# ADDED VALUE OF POSITRON EMISSION TOMOGRAPHY/ COMPUTED TOMOGRAPHY IN DETECTION OF PERITONEAL CARCINOMATOSIS

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## Introduction

Peritoneal carcinomatosis is one of the frequent sites of metastasis in many gastrointestinal and gynecological tumors mostly colorectal and ovarian cancer.

Various forms of peritoneal carcinomatosis could be noted in the form of ascites, micronodular, nodular, plaque like, mass like, omental cake, teca aspect and ileal freezing. Positron emission tomography (PET) is being increasingly used for diagnosis, staging, and follow-up of various malignancies. In peritoneal carcinomatosis, FDG-PET/CT has been shown to have higher sensitivity and positive predictive value (up to 92%) compared to FDG-PET and CT alone. It is more useful than just PET the addition of CT allows better anatomic visualization and can detect the presence of cancer lesions based on the glucose uptake of the cells. It identifies the exact localization and area of the peritoneal metastasis, PET-CT provides better accuracy. It adds good value to the conventional imaging mainly for monitoring response to the therapy, especially on long-term follow-up. PET/CT has multiple clinical applications in peritoneal oncology detecting the primary tumor in unknown primary, tumor staging and restaging; treatment planning, post therapy response, differentiating recurrence from post therapy changes; distinguishing malignant from benign peritoneal disease; can be used as a biomarker as well as alternative tracers for cancer evaluation.

## Aim of the work

Was to assess the added value of PET/CT in detection of peritoneal carcinomatosis.

## Patients and Methods

**Patients:** The study was conducted on patients with known history of malignancy presenting to the Radiology Department of Shark El Madina Hospital to perform full body PET/CT scans. The PET/CT scans of 20 patients was analyzed to detect the presence of peritoneal carcinomatosis.

**Methods:**

1-Complete history taking.          2-CT scan                    3-PET/CT scan
4-Statistical analysis of the data.          5-The medical ethics will be considered.
Exams were done and data were obtained using Siemens Bio-graph true point PET/CT scanner. These dedicated systems integrate a PET scanner with a multi-slice helical CT scanners permit the acquisition of co-registered CT and PET images in one session.
All PET/CT examinations were analyzed by a consensus of two experienced observers of nuclear medicine physicians and radiologists.

## Results

**Table 1:** Additive value of PET CT imaging

| Added value of PET CT imaging | Number | Percent |
|---|---|---|
| Increase reading confidence. | 20 | 100.0 |
| Reveal occult peritoneal lesions not visualized by CT. Fig1 | 1 | 5.0 |
| Determine nature of lesions that is equivocal by CT. Fig2 | 11 | 55.0 |
| Monitor treatment response | 5 | 25.0 |
| Reveal occult primary tumor not visualized by CT. Fig3 | 1 | 5.0 |

**Table 2:** Distribution of the studied patients regarding the CT imaging peritoneal findings in comparison with PET CT finding.

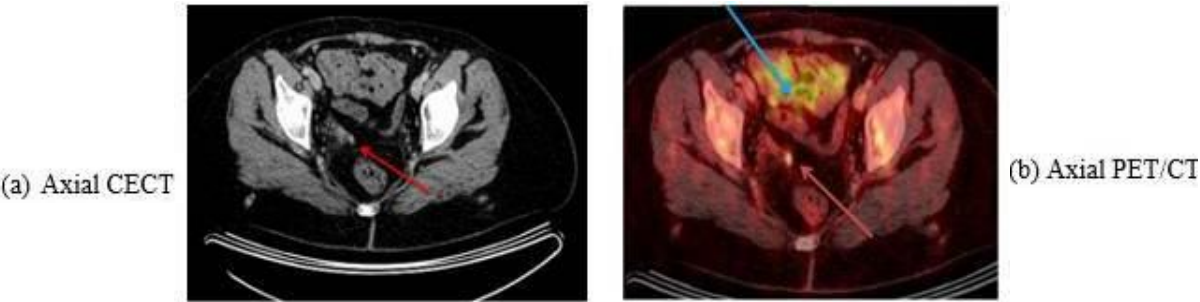| Detected lesion by CT imaging | Number | Percent |
|---|---|---|
| Same as PET CT | 7 | 35.0 |
| Missed some findings | 7 | 35.0 |
| Missed all Peritoneal lesion | 6 | 30.0 |
| Sensitivity | 35.0 | |
| Accuracy | 30.0 | |



