



Ophthalmic Oncology Service  
Memorial Sloan Kettering Cancer Center

## Spectrum of clinical and subclinical choroidal abnormalities in patients with histiocytosis

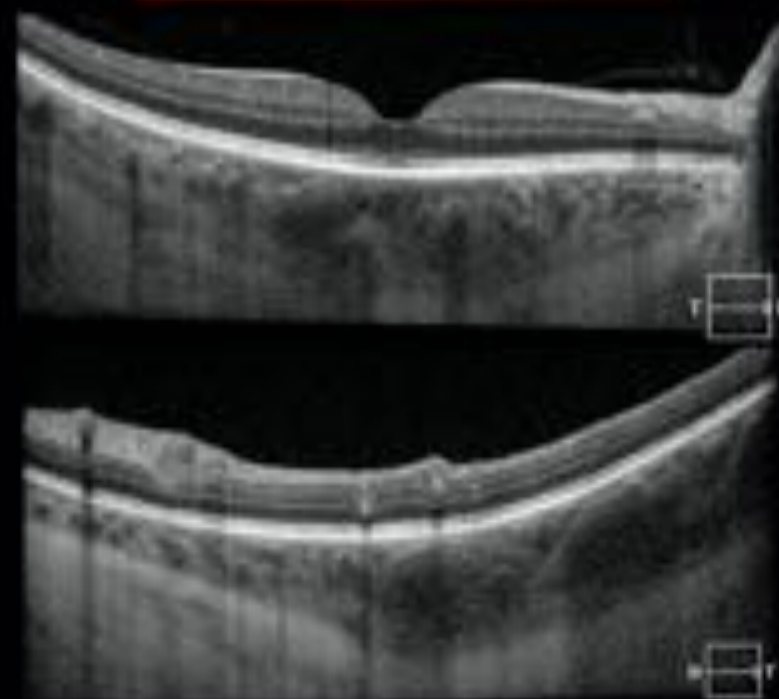
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Retina Society Meeting 2020

No Financial Interests or Relationships  
Off label Use Drugs

# Conclusion/Summary



- 14% of non-LCH histiocytosis patients have clinically evident infiltration of the choroid
- However, the vast majority of these patients (80%), have statistically significant increase in SFCT compared to age- and gender-matched controls
- With systemic treatment, SFCT decreases
- Choroid morphology:
  - outer choroidal infiltrative densities (40%)
  - enlarged Haller's layer w/ inner ch. distortion (60%)
- There is no association with CNS nor osseous disease



# Histiocytic Disorders: Introduction

- Clonal, hematopoietic disorders
- Accumulations of activated histiocytes in affected tissues

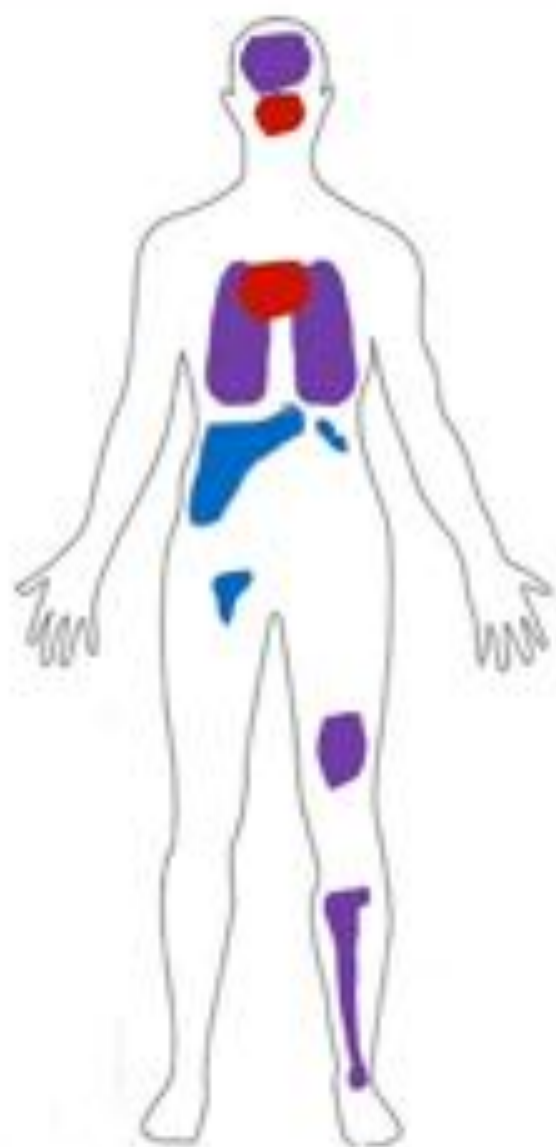
Langerhans Cell  
Histiocytosis

Non-Langerhans Cell  
Histiocytosis

- Erheim Chester Disease
- Rosai Dorfman disease
  - Xanthogranuloma



# Histiocytic Disorders: multisystem disease



## Langerhans Cell

CNS (6%)

Hypothalamic-pituitary axis

Lung (10%)

Spleen (13%)

Liver (16%)

Lymph nodes (19%)

Skin (39%)

Bone (77%)

## Non-LCH (ECD)

CNS (40%)

Lung (46%)

Orbit (22%)

Maxillary sinus (59%)

Heart (57%)

Skin (27%)

Bone (95%)

