A Case Report Demonstrating Unambiguous Clinical Utility of Pet/CT Scanning in Recurrent Ovarian Cancer

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Key Words

PET/CT scan · Recurrent ovarian cancer · Predictive utility · Prognostic utility

Abstract

There has been discussion and debate in the medical literature regarding the clinical value of PET/CT scans in ovarian cancer, particularly focusing on evidence whether the technology is of predictive versus solely prognostic utility. In the somewhat unusual case reported here, the results of the PET/CT scan were extremely helpful in developing a rational management strategy. The case emphasizes the critical need to specifically address the issue of whether data generated from an expensive diagnostic test will be useful in an individual patient's management before it is obtained.

Introduction

There has been considerable discussion in the gynecologic cancer literature regarding the potential benefits associated with the performance of a PET/CT scan in women with epithelial ovarian cancer, particularly in the setting of suspected or documented recurrent disease [1–7]. One recent report noted that 60% of patients with recurrent ovarian cancer had their treatment plan modified based on the results of this imaging procedure [1].

However, it remains unknown how such changes in management influence the patient's outcome (overall, symptom-free or progression-free survival, quality of life) [8, 9]. Specifically, one must inquire if the data obtained through the conduct of this expensive diagnostic test is of predictive utility (helps select a specific management plan predicted to be beneficial due the study findings) or only of prognostic value (defines a

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situation where the patient is more/less likely to have a relatively poor/good outcome, independent of any particular management strategy) [8, 9].

The clinical course of a woman with a long history of epithelial ovarian cancer provides a relevant example of the potential for PET/CT scanning to modify management in an individual patient and where it is rational to argue that the specific diagnostic data in rather unique settings can be considered crucial in defining optimal care.

Case Report

A 70-year-old woman presented in January of 2002 with a complex pelvic mass and a CA-125 in the 350 U/ml range. Her history was complicated by a history of breast cancer. She is of Ashkenazi heritage and therefore underwent genetic counseling and BRCA testing. These were negative.

The patient underwent an exploratory laparotomy and staging with complete resection of all gross disease. Final pathology revealed a moderately differentiated papillary serous carcinoma of the ovary. She was treated with 6 cycles of carboplatin and paclitaxel, achieving a complete response as measured by her CA-125 antigen level. Her post-treatment course was complicated by moderate neuropathy that improved but did not completely resolve.

Two years after the treatment the patient experienced a chronic bowel obstruction secondary to adhesions that caused such distressing symptoms that she underwent laparoscopic adhesiolysis. The procedure resulted in resolution of her symptoms. There was no evidence of disease with biopsies and washings being negative.

Immediately postoperatively she had a low normal CA-125 level (<13 U/ml range). Over the next 2 years the CA-125 rose from this level to 18 U/ml, and then ultimately to 28 U/ml. The marker remained stable over the next 2 years ranging from 28 to 40 U/ml. CT scans were negative. In 2008, the CA-125 began to rise slowly and CT scans demonstrated only a small amount of lymphadenopathy with a 2-cm node in the left common ileac area not easily accessible for CT-guided biopsy. Attempted biopsy was negative. Her CA-125 began to rise more rapidly and in December of 2008 increased to 80 U/ml. The CT scan of the abdomen/pelvis remained unremarkable.

In March of 2009, the marker increased to 118 U/ml. CT remained negative and a PET/CT scan was obtained. This test demonstrated military disease throughout the pelvis with many nodules <1 cm, with no disease >1 cm in diameter. She did have one retroperitoneal node that was approximately 1.5 cm.

After an extensive discussion with the patient regarding neuropathy and other comorbidities, she and her physician elected to initiate retreatment with carboplatin and gemcitabine. After 3 cycles her CA-125 level normalized. The plan is to continue to complete 6 cycles of this regimen, with a follow-up PET/CT scan. If the PET/CT is negative or mildly positive for residual disease, antiestrogen therapy will be considered.

Discussion

Considerable uncertainty surrounds the question of the utility of many innovative diagnostic techniques in the oncology arena. In addition to the issue of the specificity (does a 'positive test' result indicate the presence of cancer, and only cancer) and sensitivity (does a 'negative test' result indicate the absence of cancer), it is increasingly essential to inquire if the information provided is of predictive value or solely of prognostic significance [9].

Considering the substantial costs associated with novel diagnostic tests, and in particular imaging technology, it is appropriate to question the importance of 'another result' that indicates that the patient will have a relatively favorable versus a relatively unfavorable outcome (prognostic utility), but where the data itself does not clearly define

a known beneficial management strategy that would only have been employed because of the specific test result (predictive utility).

For example, in recurrent ovarian cancer, a PET/CT finding of 'diffuse disease throughout the peritoneal cavity', versus the observation of 'relatively localized cancer', while potentially of prognostic value, will not necessarily permit the selection of therapy that impacts survival [8]. Further, the argument that the finding of apparently localized disease should lead to surgery, while the observation of diffuse disease should not, is currently not supported by any evidence-based (randomized phase 3) clinical trials. Thus, we do not know if surgery (to remove the observed masses) in this setting is superior to initial treatment with cytotoxic chemotherapy, and conversely it is unknown if patients with 'diffuse disease' (as documented on PET/CT) are unable to benefit from surgery designed to completely remove all macroscopic cancer (of course, leaving the 'diffuse microscopic residual').

In the case presented here, there was reasonable uncertainty regarding optimal disease management based on the prior medical history (known breast and ovarian cancer, long treatment-free interval, persisting neuropathy), as well as nonspecific physical signs and symptoms and routine diagnostic tests (abdominal/pelvic CT scan, CA-125). In was appropriate to argue in this specific individual with a long treatment-free interval and a mass (enlarged lymph node) that could potentially be easily removed that surgical resection might permit the patient to go for an additional extended period of time without the reintroduction of chemotherapy. Conversely, it was equally possible that the lymph node was not the source of the increasing CA-125 levels, and may even have been nonmalignant.

The PET/CT scan findings revealed a very diffuse process in the absence of any large masses that would be amenable to surgical resection. The test results provided relevant information that reinforced the physician's decision to employ systemic treatment in this individual. Of note, in this patient, with a set of particularly unique clinical features, the PET/CT could be utilized in the selection of a specific clinical plan that also included consideration of those unique characteristics.

In the absence of evidence-based data demonstrating the utility of this procedure in the management of patients with ovarian cancer, it is essential that clinicians prospectively consider (prior to obtaining the test): (a) how the information generated from the performance of this expensive imaging modality will influence the selection of specific treatment; (b) whether such information will be of genuine utility in a particular patient; (c) and whether there are alternative, more cost-effective approaches (physical exam; CT-scan; CA-125 value alone; knowledge of the natural history of the malignancy) that may be employed to define appropriate care.

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