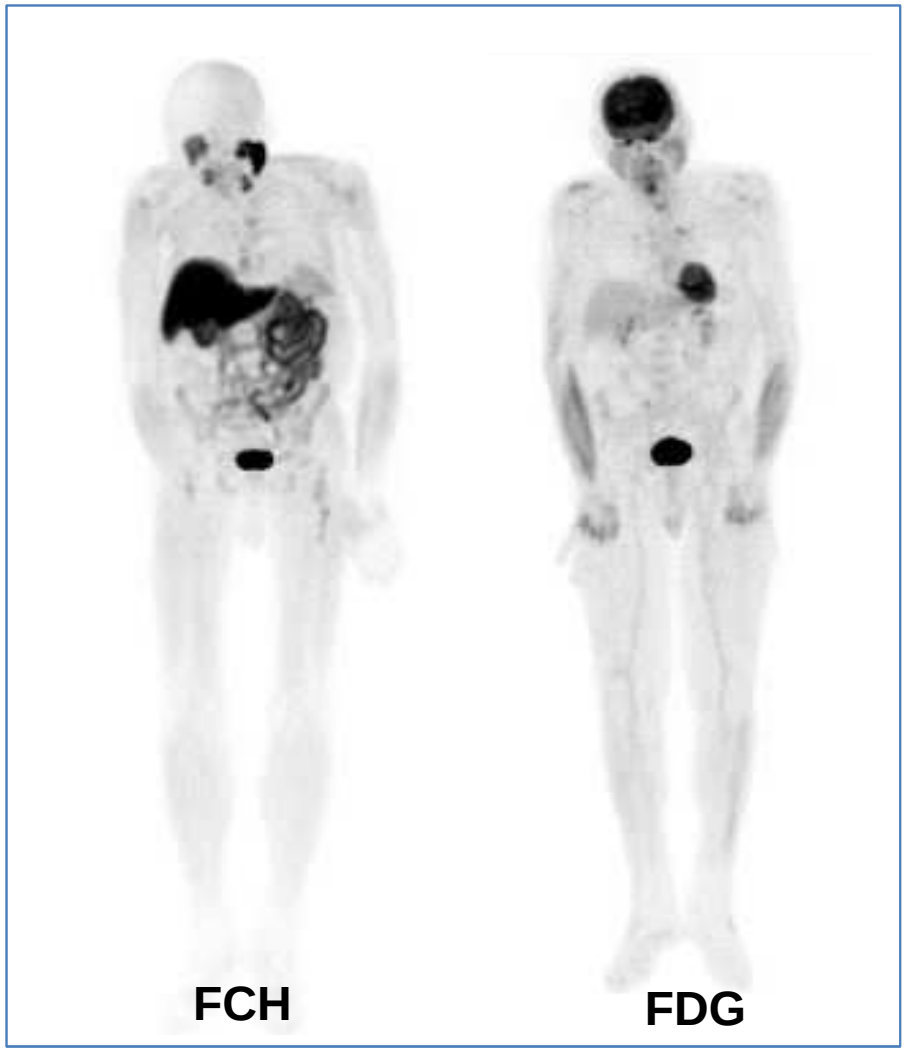



Dec 2014

78 years old male
IgA kappa Myeloma
Diagnosis in 2002
1st line: VAD + 2 ASCT in 2003
2nd line: VTD in 2006
3rd line: lenalidomide in 2010

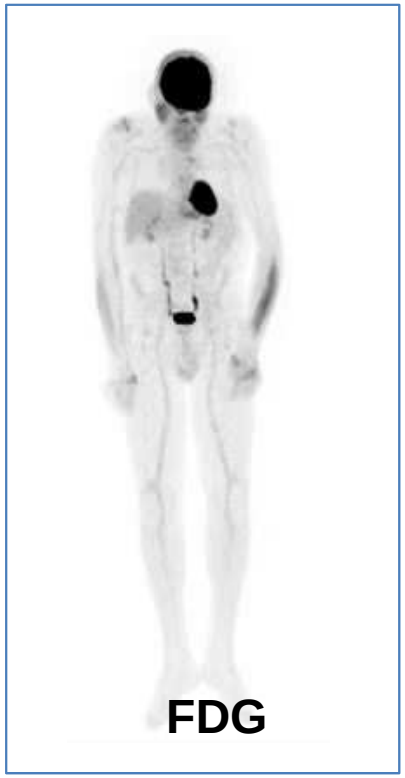
In Dec 2014, the patient was on lenalidomide maintenance.
Mild low back pain
M Spike = 5 g/L, stable
FDG and FCH PET : relapse
Bone marrow aspiration: 51% plasmocytes

