Impact of PET/MR Imaging in Patients with Gynecologic Cancers Undergoing Same-Day PET/CT: A Patient-Centric Approach

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Introduction

Gynecological malignancies are the leading cause of cancer death among females

Early and accurate assessment of disease status in gynecological malignancies is paramount for optimum surgical planning and outcome prediction

Currently, PET/CT and MRI are the two commonly used diagnostic imaging techniques for staging gynecological neoplasms

Many patients undergo both MR and PET/CT as these two studies provide complementary information and guide management

Introduction

However, the patients face significant burden leading to poor satisfaction & patient experience

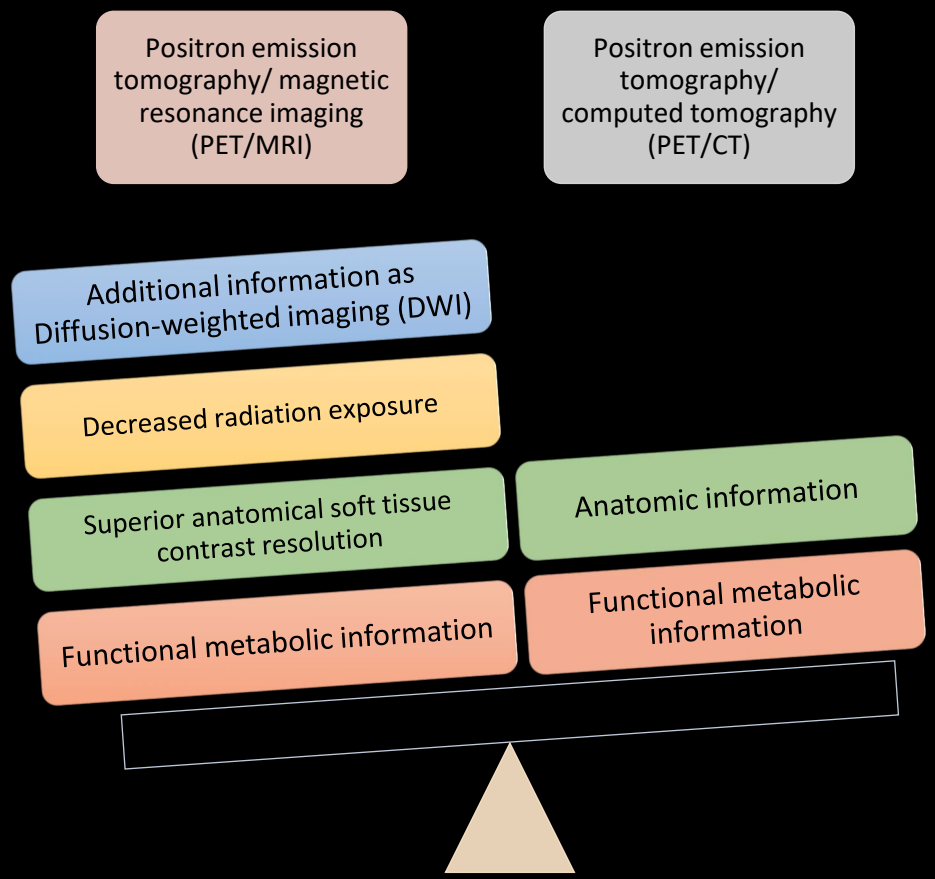
Long scanning time for each individual modality

