# PET-CT Scan in the Management of Ovarian Cancer

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Patients with ovarian cancer usually present in advanced stage of the disease, as no effective screening procedure is available. Conventional imaging with ultrasonography, CAT scan and MRI has been used with variable ability to accurately stage the ovarian cancer. Positron Emission Tomography (PET) is a functional diagnostic imaging technique. F-18 fluoro-2-deoxy-D-glucose (FDG) is commonly used radiopharmaceutical, which is an analogue of glucose. PET in combination of CT provides both functional and structural information in the same setting and has shown encouraging result in the management of cancer patients. There is not enough data to support the use of PET-CT in the initial diagnosis of ovarian cancer. However, PET-CT has definite role in initial staging, evaluation of treatment response and detecting distant metastasis. It plays significant role in identifying recurrent tumour in patients of ovarian cancer with rising tumour markers. We have done two studies evaluating role of PET-CT in ovarian cancer.

In first study we are evaluating the role of integrated $^{18}$F-FDG PET/non contrast CT imaging in evaluating response to primary treatment in advanced ovarian cancer patients in comparison with contrast enhanced CT. $^{18}$F-FDG PET/non contrast CT (NCCT) and contrast enhanced computer tomography (CECT) were performed before and after primary treatment in 9 advanced ovarian cancer patients between oct-2007 and oct-2008.

All nine patients were diagnosed with stage IIIc on both $^{18}$F-FDG PET/NCCT and CECT. Base line $^{18}$F- FDG PET/NCCT showed FDG uptake in all 9 patients. Similarly CECT was also positive in all patients but $^{18}$F- FDG PET/NCCT detected more number of lesions compared to CECT indicating high tumour burden. All patients underwent primary treatment with neoadjuvant chemotherapy, interval debulking followed by adjuvant chemotherapy or initial cytoreductive surgery followed by adjuvant chemotherapy. Seven out of 9 patients had complete remission (78%) in which both $^{18}$F-FDG PET/NCCT and NCCT were concordant. Two patients had residual disease (22%), in one patient both CECT and $^{18}$F-FDG PET/NCCT showed two lesions at liver surface (SUV max 8.5) and porta hepatis (SUV max 6.7). In the other patient, CECT was normal but $^{18}$F- FDG PET/NCCT showed two lesions at liver surface (SUV max 2.9) and porta hepatis (SUV max 3.8). Both the patients received additional chemotherapy. In conclusion, $^{18}$F-FDG PET/NCCT has an additional value in diagnosing residual disease and management of advanced ovarian cancer. A larger number of patients need to be evaluated to assess its role conclusively.

In another study we evaluated role of $^{18}$F-FDG PET-CT in the detection of recurrent disease in patients of ovarian cancer with rising CA-125. A total of 76 patients of ovarian cancer who had undergone surgery and chemotherapy for the primary tumour in the past and now presented with rising serum Ca-125 levels were included in the study. The mean age was 64.2 years and age range was 35-73 years. All the patients had undergone routine contrast enhanced computed tomography (CECT) and then referred for $^{18}$F-FDG PET-CT studies. We compared the results of CT findings with the PET-CT findings. Sixty patients (79%) had negative/equivocal findings,

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while 16 (21%) had definite abnormal findings on CECT. Of 60 patients with negative/ equivocal findings on CECT, 46 had positive, while 14 had negative $^{18}$F-FDG PET-CT scan. Of 14 patients, which had negative PET-CT scan, 3(21%) had recurrent disease with in one-year. Among 46 patients with positive PET-CT results, one patient had false positive results. Of 16 patients with abnormal findings on CECT, PET-CT scan was positive in all 16 patients and additional lesions were seen in 75% (12/16) of patients. Thus, $^{18}$F-FDG PET-CT showed abnormal findings in a total of 61 (80%) of 76 patients with rising CA-125. Therefore, $^{18}$F-FDG PET-CT had sensitivity, specificity and accuracy of 95%, 92% and 95%, respectively, in detecting recurrent disease in patients of ovarian cancer with rising CA-125. We conclude that $^{18}$F-FDG PET-CT is a useful technique to detect recurrent ovarian cancer in patients with rising tumour marker, however, $^{18}$F-FDG PET-CT can miss microscopic recurrent disease. $^{18}$F-FDG PET-CT has significantly higher detection rate of recurrent disease as compared to CECT alone in these patients.