4th line : Pomalidomide + DXM

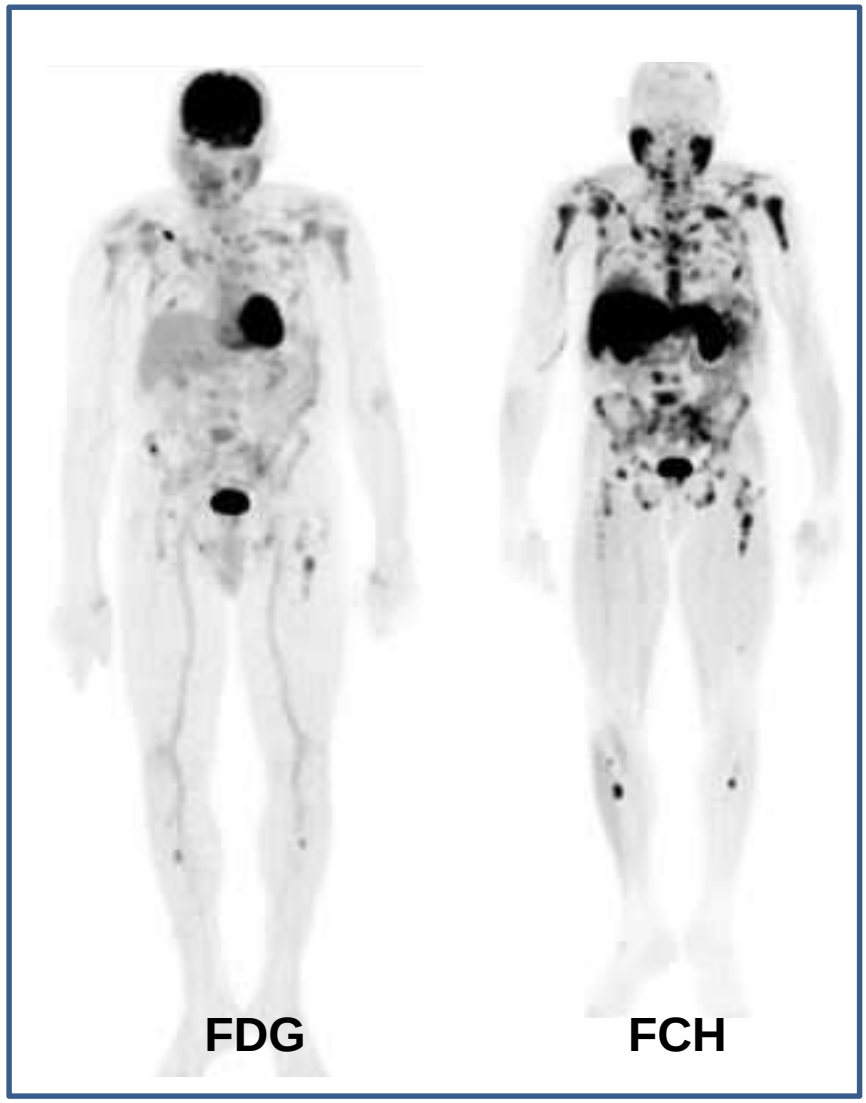



**Mar 2015**

- March 2015, complete metabolic response, FDG and FCH PET
- June 2015, treatment was stopped because of a severe lung infection
- Oct 2015, still in metabolic CR (FDG PET)