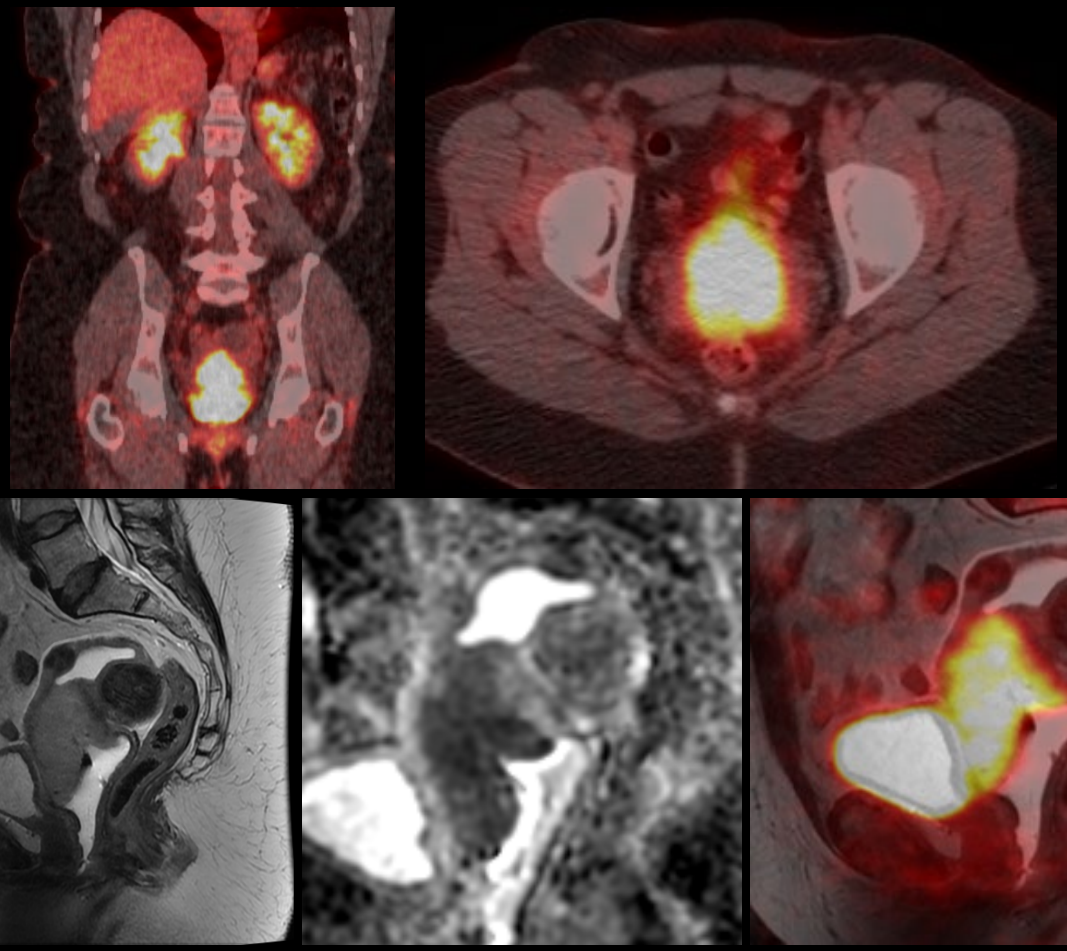
Significant waiting time between the PET/CT and MR, which can contribute to patient fatigue

The goal of our project was to compare the impact of combined positron emission tomography (PET) and magnetic resonance (MR) imaging to that of combined PET and computed tomography (CT) performed on the same day in patients with gynecologic cancer

We aimed to decrease the overall scanning time by 20%, by transitioning to a “one-stop shop” combined PET/MR study for staging gynecologic malignancies, in lieu of performing a PET/CT and pelvic MRI.

Rationale for PET/MR versus PET/CT





With PET/MR, we get all the information as PET/CT but also advanced information including DWI features, better contrast resolution, and decreased radiation by eliminating CT component – A Win-Win situation!

Methodology: A peak into Traditional Scanning workflow

8 am appointment

PET/CT area

143 min

Noon appointment

MRI

134 min

4 pm appointment

Methodology- Change is required to improve patient experience

In this traditional model, apart from the actual lengthy scanning time, the patients had to wait for a significant amount of time between the procedures, contributing to patient discomfort

In our project, combined PET/MR imaging was only performed in those patients who were undergoing same-day PET/CT, utilizing the same radioactivity as required for a stand-alone PET/CT study

Methodology

We evaluated the time taken for performing the PET/CT, standard pelvic MRI, and the combined PET/MR

