

# Clinical analysis of chemotherapy-related anemia in non-small cell lung cancer patients

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**Abstract:** The objective is to analyze the clinical features and factors of non-small cell lung cancer patients with chemotherapy-related anemia to prevent and treat anemia. 78 cases of hospitalized patients with advanced non-small cell lung cancer treated with chemotherapy from January 2008 to October 2014 were recruited as subjects. The anemia information after chemotherapy was analyzed to understand the clinical features and the factors of anemia after chemotherapy. The incidence of anemia after chemotherapy was 82.05%, while the rate moderate and severe anemia was 34.61%. No significant difference was observed from the incidence of anemia after chemotherapy in patients in terms of gender. Among the stage IV patients, patients with bone metastasis has higher incidence of anemia after chemotherapy when compared with patients without bone metastasis ( $P < 0.05$ ). Non-small cell lung cancer has a higher incidence of anemia after chemotherapy, patients should be given attention on the anemia therapy in addition to other clinical treatment. Patients with bone metastases are more prone to have anemia after chemotherapy thus, early intervention should be taken to reduce the incidence of anemia.

**Keywords:** Non-small cell lung cancer; Chemotherapy; Anemia

## Introduction

Anemia is one of the most common complications among cancer patients and its incidence is affected by many factors. The incidence of anemia is as high as 90% in patients with advanced cancer who are undergoing chemotherapy or radiotherapy<sup>[1]</sup>. For nearly half a century, the incidence of lung cancer showed a rapid upward trend and lung cancer remains the top cause of cancer death. Anemia affects the health and quality of life of patients, and also affects outcome of treatment and survival ability of patients<sup>[2]</sup>. Through a retrospective analysis of non-small cell lung cancer patients after chemotherapy, clinical features and factors associated with anemia were analyzed for better treatment of anemia after chemotherapy and reduce its occurrence.

## Materials and methods

### General Information

As shown as (Table 1), the study subjects involved 78 cases of lung cancer patients, where 48 cases are males and 30 cases are females. All patients were diagnosed by pathology and cytology diagnosis, stage 3 to 4, age 35 - 71 years, median age 58 years, 54 cases of adenocarcinoma, squamous cell carcinoma in 22 cases, 1 case of adenosquamous

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carcinoma and 1 case of large cell carcinoma. 32 cases are stage 3 and 46 cases are stage 4. 26 cases of patients with bone metastases received platinum-containing chemotherapy for more than 2 weeks with no anemia before chemotherapy, no bleeding, no course of hemoptysis or blood stained sputum. 64 cases showed varying degrees of anemia after chemotherapy, the occurrence rate was 82.05%, while the occurrence rate of anemia in stage 3–4 patient was 34.61%. The occurrence rate of anemia in stage 4 patients with bone metastases after chemotherapy was 88.46%, while the occurrence rate of anemia in patients without bone metastasis was 70%.

Table 1. Relationships between gender and anemia after chemotherapy

	Incidence of anemia	<i>P</i>
Male	81.25% (39/48)	
Female	83.33 % (25/30)	> 0.05

## Anemia

According to the World Health Organization (WHO)'s grading on the severity of anemia, hemoglobin < 110 g/L was defined as anemia. All the patients were divided into with and without anemia groups. The incidence of anemia after chemotherapy was studied. Relationship between anemia after chemotherapy and gender, and bone metastasis were analyzed.

## Statistical analysis

SPSS13.0 statistical software was used for statistical analysis,  $P < 0.05$  as statistically different.

## Results

### Cases of anemia

Among 78 patients with advanced non-small-cell lung cancer, 64 cases had anemia after chemotherapy. 18 cases had I degree of anemia (23.08%), 19 cases had II degree of anemia (24.36%), 15 cases had stage III degree of anemia (19.23%), 12 cases had stage IV of anemia (15.38%), and incidence rate of moderate to severe was 34.61%.

### Relationship between gender and anemia after chemotherapy

39 out of 48 male patients had anemia after chemotherapy, while 28 out of 39 female patients had anemia after chemotherapy. Incidence of anemia in patients had no significant difference for the gender ( $P > 0.05$ ).

### Relationship between anemia after chemotherapy and bone metastases

Out of 46 cases of stage 4 patients, anemia occurred in 23 patients among the 26 patients with bone metastases after chemotherapy, while anemia occurred in 14 patients among the 20 patients without bone metastases after chemotherapy (Table 2). The difference was statistically significant ( $P < 0.05$ ).

Table 2. Relationship between anemia after chemotherapy and bone metastasis

	Incidence of anemia	<i>P</i>
With bone metastasis	88.46% (23/26)	
Without bone metastasis	70.00% (14/20)	< 0.05

## Discussion

Anemia in lung cancer is one of the highest incidences of anemia among all solid tumor cancers. A higher incidence of anemia occurred after lung cancer patients undergo chemotherapy. Anemic patient usually shows fatigue, weakness, dizziness, drowsiness or breathing difficulties. The quality of life and survival rates of patients were affected while patients receiving radiotherapy and chemotherapy<sup>[3]</sup>

This retrospective analysis of the clinical characteristics and influencing factors of hospital after chemotherapy in patients with non-small cell lung cancer found that the occurrence rate of anemia after receiving chemotherapy was 82.05% and the occurrence rate of moderate to severe anemia was 34.61%. Previous study reported that cisplatin or carboplatin-based first-line chemotherapy regimens that widely used in advanced lung cancer is the leading cause of high incidence of anemia in lung cancer patients. Bone marrow suppression, chemotherapy and platinum drugs cause renal tubular cell damage and lead to insufficient production of endogenous erythropoietin<sup>[4]</sup>.

The results of this study showed that the incidence of anemia in cancer patients after chemotherapy has no association with gender. Stage 4 patients with bone metastases are more likely to have anemia after chemotherapy, which may be due to the chemotherapy drugs, bone marrow transplant, or lung itself. Direct invasion or metastasis through bone marrow destroys the hematopoietic cells and suppress the bone marrow function as a barrier to control release of immature cells, then causes anemia<sup>[4]</sup>. Therefore, lung cancer chemotherapy patients, especially with bone metastasis, need early intervention and preventive treatment. Individualized treatment programs should be developed to reduce the incidence of anemia, improve the quality of life of patients and improve the prognosis.

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