

# Characterization of Hypereosinophilia in a University Health Care System



Jennifer C. Li, M.D.<sup>1</sup>, Basil Kahwash, M.D.<sup>2</sup>, Princess Ogbogu, M.D.<sup>2</sup>, and Sameer K. Mathur M.D., Ph.D.<sup>1</sup>

<sup>1</sup>University of Wisconsin-Madison, Department of Medicine, Division of Allergy, Pulmonary and Critical Care

<sup>2</sup>The Ohio State University Wexner Medical Center, Division of Allergy and Immunology, Department of Otolaryngology

## Abstract

- Rationale:** Due to the relatively rare diagnosis of hypereosinophilic syndrome (HES) and hypereosinophilia of unknown significance (HEUS) and the broad differential for hypereosinophilia, the evaluation of hypereosinophilia can be challenging. We present an analysis of the University of Wisconsin EMR database characterizing the pattern and etiology of hypereosinophilia on multiple CBCs in a University based health care system.
- Methods:** In an IRB-approved EMR-based protocol, 98 patients were identified with absolute eosinophil values  $\geq 1500$  cells/ $\mu$ L on at least 2 occasions after 2000. The EMR was accessed for eosinophil counts and clinic notes to determine specialists involved in evaluating hypereosinophilia and whether an etiology was identified.
- Results:** Of the 98 patients, 44% had a single untreated transient episode of hypereosinophilia ranging from less than 1 week to 43 months. Of those patients, 14% had hypereosinophilia that resolved after 1 year, and 67% had hypereosinophilia that resolved in less than 1 month. Two patients had persistent hypereosinophilia of unknown etiology for over 1 year. Additionally, of the 98 patients, 35% had an identifiable etiology, including malignancy, drug-induced, eosinophilic gastrointestinal disease, vasculitis, and HES. Patients were referred to an allergist (34%), hematologist (46%), gastroenterologist (16%), infectious disease (9%), pulmonologist (12%), rheumatologist (9%), or dermatologist (4%). 22 patients were not evaluated by any specialist.
- Conclusions:** In the University of Wisconsin cohort, many patients had an identified etiology (35%) or transient hypereosinophilia of varying duration (44%). Episodes of hypereosinophilia that are sustained may require specialist referral.

## Methods

- In an IRB-approved EMR-based protocol, 98 patients with episodes of hypereosinophilia were identified with absolute eosinophil values  $\geq 1500$  cells/ $\mu$ L on at least 2 occasions after 2000.
- EMR was reviewed to identify which medical specialists were involved in the management and the etiology of hypereosinophilia, if identified.
- Hypereosinophilia episodes were categorized as
  - Sustained persistent episode* did not resolve based on the most recent eosinophil count.
  - Sustained transient episode* resolved ( $<1500/\mu$ L) with no further hypereosinophilia
  - Multiple episodes* were defined as episodes of hypereosinophilia with eosinophil values  $<1500/\mu$ L in-between hypereosinophilia.

## Demographics

- 55 of 98 patients were women.
- Age ranged from 34 months to 90 years of age, with 49% of patients over 50 years of age.

## Results

Table 1. Etiology of Hypereosinophilia

Etiology	No. of Patients	Percentage
Malignancy	8	8%
Drug-induced	8	8%
HES	2	2%
GI disease	6	6%
Vasculitis	2	2%
Infection	1	1%
Other	7	7%
Unclear	64	65%

Figure 2. Sustained Transient Hypereosinophilia Episode Length with Unclear Etiology