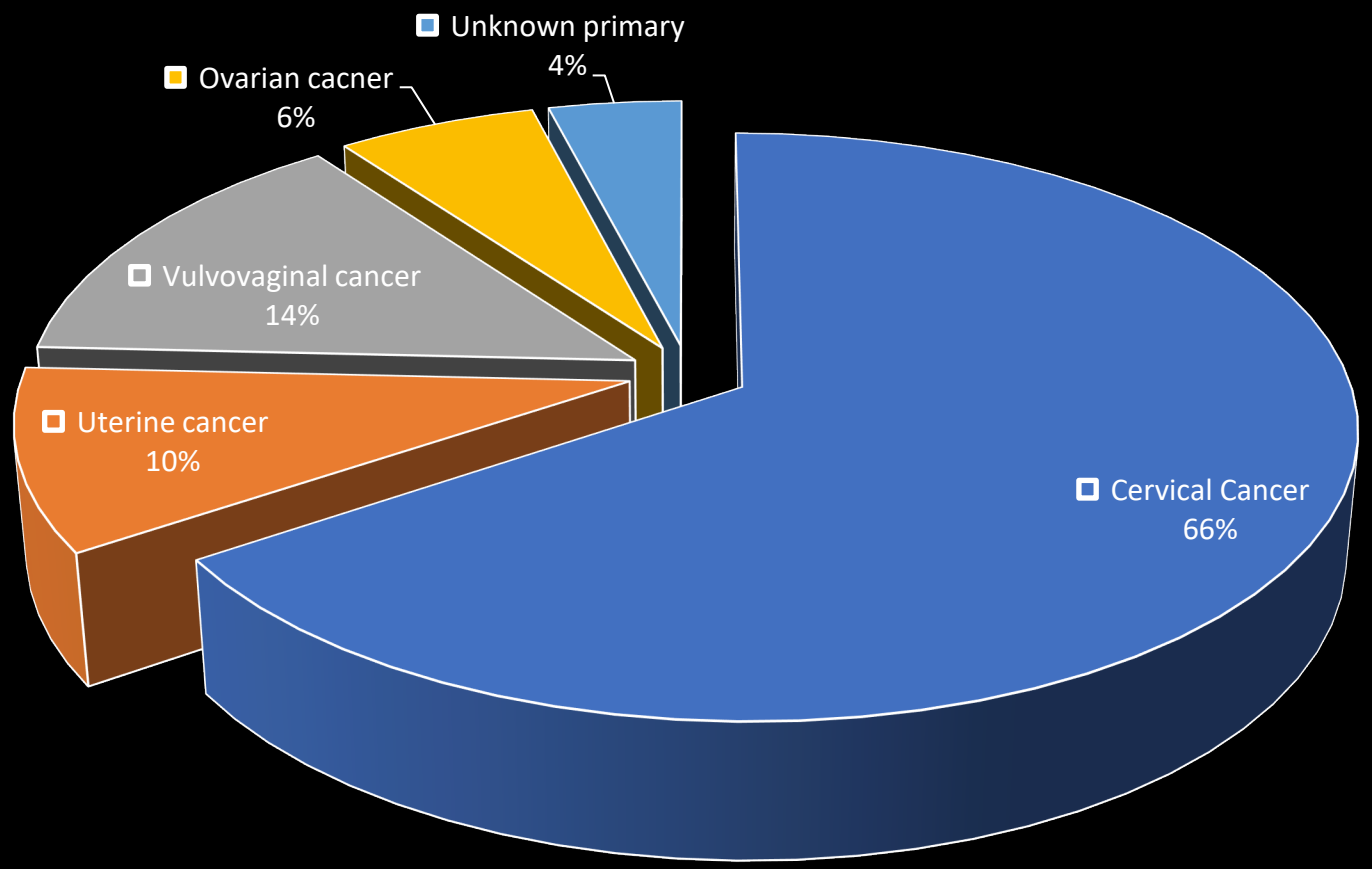
We also evaluated the diagnostic performance of the PET/CT and PET/MRI for TNM staging

The McNemar test was employed for statistical analysis. P-values < 0.05 were considered statistically significant.