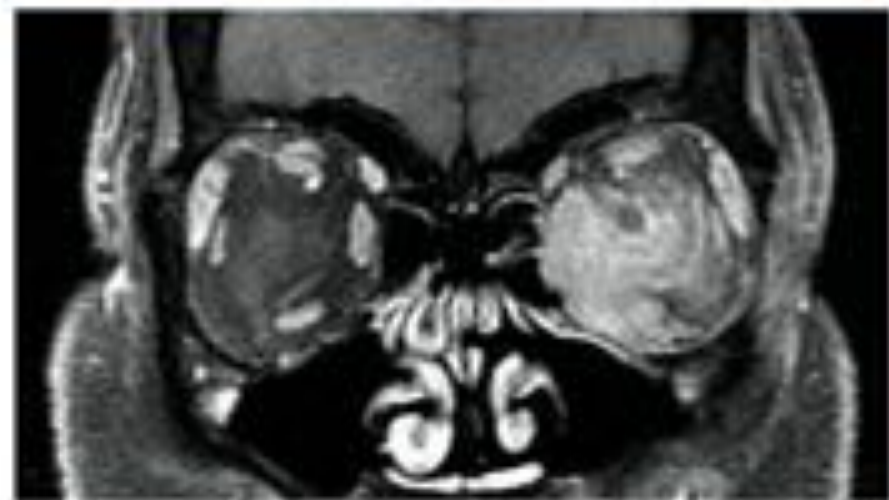


# Histiocytic Disorders: Ocular manifestations

Orbit

Eyelid

Other...





# Histiocytic Disorders: Published Choroid



Kim & Kim, Acta Ophthalmol Scand, 2000



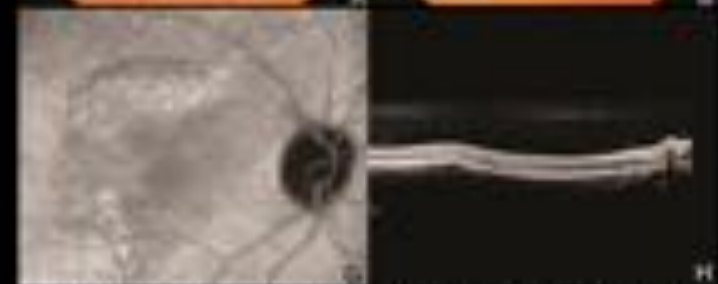
Patton et al. Arch Ophthalmol, 2006



Abdellatief et al. Ophthalmic Surg Lasers Imaging Retina, 2015



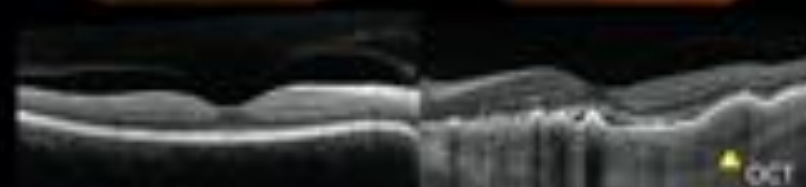
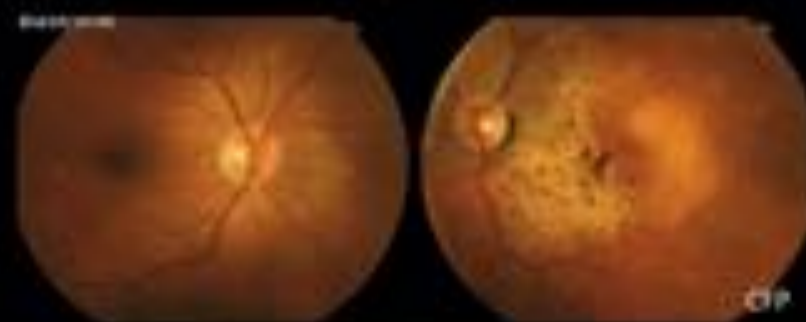
Vermeulen et al, Graefes Arch Clin Exp Ophthalmol, 2013



Barak et al, Retin Cases Brief Rep, 2012



Fassbender et al, Graefes Arch Clin Exp Ophthalmol, 2015



Tan et al. Am J Ophthalmol, 2017



# Histiocytic Disorders: Published Choroid

## Choroidal Langerhans' cell histiocytosis

Acta Ophthalmol Scand, 2000  
In Taek Kim and Yong Min Lee

Kim & Kim, Acta Ophthalmol Scand, 2000

## Presumed Choroidal Langerhans Cell Histiocytosis Following a Previously Resected Solitary Central Nervous System Lesion in an Adult

Niall Patton, MRCOphth  
Teri Lai, MBBS(Mons)  
Peter Robbins, FRCPA  
David Holthouse, MBBS(Mons)  
Chris Barry, MMedSci  
Ian Cowstable, FRACO, FRACS  
Arch Ophthalmol, 2006

Ophthalmol, 2006

## Choroidal Involvement in Erdheim-Chester Disease

Amro Abdellatif, MBBCh, Craig M. Mason, MD, Steven K. Ylitalo, MD, Stephen A. Buehler, MD, Divya R. Salvekar, MD, Jose Pulido, MD, MS, MPH

