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# Non-small cell lung cancer and elevated eosinophil count: A case report and literature review

Rohit Venkatesan[a,*], Amir Salam[b,1], Issam Alawin[b,1], Maurice Willis[b,1]

[a]*University of Texas Medical Branch- Department of Internal Medicine Residency Program, 301 University Blvd., John Sealy Annex 4.174, Galveston, TX 77555-0566, USA*
[b]*University of Texas Medical Branch- Department of Hematology/Oncology, 301 University Blvd., John Sealy Annex 4.164, Galveston, TX 77555-0566, USA*

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**Abstract**
In earlier work it was unclear whether there was any true prognostic value when high numbers of eosinophils were seen in the peripheral blood of lung cancer patients. As time passed, it became somewhat clearer that this occurrence may correlate with a poor prognosis in these patients. These ideas reflected what we came to know about the pathophysiology of hypereosinophilia in the blood in this setting. With paraneoplastic processes and distant metastases (to the bone marrow) thought to function at least in part as the mechanism of hypereosinophilia in these patients, it became more evident why these patients tended to have a poorer prognosis. However interestingly and paradoxically, there also has been work indicating that this occurrence may actually be protective against metastatic disease.
Here, we present the case of a sixty year old Caucasian female who presented with non-small cell lung cancer (NSCLC), diffusely metastatic at presentation, who also presented with hypereosinophilia which proved to be a poor prognostic indicator in this case.


## 1. Introduction

Reports of increased eosinophils in the peripheral blood have been described in solid tumor malignancies, however it is still considered to be a rare event and is rarely reported [1-3].

There are many causes of eosinophilia in the peripheral blood. Some well-known examples include leukemic processes, allergic disorders, and parasitic infections [3].

*Corresponding author. Tel.: +1 409 772 4182; fax: +1 409 772 6507.
*E-mail addresses:* rovenkat@utmb.edu (R. Venkatesan), Amsalam@utmb.edu (A. Salam), iaalawin@utmb.edu (I. Alawin), mawillis@utmb.edu (M. Willis).
[1]Tel.: +1 409 772 1164; fax: +1 409 772 3533.

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Other causes can include helminthic infections, drug allergies
or reactions, autoimmune diseases or immunodeficiency. Regarding the incidence of increased eosinophils in solid tumors, there have been several theories about the pathophysiology of its occurrence. Its prognostic value was initially unclear, however it is now generally accepted that the presence of hypereosinophilia in this setting is a poor prognostic indicator [3-5].

## 2. Case presentation

A 60 year old Caucasian female initially presented for abdominal pain and fatigue. At the time of initial presentation she was found to have a leukocytosis with white blood cell (WBC) count of 64,000 with differential showing an eosinophil percentage of 41%. This prompted an infectious work-up including chest x-ray which showed a 2.1 × 1.8 cm hazy opacity in the left upper lobe. A follow up CT thorax showed that the lesion found on chest x-ray was a cavitary lesion with multiple enlarged supraclavicular lymph nodes bilaterally (Fig. 1). The CT thorax also made mention of necrotic masses in the liver for which follow up CT abdomen and pelvis was ordered and showed multiple low-attenuation liver lesions with peripheral enhancement (Fig. 2). These were most likely representative of metastatic disease. Liver core biopsy revealed adenocarcinoma, metastatic and poorly differentiated consistent with a lung primary (Figs. 3-5). Abundant eosinophils were noted on the biopsy. Characteristic findings of parasitic infection were absent on biopsy, and fungal and parasitic serologies were also negative. Further imaging with bone scan revealed a photopenic area in the sacrum which most likely represented lytic metastases. MRI of the brain showed innumerable scattered lesions which included several ring-enhancing lesions. She was clinically stable, and was then discharged to be re-admitted at a later date for further treatment and management.