**Figure 1:** Solitary indeterminate pelvic nodule on CECT imaging (a) (arrow) showing high FDG uptake on the corresponding PET CT imaging (b) of SUV max 6confirming malignant nature
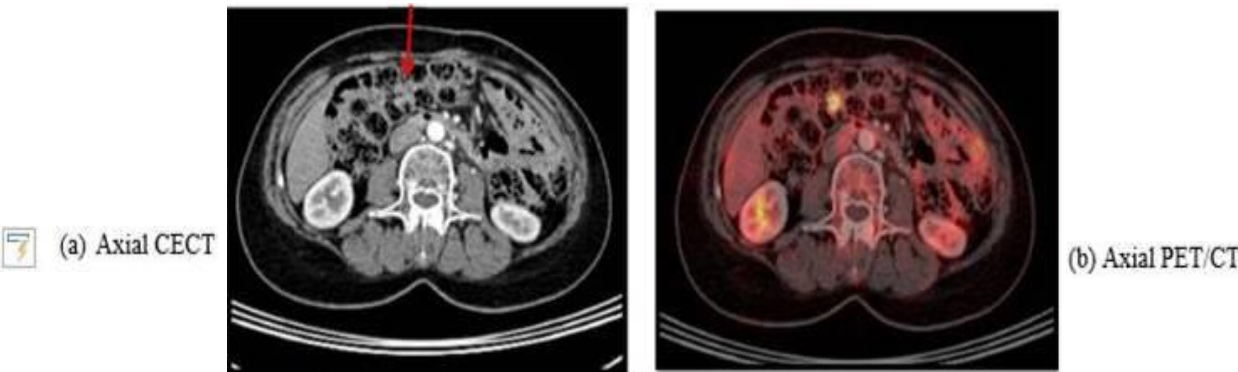


**Figure 2:** A Hypermetabolic active metastatic serosal nodule in image (b) of SUV max 9.5 which could not be identified on the corresponding CECT alone in image (a)(arrow).
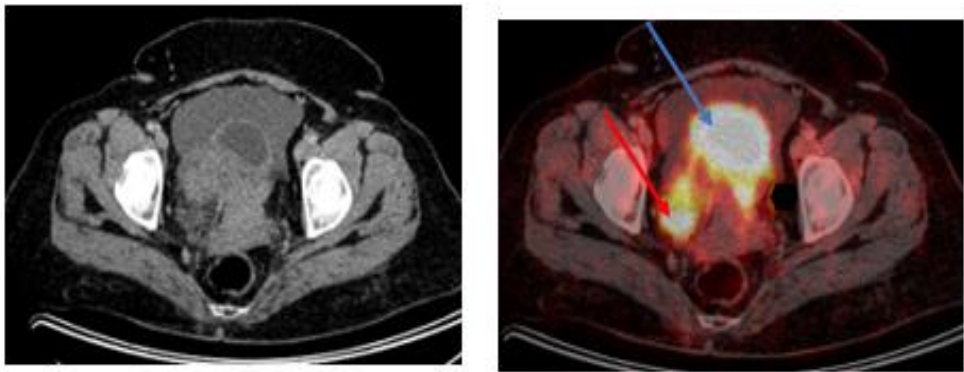


**Figure 3:** A case of metastasis of unknown origin shows a increased uptake of right ovary of SUV max 14 that was proved to be the primary lesion (red arrow) with physiological, diffuse uptake of FDG by the urinary bladder (blue arrow).

## Conclusion

18F-FDG PET/CT is superior to CECT in the diagnosis of peritoneal metastases in patients with malignant tumors with CT shows accuracy of 30 %. The additional anatomic information provided by CT improves the diagnostic accuracy of PET. Thus, it is unlikely that any one modality will ultimately replace another; rather, the combined information obtained from multiple modalities will substantially increase our ability to better and easily identify peritoneal carcinomatosis. 18F-FDG PET/CT adds substantially to CT scanning for accurate characterization of peritoneal pathology and for diagnosis, staging as well as monitoring treatment response of the disease, Awareness of potential interpretation issues and artifacts in the utility of FDG-PET/CT in the peritoneum will improve diagnostic accuracy.