Abdellatif et al. Ophthalmic Surg Lasers Imaging Retina, 2015

## Rosal-Dorfman disease presenting as choroidal melanomas: a case report and review of the literature

Vermeulen et al, Graefes Arch Clin Exp Ophthalmol, 2013

## ROSAL-DORFMAN DISEASE DIAGNOSED BECAUSE OF BILATERAL CHOROIDAL MASSES

Yoshitaka, MD, Yoshiko G. Yang, MD, David Pulido, MD, Steven B. Weinstock, MD, PhD  
Retin Cases Brief Rep, 2012

Barak et al, Retin Cases Brief Rep, 2012

## Choroidal involvement in Rosal-Dorfman syndrome may be depicted and followed using enhanced depth imaging optical coherence tomography (EDI-OCT)

Fassbender et al, Graefes Arch Clin Exp Ophthalmol, 2015

## Three Cases of Erdheim-Chester Disease With Intraocular Manifestations: Imaging and Histopathology Findings of a Rare Entity

Tan et al. Am J Ophthalmol, 2017





# Study Question

In histiocytosis:

1. Does the OCT of the choroid have characteristic findings?
2. Does this change with treatment?

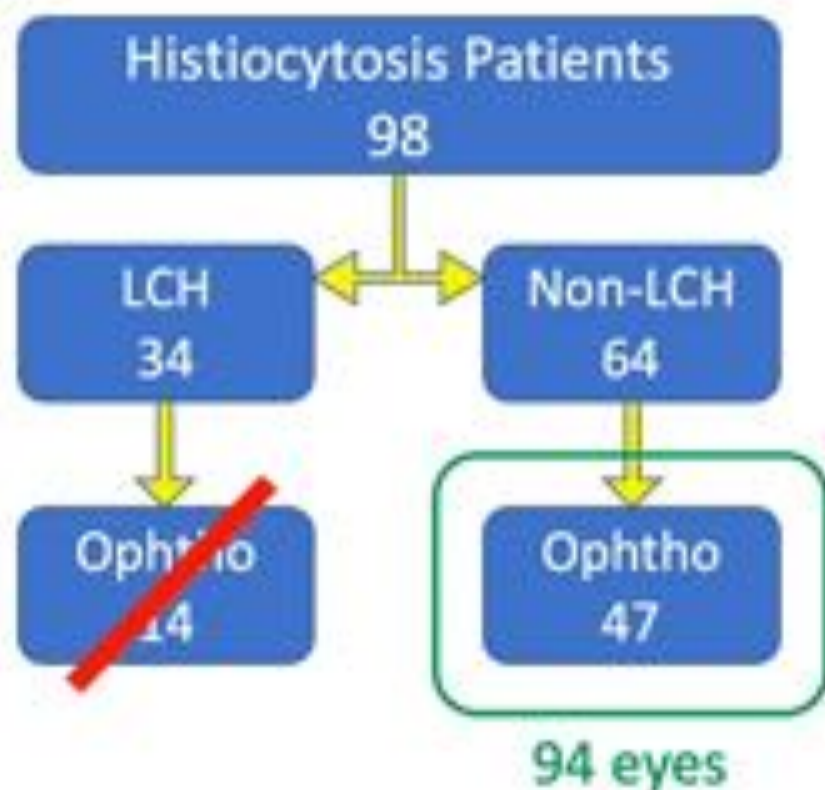
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<https://www.mskcc.org/cancer-care/types/histiocytosis>

