

Accuracy and Efficacy of Whole-Body ^{18}F -FDG PET in Patient with Recurrent Colorectal Cancer: A Case Report

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Abstract Background: A 2-deoxy-2-[^{18}F]fluoro-D-glucose (^{18}F FDG) is useful for early metabolic response assessment in various malignancies, including Colorectal Cancer (CRC). Herein, we express that Positron Emission Tomography/Computed (PET-CT) with ^{18}F FDG was very useful for early diagnosis, accuracy and additional value of whole-body in recurrent CRC. **Case Report:** A 50 years old woman was diagnosed with an adenocarcinoma of the left side colon. She selected for surgery with left sided hemicolectomy. Final pathologic report of adenocarcinoma high risk stage 2 patient, candidate for adjuvant chemotherapy with Folinic acid, Fluorouracil and Oxaliplatin regimen. Her carcino embryonic antigen (CEA) marker at beginning of diagnosis was in normal range but during last year of follow up her CEA marker increased and rising progressive without any complaints by patient. Gastroenterologist tried to diagnosis further secondary staging with lung, brain, abdominal and pelvic contrast computed tomography (CT) scanning but he could not find any lesion in these areas. But After second staging by whole body PET- CT that we suggested it could reveal a multiple lesion uptake in the left lateral sided of the rectum according to a stage IVB disease. For intraperitoneal metastasis adjuvant chemotherapy (CTX) with capecitabine and oxaliplatin was started. At now she is alive without significant abdominal complaint and therefore she treated with maintenance regimen CTX with capecitabine and regorafenib. **Conclusion:** A ^{18}F -FDG PET/CT scan was very effective in early diagnosis and High accuracy in finding the precise location of lesion in adenocarcinoma CRC and it can prepare better survival to patients with correctly therapeutic management.

Keywords: CRC, hemicolectomy, F-FDG PET/CT, intraperitoneal, regorafenib

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1. Introduction

Gastrointestinal tumor is one of the most common malignant tumors in the world. Esophageal, stomach and CRC are leading causes of death worldwide, accounting for 1.8 million deaths (38.9% of all cancer-related deaths) in 2012 [1]. Clinicians have a variety of diagnostic tools to delineate the aforementioned tumor-related factors. Of the available technologies, CT, magnetic resonance imaging (MRI), and endorectal ultrasound (ERUS) have evolved as the best modalities for accurately staging rectal cancer [2]. In addition, although ^{18}F FDG-PET/CT is well-known for its effectiveness in diagnosing primary tumors or distant organ metastasis, there are no well-defined findings for its reliability and effectiveness regarding the lymph-node status in patients with CRC [3]. There is evidence that functional imaging of tumor metabolism using PET and radiotracer ^{18}F FDG is useful for early metabolic response assessment in various malignancies, including CRC.

There is evidence that functional imaging of tumor metabolism using PET and the radiotracer ^{18}F FDG is useful for early metabolic response assessment in various malignancies, including CRC [4]. We report a case in which ^{18}F -FDG PET/CTs was very useful for early diagnosis, accuracy and additional value of whole-body in recurrent CRC.

2. Case Report

In September 2009, a 50 years old woman was diagnosed with an adenocarcinoma of the left side colon. She selected for surgery with left sided hemicolectomy. After complete initial staging by abdominal and pulmonary CT scan, with final pathologic report of adenocarcinoma high risk stage 2 patient, candidate for adjuvant chemotherapy with FOLFOX (Folinic acid + Fluorouracil + Oxaliplatin) regimen. She completed this policy regimen for six months without any complication despite of sensory neuropathy grade two. Her Carcino

embryonic antigen (CEA) marker at beginning of diagnosis was in normal range. Her follow up was done in a classic manner every (3-6 months) consist of physical examination, ultrasonography and CEA tumor marker. During last 4 years she did not have any complaints or abnormal finding. But during last year of follow up her CEA marker increased and rising progressive without any complaints by patient. Gastroenterologist tried to diagnosis further secondary staging with lung, brain, abdominal and pelvic with contrast CT scanning, he could not find any lesion in these areas. But After second staging by whole body PET- CT that we suggested for her it could reveal a multiple lesion uptake in the left lateral sided of the rectum (extra luminal penetrating the visceral peritoneum with infiltration of the abdominal wall (cT4b)), (M1b) according to a stage IVB disease. Managing patients with an elevated CEA level after resection should include colonoscopy; chest, abdominal, and pelvic CT scans; physical examination; and consideration of PET/CT scan. For intraperitoneal metastasis adjuvant chemotherapy

(CTX) with capecitabine and oxaliplatin was started. After 6 cycles of adjuvant CTX the patient complained about a considerable increase of his abdominal pain. An abdominal CT in December 2014 yielded peritoneal nodules. After confirmation of a mutated K-RAS gene a palliative first line CTX with capecitabine and irinotecan in combination with bevacizumab was started. Surveillance by CT scan in April, and October 2014 showed a partial response of the peritoneal lesions. While the peritoneal lesion showed a further re-gression in size with significant decrease in CEA marker a CT scan in December 2014. At now she is alive without significant abdominal complaint and therefore she treated with maintenance regimen CTX with capecitabine and regorafenib (kinase inhibitor) and decreased in size and number of intra abdominal lesions after new line of treatments. **Figure 1** show first PET - CT scan the patient when she had 53 old and **Figure 2** show second PET - CT scan in after seven months of second line treatment.