The patient re-presented approximately two weeks later for treatment and further management by oncology. At the time of re-presentation, the patient's WBC count was

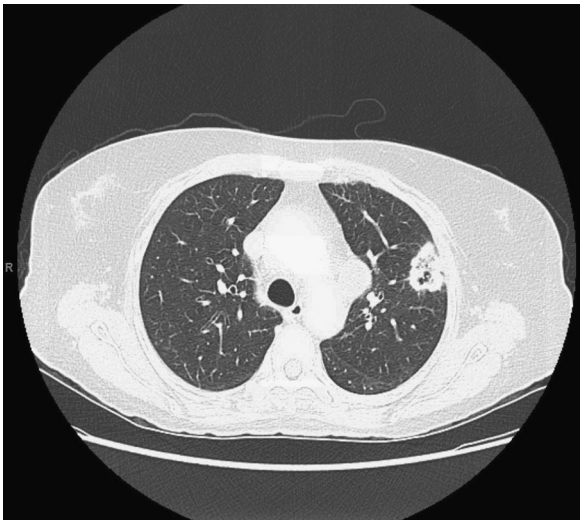

**Fig. 1** Left upper lobe cavitary lesion, 2.1 × 1.8 cm.

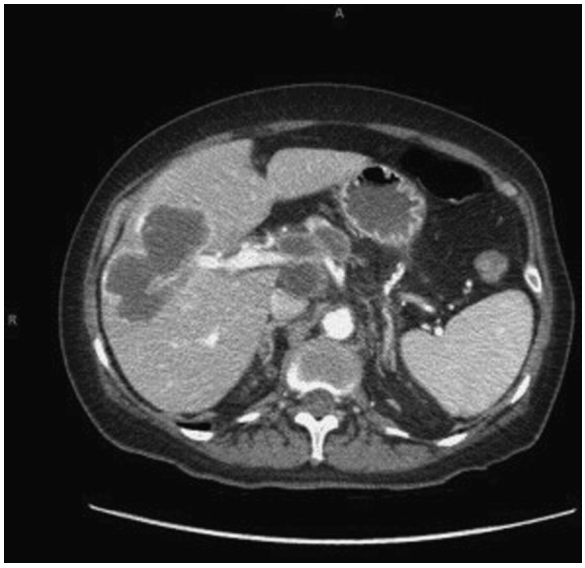

**Fig. 2** Multiple low-attenuation metastatic liver lesions.

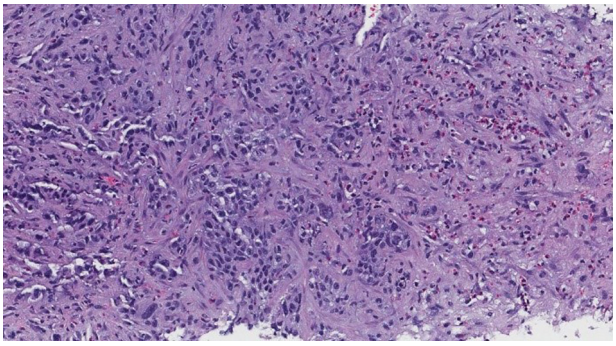

**Fig. 3** Pathology: Adenocarcinoma with abundant eosinophils.

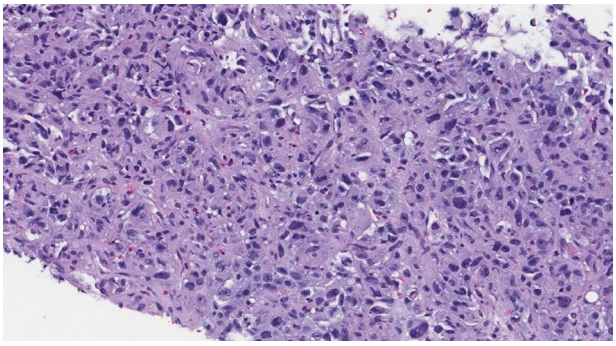

**Fig. 4** Pathology: Adenocarcinoma with abundant eosinophils.

84,000 with an eosinophil percentage of 51%. During her re-admission, her WBC count peaked at 90,000 with an eosinophil percentage of 52%. After initiation of treatment with steroids, her eosinophil percentage trended down to 24%. At the time of discharge four days later, her WBC count was 66,000 and her eosinophil percentage was 1%.

The patient went on to receive whole brain radiation as an outpatient and re-presented with fatigue and weakness after an XRT session approximately two weeks later. She was treated conservatively and the family and patient elected to pursue palliative care and hospice. During this prese-