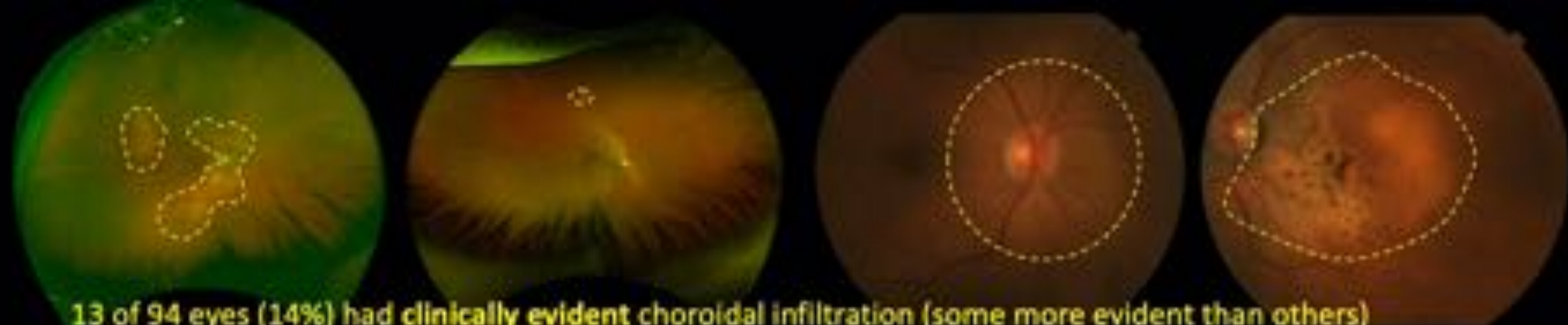


Eli Diamond MD

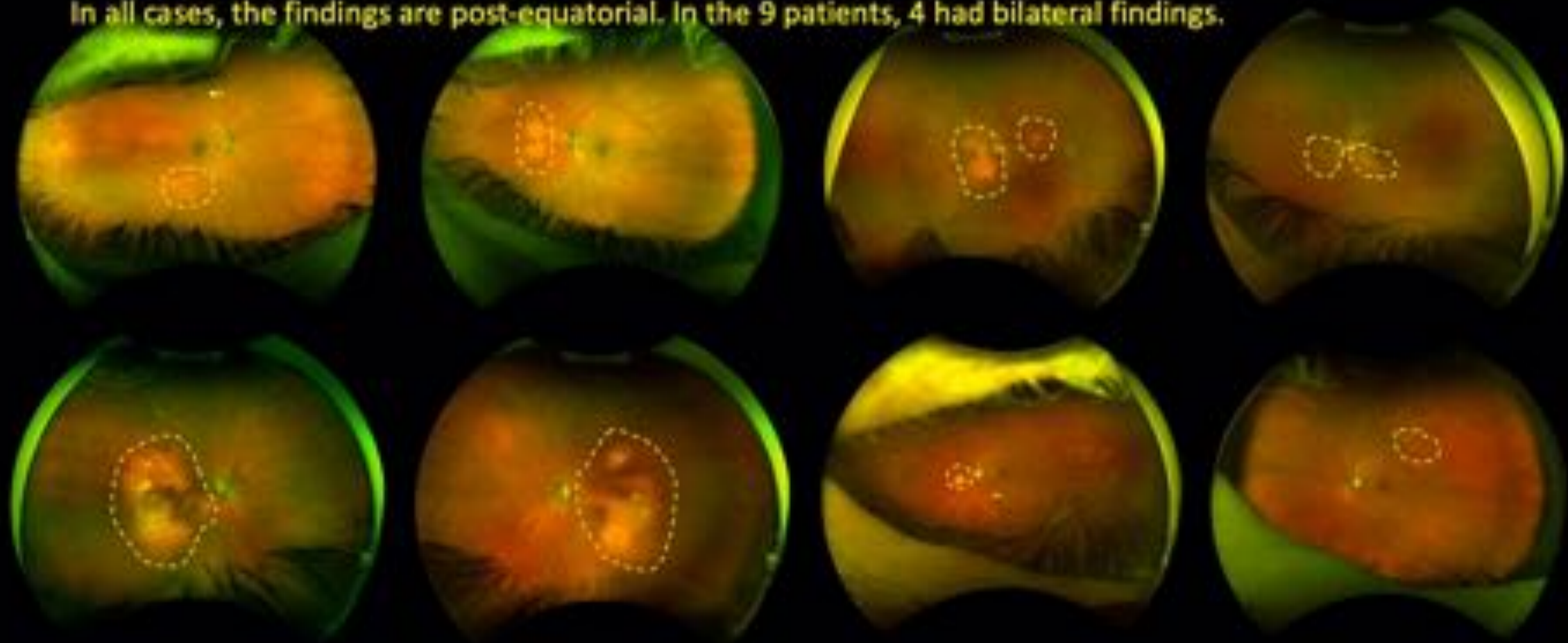
## Patients included:



- This was compared to an age and gender matched control set of patients

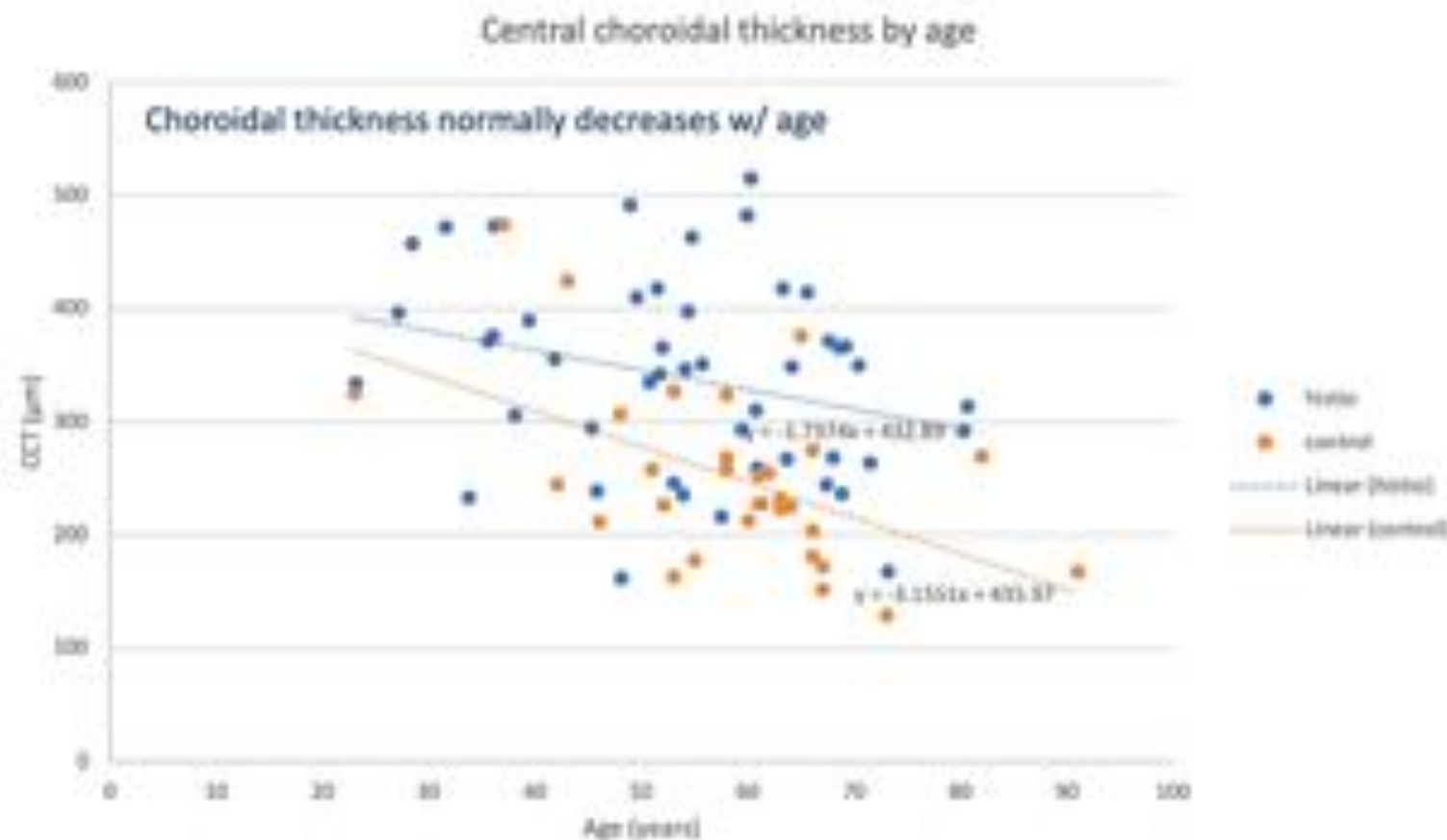


13 of 94 eyes (14%) had clinically evident choroidal infiltration (some more evident than others)  
In all cases, the findings are post-equatorial. In the 9 patients, 4 had bilateral findings.





# Results



Mean subfoveal choroidal thickness (SFCT):

Normal controls = 250 $\mu$ m

Non-LCH patients = 337 $\mu$ m.

The difference,  $p = 0.00008$

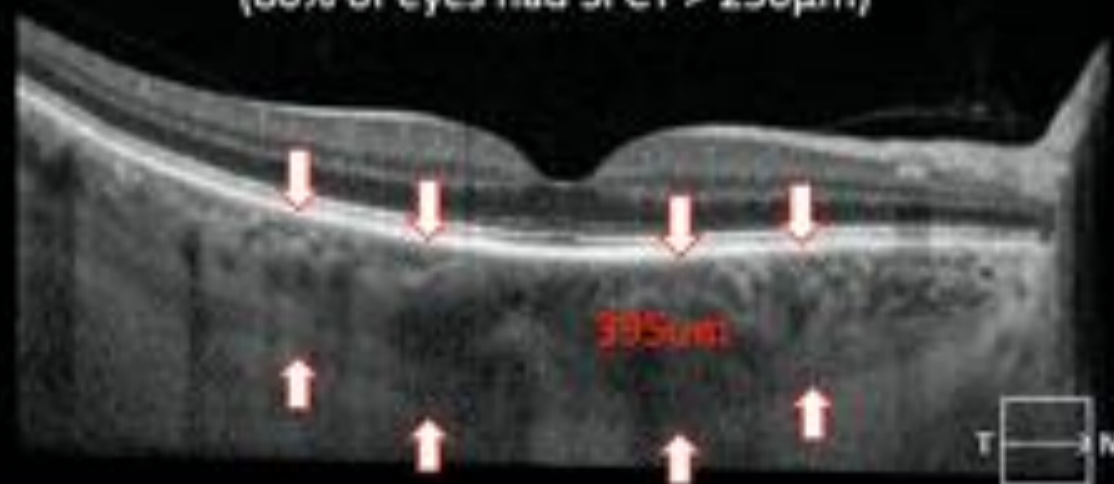
- Non-LCH patients had thicker SFCT, as measured by OCT

