

# Rapid Increases in Parasitemia following Red Cell Exchange for Malaria

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# Conflict of Interest Disclosure

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Have no conflict of interest to report.

A 20-year-old white female presented to UNC Hospitals after travelling to West Africa.

CC: High fever and altered mental status

HPI: 7 days ago, she had high fever, diarrhea, and headache.

3 days ago, she developed nausea, fatigue, and altered mental status.

PMH: No

## Physical Exam:

Appearance: Moderate distress, not alert

V/S: BT 38.7°C, BP 100/61, RR 30, HR 127  
(regular)

HEENT: Pale conjunctivae and icteric sclerae

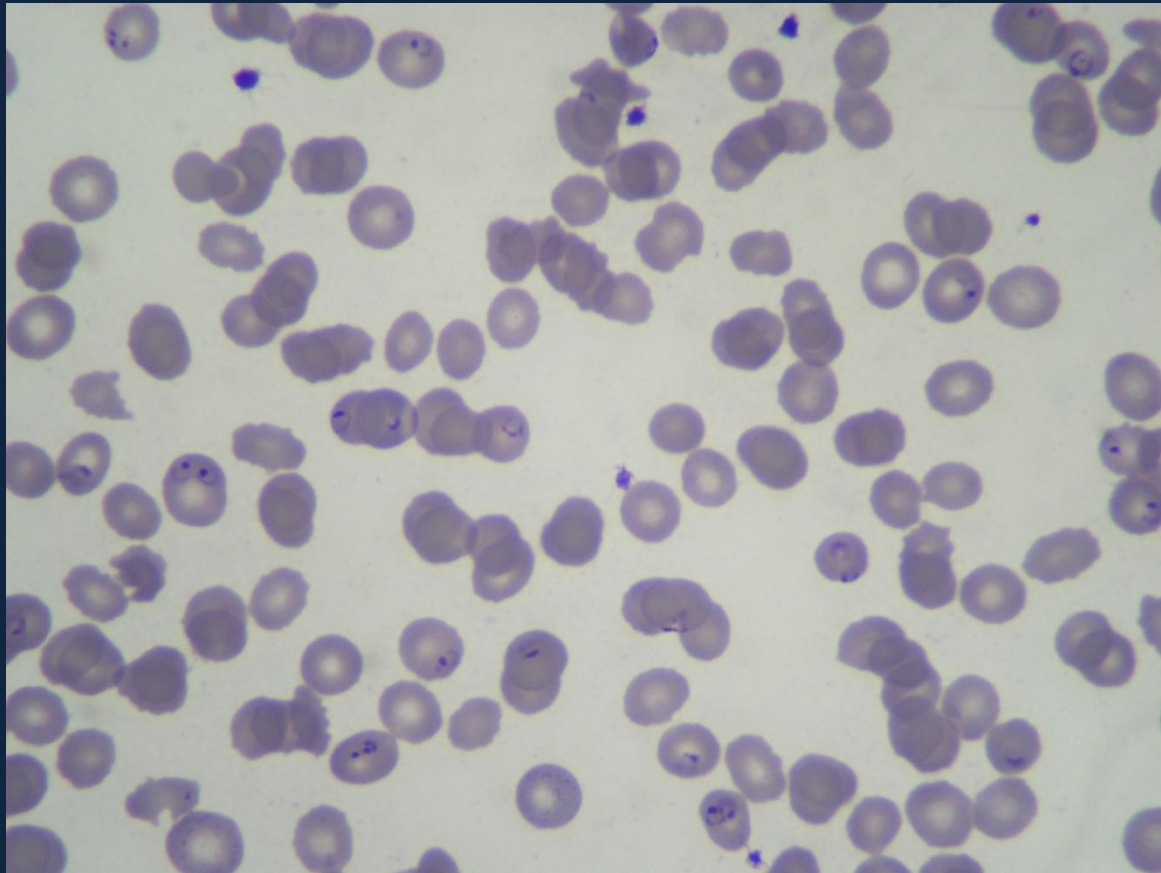
CVS: Slightly tachycardia and normal heart sounds