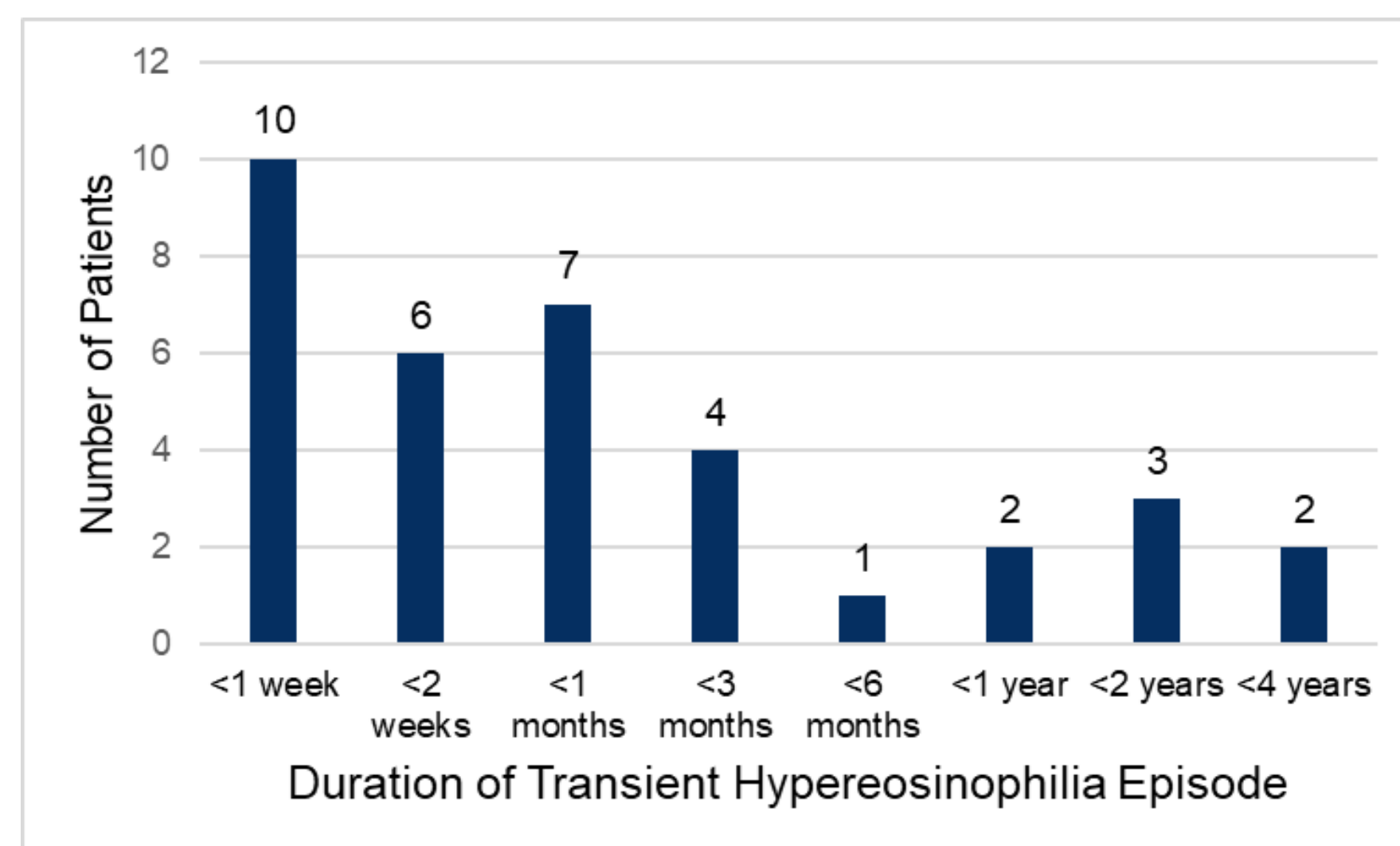
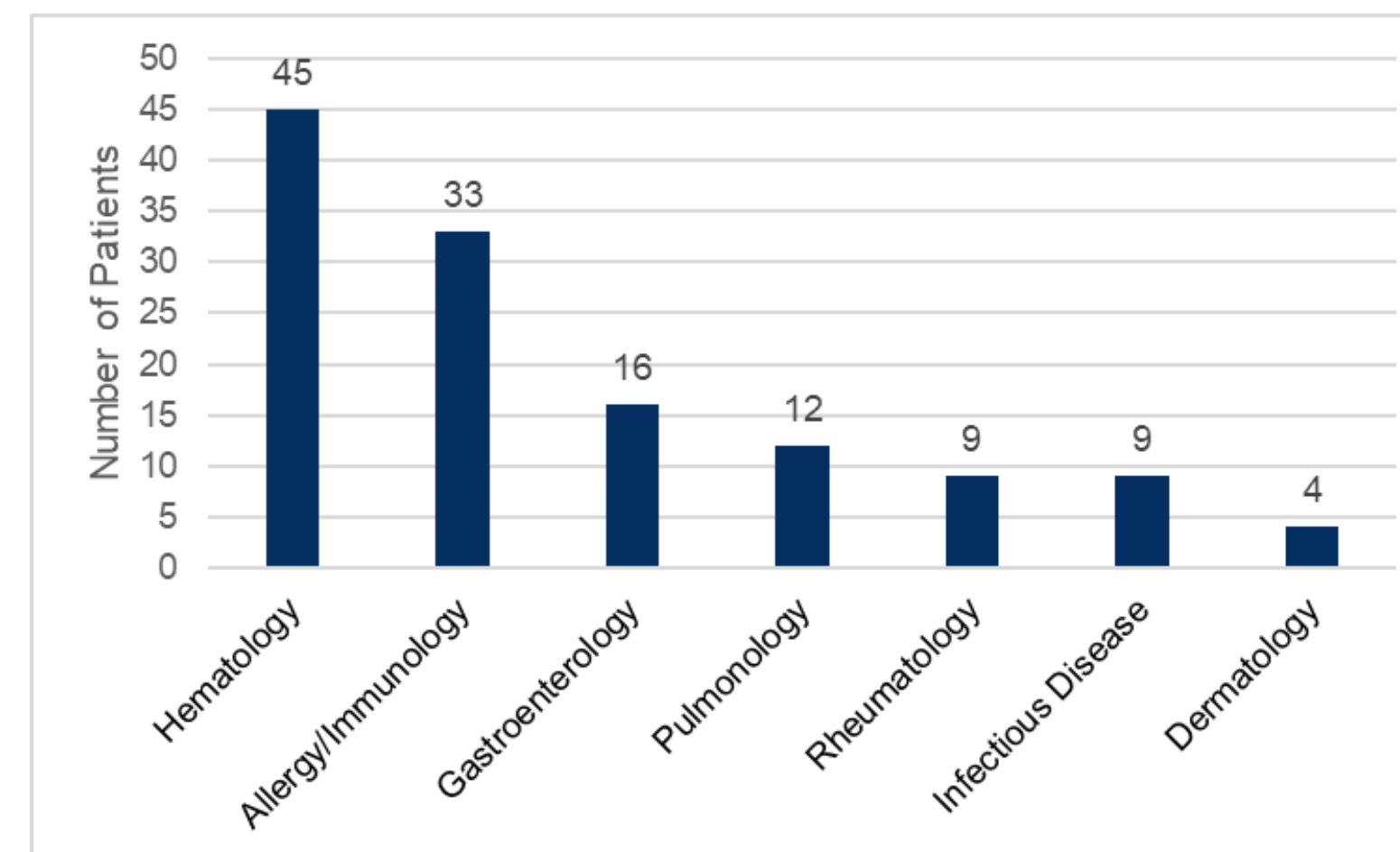