## Examples of choroidal thickness

NORMAL: mean 250 $\mu$ m



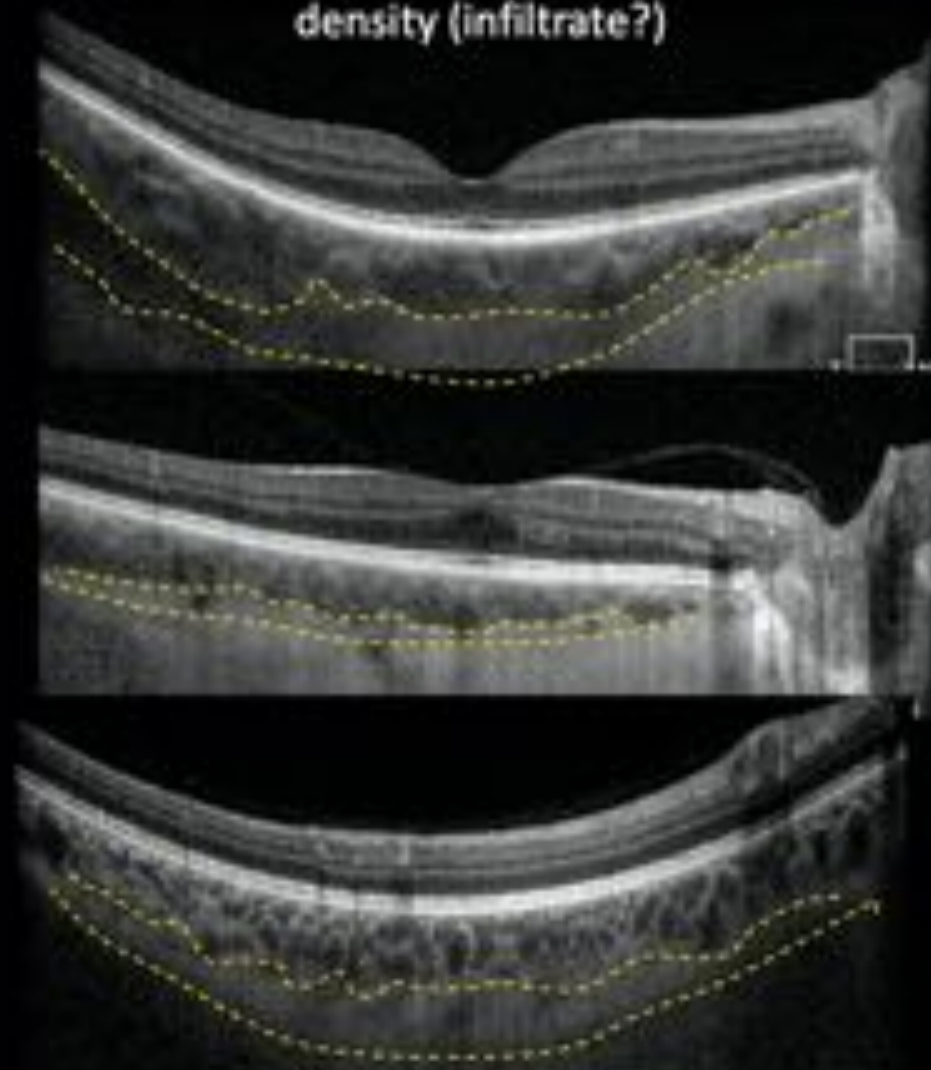
HISTIO: mean 337 $\mu$ m  
(80% of eyes had SFCT > 250 $\mu$ m)



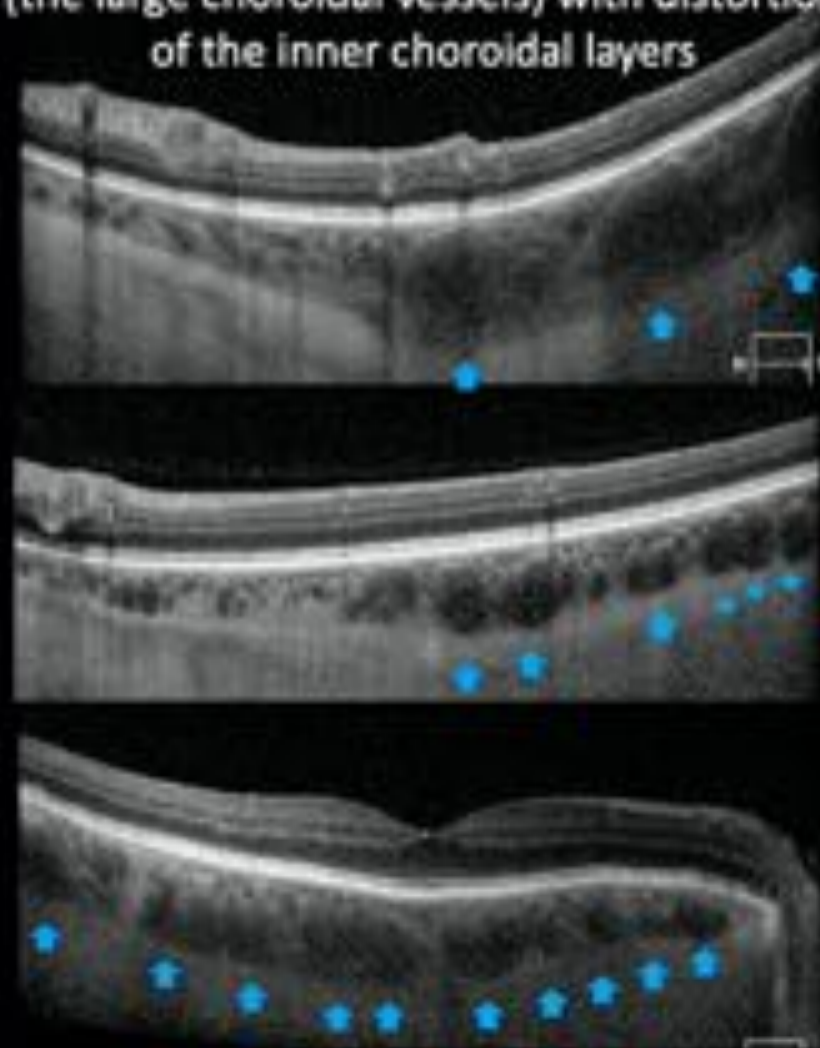
# Results

## Other occult choroidal findings in non-LCH eyes

40 % of eyes have an outer choroidal density (infiltrate?)