Lungs: Clear to auscultation bilaterally

Abdomen: Liver and spleen not palpable

Neurological exam: Confused, stuporous, and disorientated to time, place, person

# Diagnosis



*Plasmodium falciparum* malaria with 30% parasitemia

# Management

## Red blood cell exchange (RCX)

- Category II
- The Centers for Disease Control considers RCX if
  - Parasitemia > 10%
  - Severe malaria (non-volume overload pulmonary edema, renal complication, or cerebral malaria)

# Management

## Red blood cell exchange (RCX)

- COBE Spectra
- Target Hct 30% with 30% FCR
- 1 blood volume
- Fluid balance 100%
- ACD-A solution

# Management

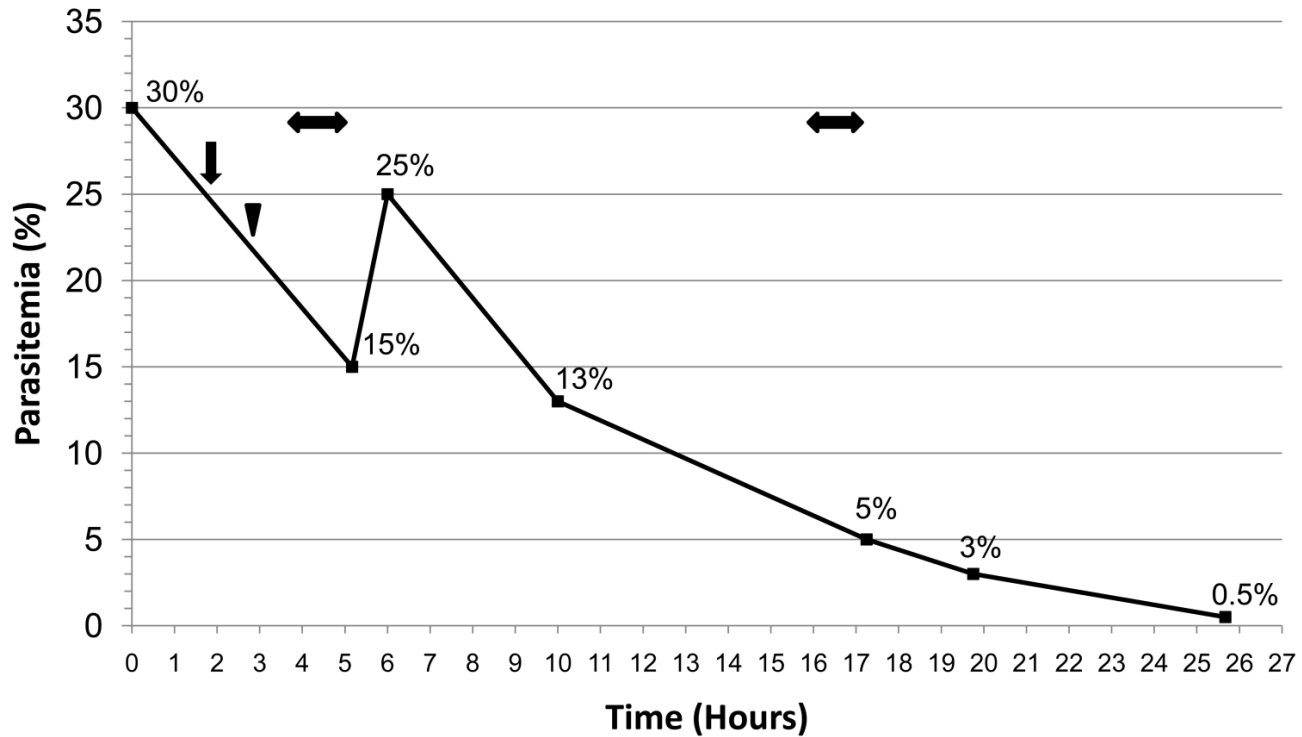
Complication after RCX

- Hypotension
- Pulmonary edema?