**Oct 2015**




Aug 2016

- Aug 2016, one year after end of treatment,
Patient was barely symptomatic
M Spike: 3,5 g/L
Standard check up with FDG and FCH PET : relapse
Bone marrow aspiration failed
5th line : Pomalidomide-Bortezomib-DXM

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ORIGINAL ARTICLE

# 18F-fluorocholine versus 18F-fluorodeoxyglucose for PET/CT imaging in patients with suspected relapsing or progressive multiple myeloma: a pilot study

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# Patients and methods

- 21 patients with clinical and/or biochemical suspicion of relapse or progression

- mean interval between FCH and FDG PET/CT:

10.4 days (median 7, range 3-35)

- 2 readers:
  - on site reader
  - masked external reader

High interobserver agreement
k = 0.89 (FCH)
k = 0.81 (FDG)

# RESULTS

- 2 patients FDG- and FCH-: 2 true negative results

- 4 patients with FDG and FCH **innumerable** bone foci:

  4 true positive results (with confirmed bone marrow infiltration)

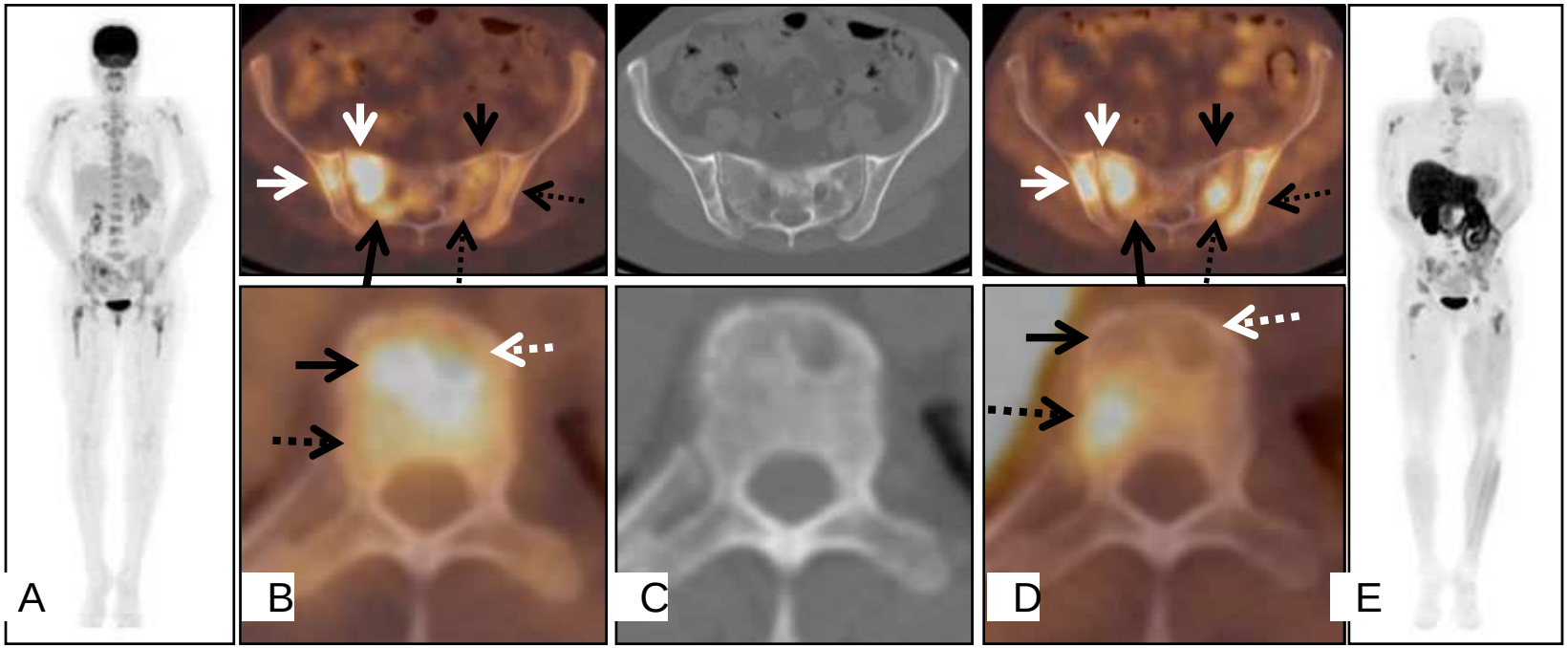
  (in one patient, a clear mismatch between FCH and FDG uptake of some foci was observed)