Figure 1. Number of Patients Evaluated By Specialists



- 76 of 98 patients were evaluated by a specialist.
- Of the 64/98 patients with an unclear etiology for their hypereosinophilia, 42 patients were evaluated by a specialist.
- All 22 patients not evaluated by a specialist had an unclear etiology.

Table 2. Pattern of Hypereosinophilia Episodes

Episodes of Hypereosinophilia	Total No. of Patients	Identified Etiology
Sustained persistent episode	4	0
Sustained transient episode	51	8
Multiple episodes	43	19

- The 4 patients with sustained persistent episodes had hypereosinophilia lasting for 1, 4, 34 and 67 months.

## Discussion

- Of the 98 patients, 44% had a single untreated transient episode of hypereosinophilia ranging from less than 1 week to 43 months.
  - Of those patients, 14% had hypereosinophilia that resolved after 1 year, and 67% had hypereosinophilia that resolved within one month.
- Two patients had persistent hypereosinophilia of unknown etiology for  $>1$  year.
- 35% of the 98 patients had an identifiable etiology, including malignancy, drug-induced, eosinophilic gastrointestinal disease, vasculitis, and HES.
- 22 patients were not evaluated by any specialist.

## Conclusions

- In the University of Wisconsin cohort, many patients had an identified etiology (35%) or transient hypereosinophilia of varying duration (44%).**
- Episodes of hypereosinophilia that are sustained may require specialist referral.**

## References

- Ogbogu PU, Bochner BS, Butterfield JH, et al. Hypereosinophilic syndrome: a multicenter, retrospective analysis of clinical characteristics and response to therapy. *J Allergy Clin Immunol* 2009;124(6):1319-1325, e3.
- Klion A. Hypereosinophilic syndrome: current approach to diagnosis and treatment. *Ann Rev Med* 2009;60:293-306.