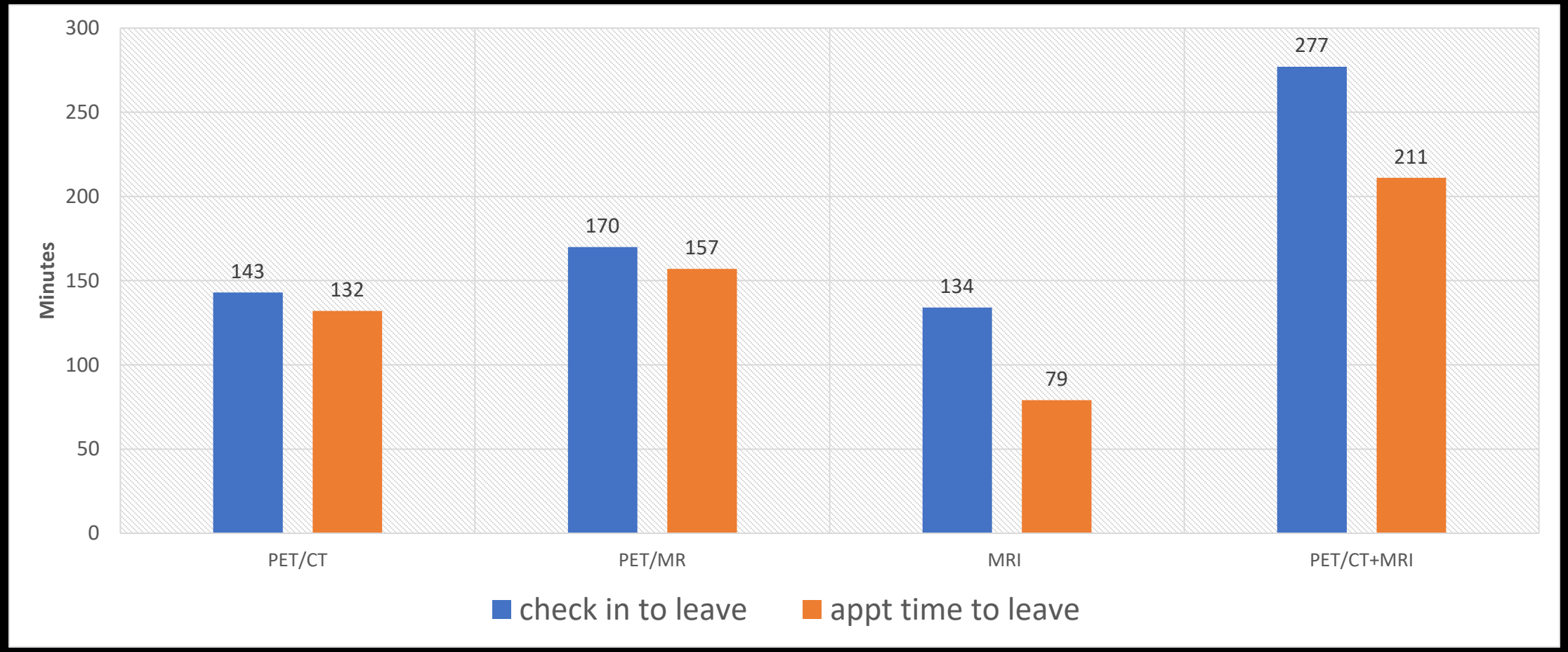
Results

- 49 patients were included in the final analysis
- Median age of 51 years (range 23-75).

Based on cancer type



Time spent in the imaging area



Results

Performing a PET/MR reduced time spent in the department by 38.6% which was well over the proposed 20 %

PET/MRI detected primary tumor in 8 patient that were missed using PET/CT

PET/MRI detected adenopathy in 5 patients that were missed using PET/CT

However, given the very low sample size, it is difficult to interpret these findings. Larger studies would be required for validation of superior diagnostic performance

Conclusion

Hybrid PET/MRI combines the advantages of both MR and PET, thereby providing superior soft tissue contrast resolution, as well as vital functional information regarding the tumor metabolism

Our project confirmed that the combined PET/MRI can successfully reduce patient scanning time and wait time, without compromising diagnostic performance

Performing a PET MR will reduce the time spent by the patient in the hospital and may improve patient experience and satisfaction.