- 15 patients with **countable** bone foci:

  75% more bone foci were detected with FCH than with FDG

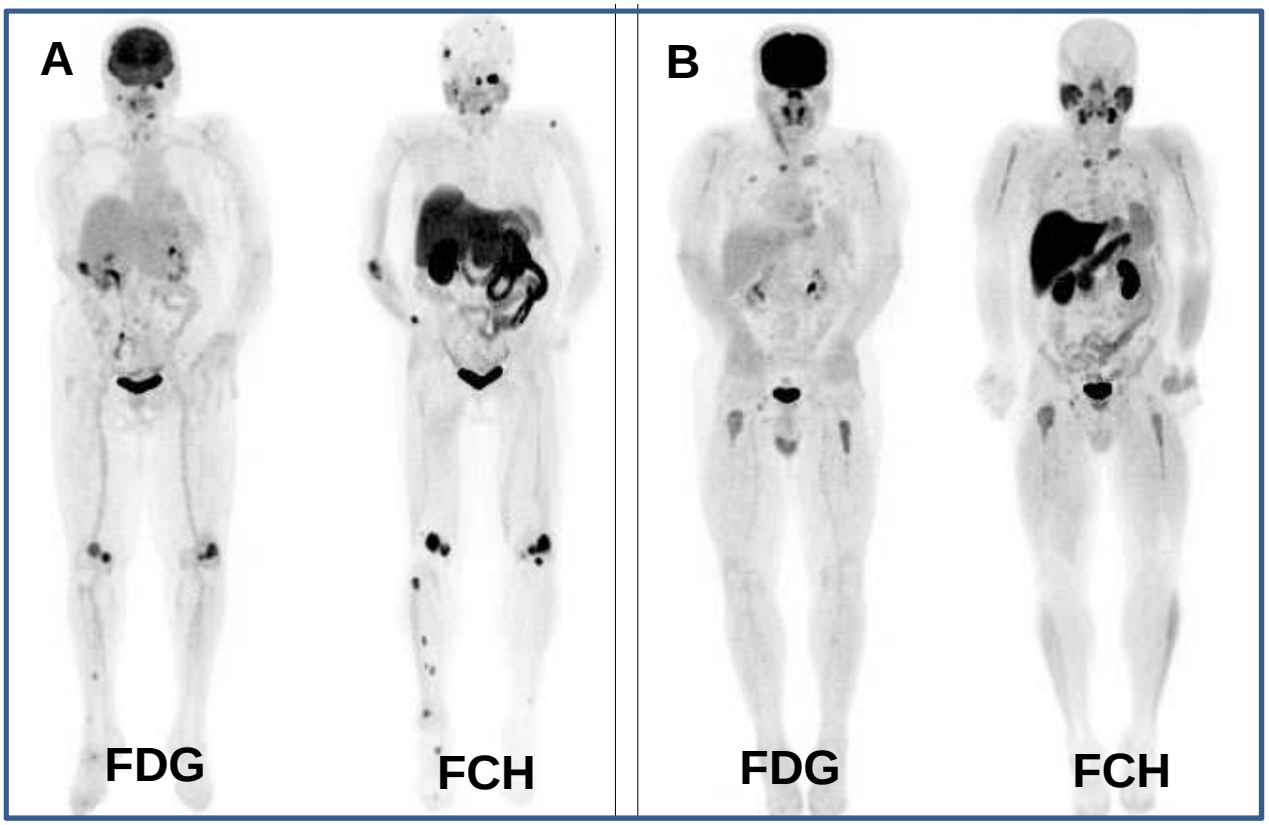
  in the matched foci, higher intensity of uptake for FCH vs FDG