# Management

- Medication:
  - Quinidine IV
  - Clindamycin IV
- Supportive and symptomatic treatment

# Hospital course



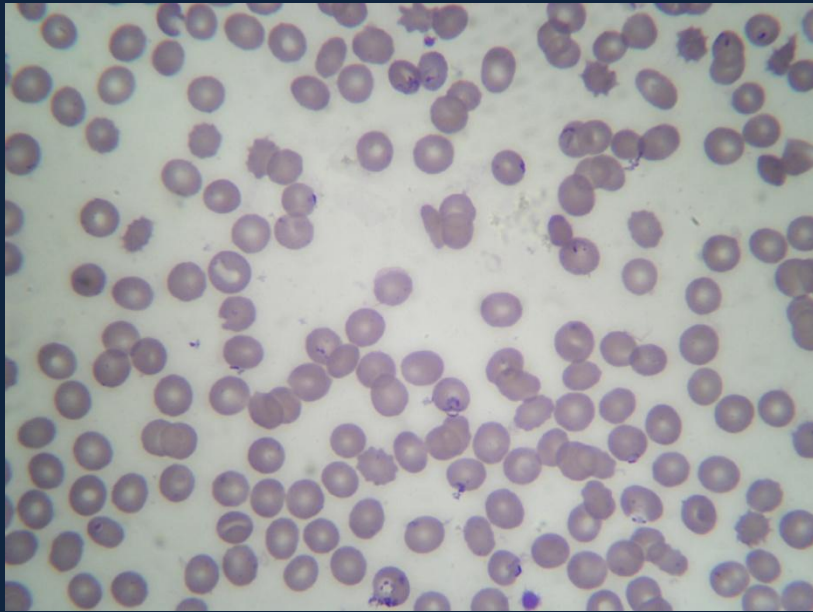
- ↔ Red cell exchange was performed
- ↓ Intravenous quinidine was started
- ▼ Intravenous clindamycin was started

# Patient's outcome

- Mental status improved the day after the first RCX
- Switch to oral antibiotic on day 3
- Afebrile on day 5
- Discharge on day 6