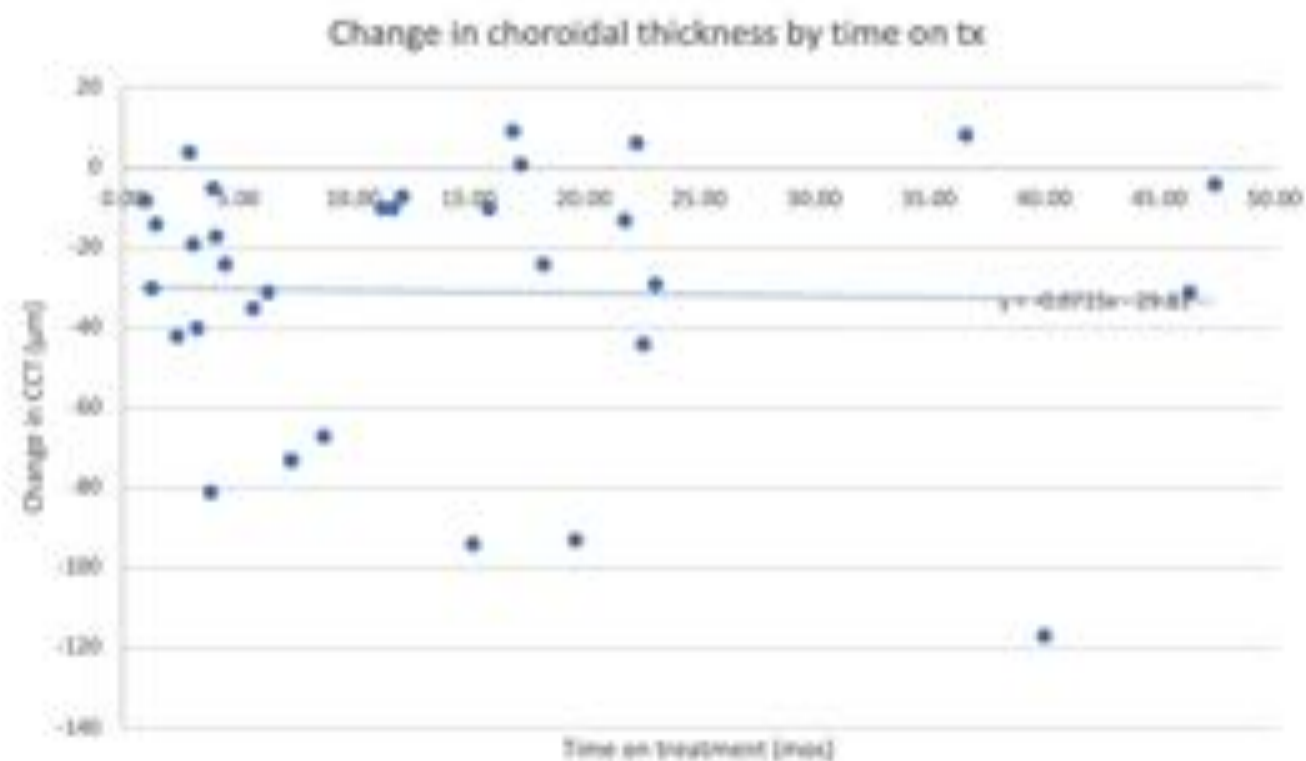
60 % of eyes have an enlarged Haller's layer (the large choroidal vessels) with distortion of the inner choroidal layers





# Results

- 34 non-LCH patients (with imaging at baseline AND follow up): significant decrease in SFCT on systemic treatment



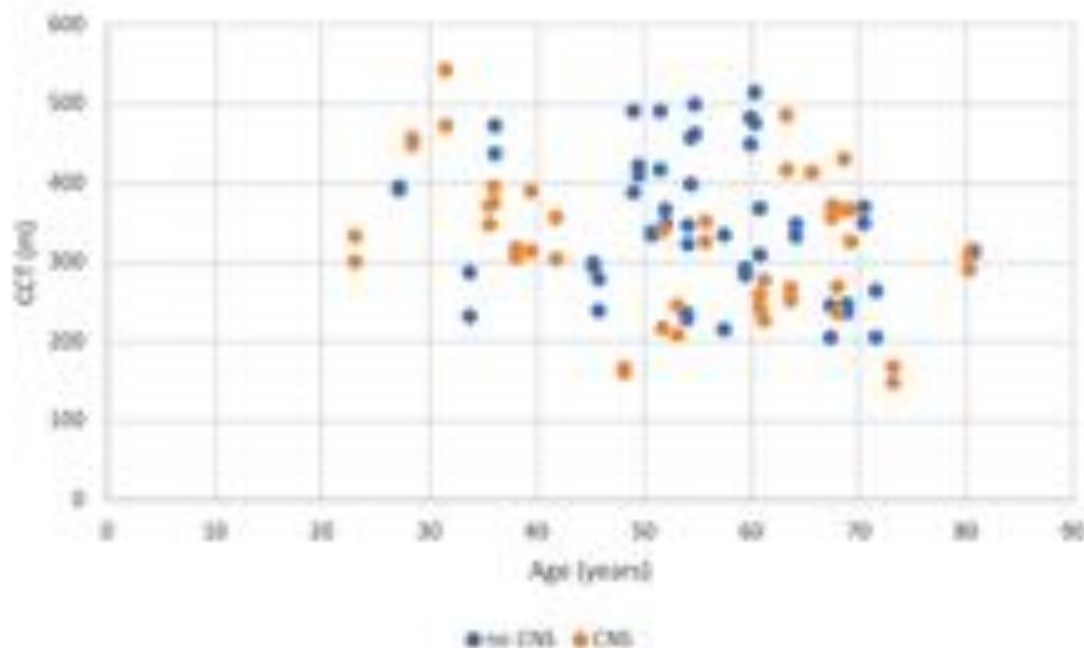
The mean change was a decrease of  $31\mu\text{m}$  (p-value = 0.000005)

