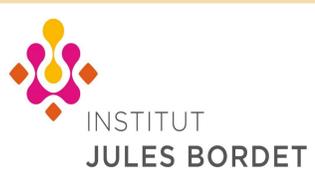


An exceptional case of using 68 Gallium PSMA-PET / CT for targeting prostate biopsies



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INTRODUCTION

The emergence and widespread use of positron emission tomography (PET) / CT with prostate specific antigen membrane (PSMA) have led to better detection of metastatic prostate cancer, particularly at low levels of prostate specific antigen (PSA) (1).

Albisinni (2) using a retrospective study and Roach (3) using a prospective study showed that PSMA PET / CT changed disease management in respectively 76 and 62% of patients compared to conventional staging. Through this certainly exceptional case, a new application of PET 68Ga-PSMA have been found : initial diagnosis of prostate cancer difficult to find.

PATIENTS AND METHODS

This is a 69-year-old Caucasian patient with no specific history who went for urological consultation for prostate cancer screening. The PSA level being 13 ng / ml, a first systematic biopsy series returned negative. Faced with an increase in PSA levels, a 3-parameter multi-parametric MRI revealed a PIRADS 4 lesion at the right baseline. The patient then underwent a second series of prostatic biopsy guided by Koelis MRI image fusion that returned negative (Fig. 1).

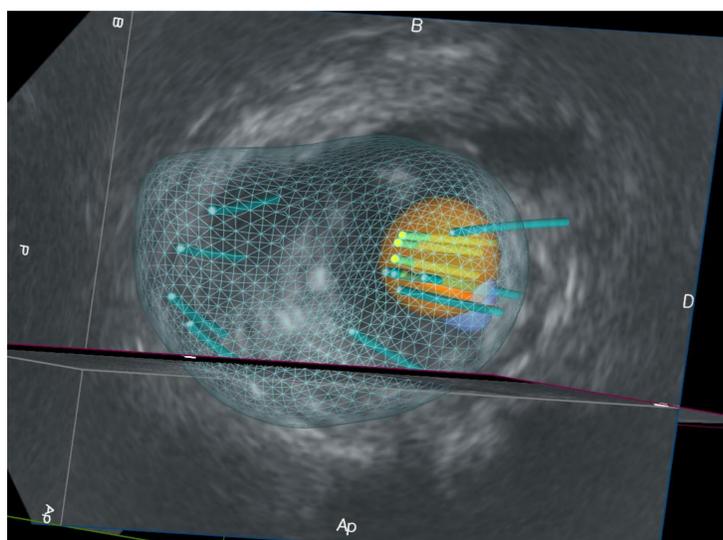


Figure 1: 3-D reconstruction of the prostate as viewed by the operator during biopsy. The MRI target volume is now a 3-D region of interest (ROI- yellow) and the PSMA target volume is now a 3-D region of interest (ROI- blue) for a targeted biopsy. None of the old biopsies reach the suspect area at pet psma (blue zone) while they are within the suspect zone on the MRI (yellow zone)

PSA increased to a maximum of 27 ng / ml, which is why we recommended a 68Ga-PSMA PET / CT scanner. The analysis revealed an "avid" spot of PSMA in the prostate also anterior base right but slightly displaced from the lesion found on the MRI. There was no sign of local metastasis or distance. The 68Ga-PSMA region of interest delineated, was then loaded into the koelis device; while imaging the prostate via real-time ultrasound, a fusion with the stored MRI was performed. A 3-Dimensional model of the prostate, incorporating the PSMA-derived region of interest (ROI), was created and 8 target biopsies were performed. We completed 8 systematic biopsies (fig2).

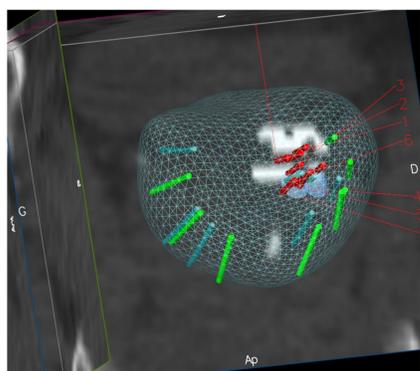


Figure 2: 3-D reconstruction of the prostate as viewed by the operator during biopsy. The PSMA target volume (white) is now a 3-D region of interest (ROI- blue) for a targeted biopsy. Biopsy cores (red) targeted into the ROI revealed clinically significant prostate cancer.

Histopathological examination revealed the presence of Gleason 7 (4 + 3) prostate adenocarcinoma without perineural invasion or extra prostatic invasion (Table 1).

Biopsy	Length	Tumor size	Gleason
1	18	5	4+3
2	17	6	4+3
3	20	8	4+3
4	17	6	4+3
5	16	5	3+4
6	16	5	3+4
7	17	9	4+3
8	17	4	3+4

Table 1 : Table of positive biopsies

DISCUSSION

Sterzing (4) investigated the value of PSMA PET in the initial staging of high-risk prostate cancer. Thus, nearly 28% of patients switched from M0 disease to M1a disease, so about 14% went from M0 to M1b.

To our knowledge, there are only 2 cases in the literature of targeted biopsy guided by images of PET CT PSMA (5-6). It is obvious that this technique is expensive and difficult to obtain in most establishments but it finds all its interest in difficult and rare cases like this one.

Monni and al (7) found in a systematic and critical analysis that approximately 10% of significant lesions are still MRI-invisible. For patient like in our cases where mpMRI is normal and clinical suspicion for cancer remains such, improved imaging of the prostate is needed. When standard imaging modalities and standard biopsies and MRI-image-guided biopsies have all failed to find cancer, nuclear imaging appears to be an interesting, feasible and effective option.

CONCLUSIONS

We report the case of a patient with a very high PSA level having undergone 2 sets of biopsies (standard and by MRI image fusion) both returned negative. The cancer was detected by fusion-guided biopsy of 68Ga-PSMA PET / CT images and real-time ultrasound.

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