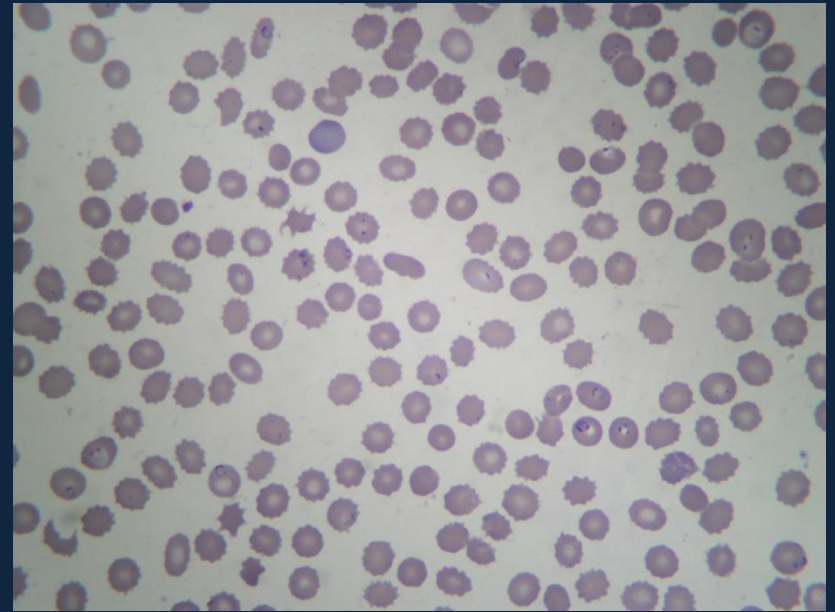
# After the first RCX

Immediately



15% ring-form trophozoites

Fifty minutes later



25% ring-form trophozoites

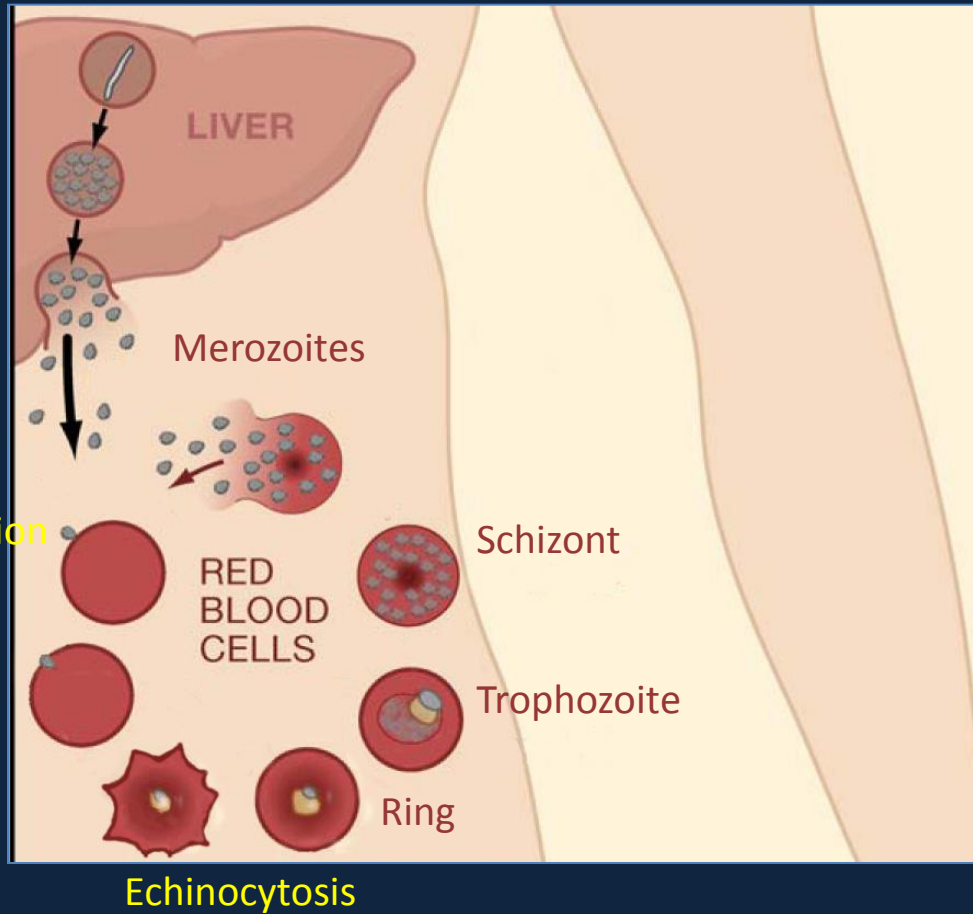
# WHY?

## Goals

- To decrease parasitemia until anti-malarial drugs take action.
- To prevent further end-organ damage.

# Hypothesis 1

Process from pre-invasion to ring-form takes about 15 minutes



Int J Parasitol 2009;39(1):91-6  
Science 1975;187(4178):748-50

# Hypothesis 1

RCX



Reduce formalin of RBCs

Limit the amount of the malarial invasion



Am J Trop Med Hyg 1997;57(5):507-11  
Blood 1989;74(5):1836-43

# Hypothesis 2

- The release of sequestered infected RBCs from the spleen
- The splenic retention of RBCs in malaria cases
- Severe malaria patients had larger spleen weights (mean 300 g, range 150-400 g)

Curr Opin Hematol 2009;16(3):157-64  
Infect Immun 2005;73(4):1986-94

# Conclusion

- Rapid increases in parasitemia can be observed after an acute mechanical load reduction in circulating parasites.

Potential benefits



Risk of procedure

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