# One patient with innumerable bone foci on both FDG and FCH PET/CT

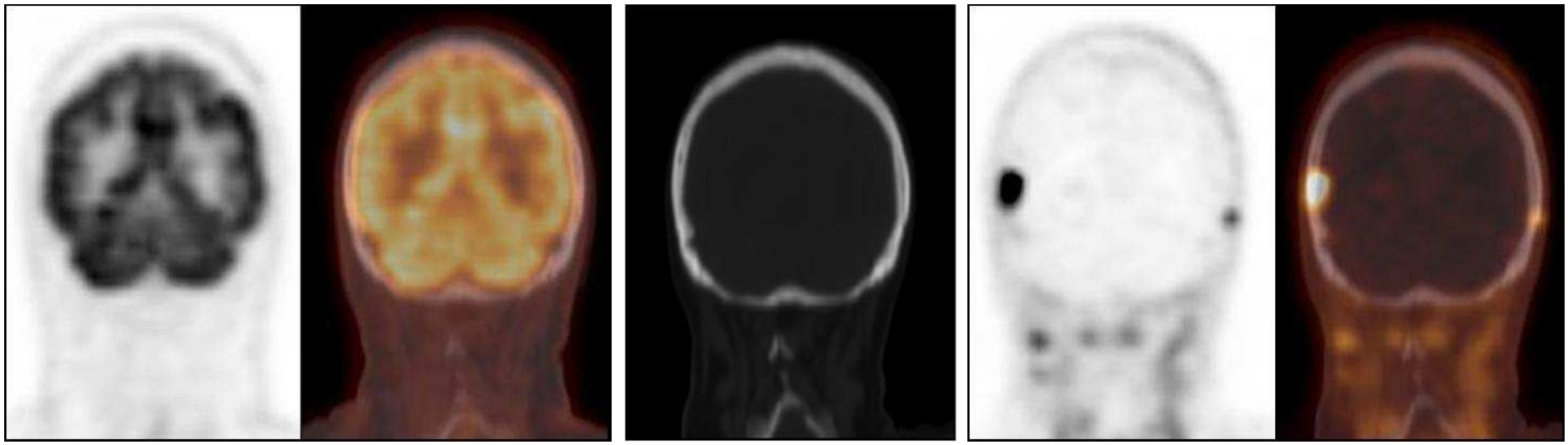



The majority of foci are matched (white arrows). However, some foci appear more intense with FDG (black full arrow) and other with FCH (black dotted arrow). Furhermore, some lesions visible on CT take-up neither FDG nor FCH (white dashed arrow), probably as a consequence of the previous treatment

# Two patients with numerable bone foci on both FDG and FCH PET/CT




FCH shows much more foci than FDG in patient A.
FCH and FDG show the same foci in patient B



A B C

Coronal slices of the same patient.
Negative FDG PET/CT (A),
small lytic lesions in the skull on CT (B)
and positive FCH PET/CT (C)

# Discussion

- The good performance of FCH PET can be explained by the increase of serum lysophospholipid levels in MM patients compared to healthy subjects, illustrating the increased lipid metabolism

*Sasagawa T. et al, Lipids, 1999*

- In accordance with previous studies with other tracers of lipid metabolism, either $^{11}$C-choline or $^{11}$C-acetate

*Ho C. et al, J Nucl Med, 2014 ($^{11}$C-acetate)*
*Lin C. et al, Eur J Nucl Med Mol Imaging, 2014 ($^{11}$C-acetate)*
*Nanni C. et al, World J Surg Oncol, 2007 ($^{11}$C-choline)*

The better detection of bone foci using FCH than FDG in this pilot study requires confirmation:

- in large prospective series,
- in other settings (initial staging, assessment of treatment response including after stem cell transplantation),
- with evaluation of the impact of FCH PET/CT on patient management and of the adequacy of changes.
- with evaluation of the significance of mismatched foci which can be sometimes observed

In conclusion, FCH PET/CT, now widely available in several countries, might constitute a promising imaging modality in multiple myeloma.