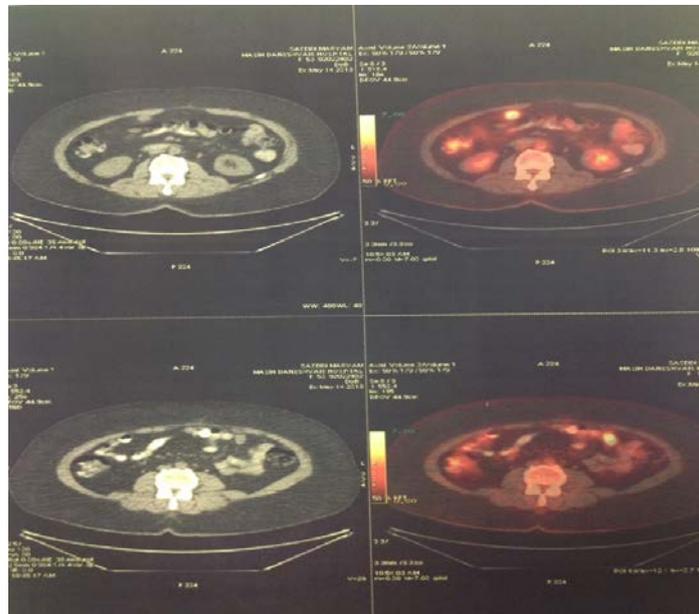


Figure 1. The sites of CEA rising that despite of normal total colonoscopy and abdominal- pelvic CT scan

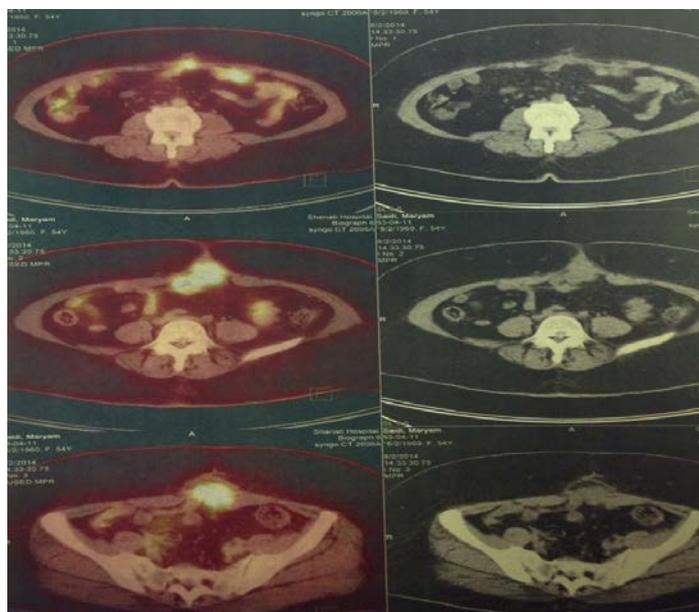


Figure 2. the decreased uptakes in previous sites of CEA rising

3. Discussion

CRC is the third most common neoplastic disease worldwide. It is one of the leading causes of cancer mortality, accounting for about 10% of all cancer deaths, with approximately 40%-50% of all cases diagnosed as metastatic [5]. PET/CT has become the most reliable and best-established imaging modality for diagnosis, staging and follow-up of cancers. It also offers prognostic information based on tumors' responses to treatments [6]. Several other studies have described PET/CT as an effective imaging strategy for the staging of CRC, with a reported sensitivity of 89–98% and specificity of 83–96% [7]. ¹⁸F-FDG PET can show the metabolic activity of malignant tumors and is accepted as an important imaging method in the diagnosis and staging of many malignant diseases [2]. Another study reported a change in the surgical management in only 3.2% of the participants based on FDG PET/CT findings and the authors concluded that FDG-PET/CT should not be routinely used for primary staging of CRC [8]. Most previous studies have shown that a change in the MSUV (maximum-standardized uptake value) is an important indicator of chemotherapy response [9]. In patients' ¹⁸F-FDG PET/CT scan reported at least four FDG-avoid lesion (SUV_{max} up to 11.72) in the abdominal wall along the mid line surgical incision is identified. There is also persistent activity ($SUV_{max}=6.52$) in the rectum is seen. Several single-center studies have reported the prevalence of FCIs (focal colorectal incidental) and risk of malignant and premalignant lesions between FCIs detected by ¹⁸F-FDG-PET or PET/CT with discordant findings [10]. Panel opinion was divided on the usefulness of PET/CT scan in the scenario of an elevated CEA with negative, good-quality CT scans (ie, some panel members favored use of PET/CT in this scenario whereas others noted that the likelihood of PET/CT identifying surgically curable disease in the setting of negative good-quality CT scans is vanishingly small). A recent systematic review and meta-analysis found 11 studies (510 patients) that addressed the use of PET/CT in this setting [11]. The pooled estimates of sensitivity and specificity for the detection of tumor recurrence were 94.1% (95% CI, 89.4–97.1%) and 77.2% (95% CI, 66.4–85.9), respectively. Use of PET/CT scans in this scenario is permissible within these within these guidelines.

4. Conclusion

In the case we presented ¹⁸F-FDG PET/CT scan was very effective in early diagnosis and high accuracy in finding the precise location of lesion in adenocarcinoma CRC and it can prepare better survival to patients with correctly therapeutic management.

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