

## Case Report

# Personalized Therapy in the Management of Non Small Cell Lung Cancer

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## Abstract

Lung cancer has been the leading cause of cancer death among men in the United States for years, and since 1988, it has become the number-one cause of cancer death among women. An estimated 222,520 new cases of lung cancer are expected in 2010, and 157,300 deaths due to this disease are expected to occur, roughly 28% of all cancer deaths. She is a 64 female lady, a known case of Non Small Cell Lung Cancer, where she received concurrent Chemotherapy and Radiotherapy, followed by maintenance Chemotherapy for almost 10 months. She achieved a very good Response rate, plus survival benefit together with improving quality of life.

**Keywords:** Non Small Cell Lung Cancer; Pemetrexed; Maintenance; Adenocarcinoma

## Introduction

In the past, radiation therapy was considered the standard therapy for patients with stage IIIA or IIIB disease. Long-term survival was poor, in the range of 5%, with poor local tumor control and early development of distant metastatic disease. At least 11 randomized trials have compared thoracic irradiation alone with chemo-radiation therapy in patients with stage III NSCLC. Several meta-analyses have demonstrated a small, but statistically significant, improvement in survival with the combined-modality regimens [1,2]. Pemetrexed continuation maintenance therapy is well-tolerated and offers superior overall survival compared with placebo, further demonstrating that it is an efficacious treatment strategy for patients with advanced non-squamous NSCLC and good performance status who did not progress during pemetrexed-cisplatin induction therapy [3].

## Case Presentation

Mrs. DS, a 64 years old lady, is a known case of Right Lung Cancer (Grade III Adenocarcinoma), Stage III B, since September 2013 (Figure 1). CT scan of the chest showed an irregular cavitating lesion of the lower lobe of the left lung, associated with large right upper lobe parenchymal nodule. She received 4 cycles of Pemetrexed /Cisplatinum (PEM 500mg/m<sup>2</sup>, Cis 70mg/m<sup>2</sup>), once every 3 weeks, after which she achieved Partial Response. A PET-CT scan done in November 2013 showed further mass lesion regression.

Then she received local Radical 3D-Conformal Radiotherapy to the primary tumor and mediastinal + hilar lymph nodes (60 Gy/ 30 fractions/6weeks), ended February 2014. The response was Stationary of her mass lesions, as shown by a CT scan done in March 2014 (Figure 2).

She was then put on Pemetrexed (Alimta) single agent maintenance, for a total of 10 cycles, every 3-4 weeks, and last one was given in December 2014.

Her creatinine clearance started to drop, up to 40ml/min, and was referred to a nephrologist.

The last CT Scan chest done in March 2015 showed further regression of the primary lung lesion, with no new novo lesions (Figure 3).

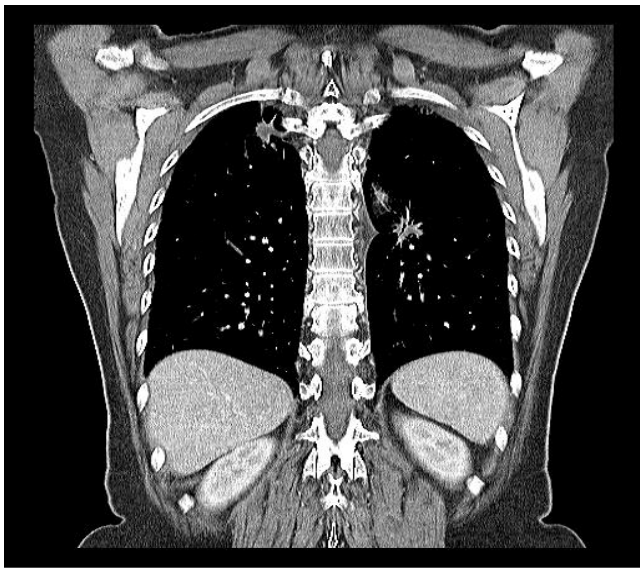
## Discussion

Recent phase III trials have explored the efficacy of maintenance therapy following a platinum-based first-line doublet as treatment for locally advanced or metastatic (stage IIIB to IV) non-small-cell lung cancer (NSCLC) [4-9]. Maintenance therapy is started immediately after first-line (induction) therapy and aims to prolong tumor response or stable disease (SD), thus improving progression-free survival (PFS) and overall survival (OS), while maintaining or improving quality of life and minimizing toxicity. Maintenance therapy is usually administered until disease progression or unacceptable toxicity.

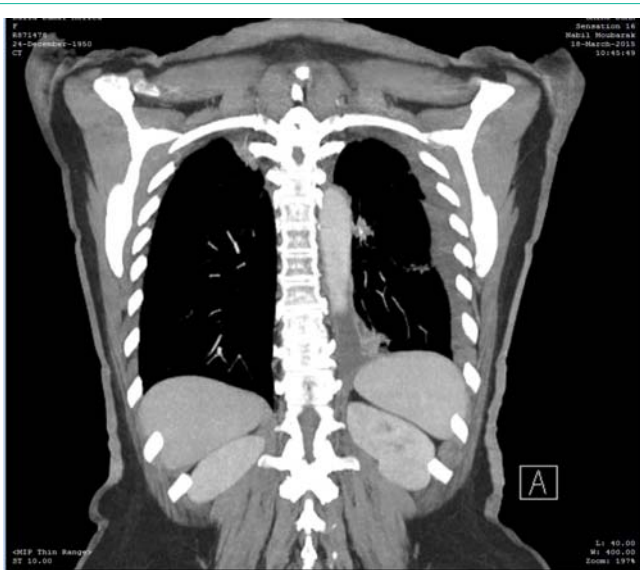
Previous studies have demonstrated that switch maintenance



**Figure 1:** Showing irregular cavitating lesion of the lower lobe of the left lung, surrounded by reticular infiltrates & consolidative changes associated with large Right Upper Lobe parenchymal nodule.



**Figure 2:** Showing stationary course of previously Right Upper Lung Lobe, post segment soft tissue mass plus fibrotic lesion in the Left Lower Lung Lobe.



**Figure 3:** Showing slightly regressive course as regards the size of the ill-defined, irregular, with speculated border neoplastic mass lesion, seen at posterior segment of the Right Upper Lung Lobe 1.6\*1.3cm vs. 1.8\*2.1cm.

affects OS [10,11]. Indeed, a recent meta-analysis that included 4,286 patients found superior efficacy of the switch maintenance strategy [12]. Although PFS was statistically significant for both switch maintenance (HR, 0.62) and continuation maintenance (HR, 0.90), OS was significantly improved in the switch analysis only (HR, 0.84;  $P_{.00026}$  vHR, 0.92;  $P_{.33}$ ). Another recent phase III study by PEROL et al. [8] also found that gemcitabine continuation maintenance delivered a PFS benefit but not improvement in OS. However, that study was not powered to assess a difference in OS. Interestingly, in the adenocarcinoma subgroup of the PEROL study, there was no advantage in favor of gemcitabine continuation maintenance (HR,

0.98; 95% CI, 0.72 to 1.35). Until PARAMOUNT, no trial evaluating continuation maintenance therapy reported an OS improvement. This result may be because PARAMOUNT was sufficiently powered to detect a difference in OS, only enrolled patients with good PS, and denoted the favorable efficacy/toxicity ratio of pemetrexed in this setting.

## Conclusion

In Summary, it is shown that Pemetrexed continuation maintenance therapy extends OS, in addition to PFS, and is well tolerated in patients with advanced non-squamous NSCLC and good PS who did not progress after induction with Pemetrexed-Cisplatin.

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