The length of time on treatment (and f/u exam) did not appear to influence the amount of SFCT

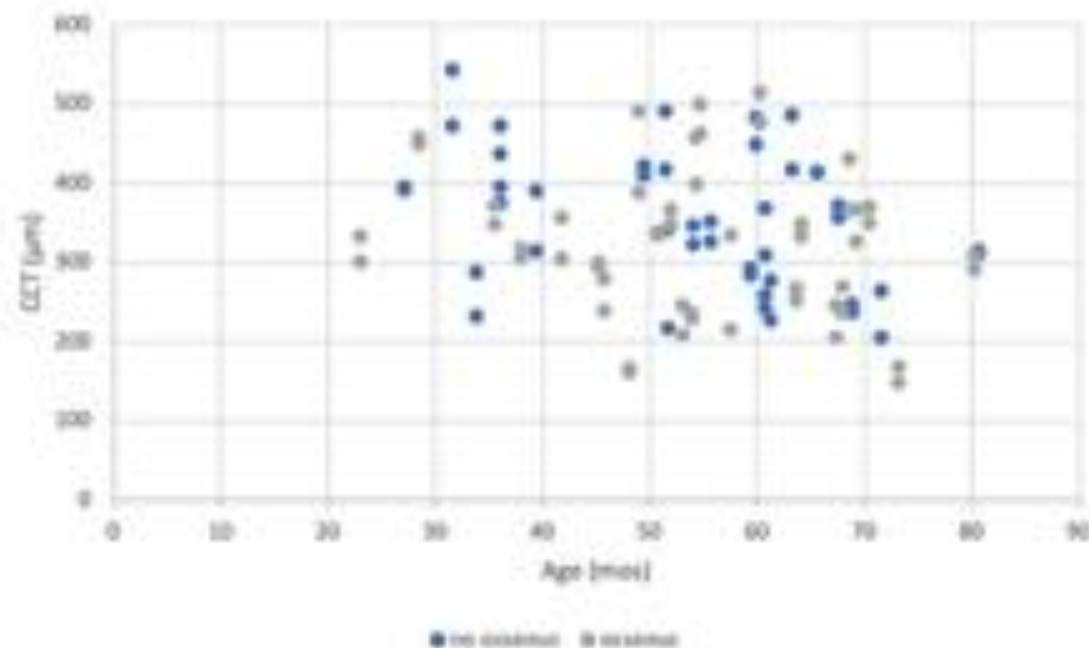
# Results

Is CNS/osseous disease a marker for disease burden and would that correlate with choroidal thickness?

- No significant difference in SFCT between patients with or without CNS disease (p-value = 0.35)



- No significant difference in SFCT between patients with or without osseous disease (p-value = 0.35)

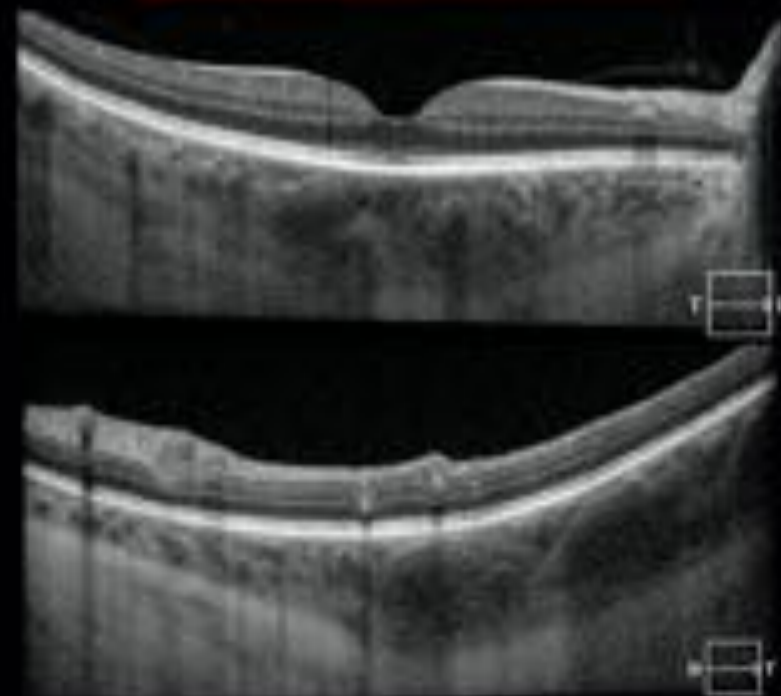


## Why is the choroid thicker in histio?

- We know the choroid is a site for accumulation of activated histiocytes (in the clinically evident cases). In the subclinical eyes, could the thicker choroid represent disease involvement?
- *For instance, lymphoma and myeloproliferative diseases can infiltrate the choroid*
- And/or could the choroid be a site where these abnormal activated histiocytes are being generated?
- We know the choroid can be a site of extramedullary hematopoiesis (both in neonates and adults- although our knowledge is limited to enucleation specimens). Therefore, presumably, the choroid could be a source of these cells



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