

# Cryoglobulinemia Diagnosed by Peripheral Smear Examination: Value of a Basic Underestimated Test

Preethi Muthusamy Sundar<sup>1</sup> Sakthisankari Shanmugasundaram<sup>1</sup> Santni Manickam<sup>2</sup>

<sup>1</sup>Department of Pathology, PSG Institute of Medical Sciences and Research, Coimbatore, Tamil Nadu, India

<sup>2</sup>Department of Medicine, PSG Institute of Medical Sciences and Research, Coimbatore, Tamil Nadu, India

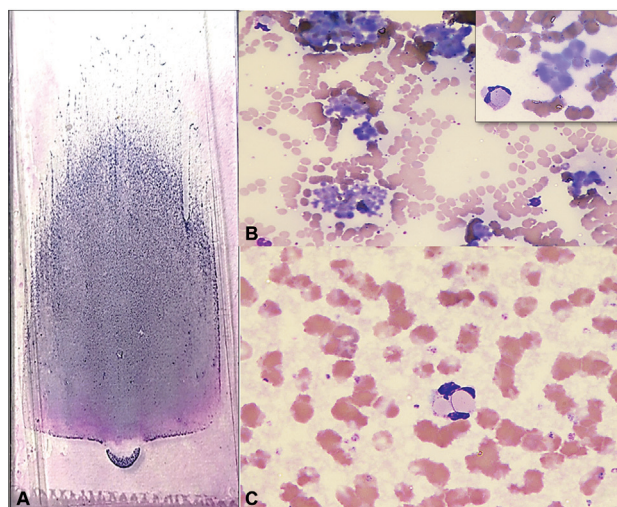
Address for correspondence Sakthisankari Shanmugasundaram, MD, Department of Pathology, PSG Institute of Medical Sciences and Research, Peelamedu, Coimbatore, Tamil Nadu, 641004, India (e-mail: sakthisankari@gmail.com).

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A 58-year-old female with a history of vasculitis presented to the hospital with sudden onset hemoptysis, ulceration over bilateral lower limbs, and low-grade intermittent fever. Computed tomographic scan of chest revealed pulmonary hemorrhage. Investigations showed a hemoglobin of 5.8 g/dL, pseudoleukocytosis ( $46 \times 10^3/\mu\text{L}$ ), and platelet count of  $483 \times 10^3/\mu\text{L}$ . Examination of the Leishman-stained peripheral smear showed blue background with grossly visible agglutinates (**Fig. 1A**) and a normal total white

blood cell count. Pseudoleukocytosis could have been the result of counting of precipitated cryoglobulin deposits as leukocytes by the automated cell counter.<sup>1</sup>

Basophilic to faint eosinophilic amorphous globular and granular deposits in the background (**Fig. 1B** and inset) and intracytoplasmic vacuoles within the neutrophils (**Fig. 1C**) were observed suggestive of cryoglobulin precipitates. Qualitative determination of cryoglobulin was positive—cryoglobulin deposits at 4°C (**Fig. 2A**) and



**Fig. 1** (A) Peripheral smear showing a blue background and visible agglutinates. (B) Basophilic amorphous globular deposits in the background. (C) Intracytoplasmic faint basophilic deposits within neutrophils.

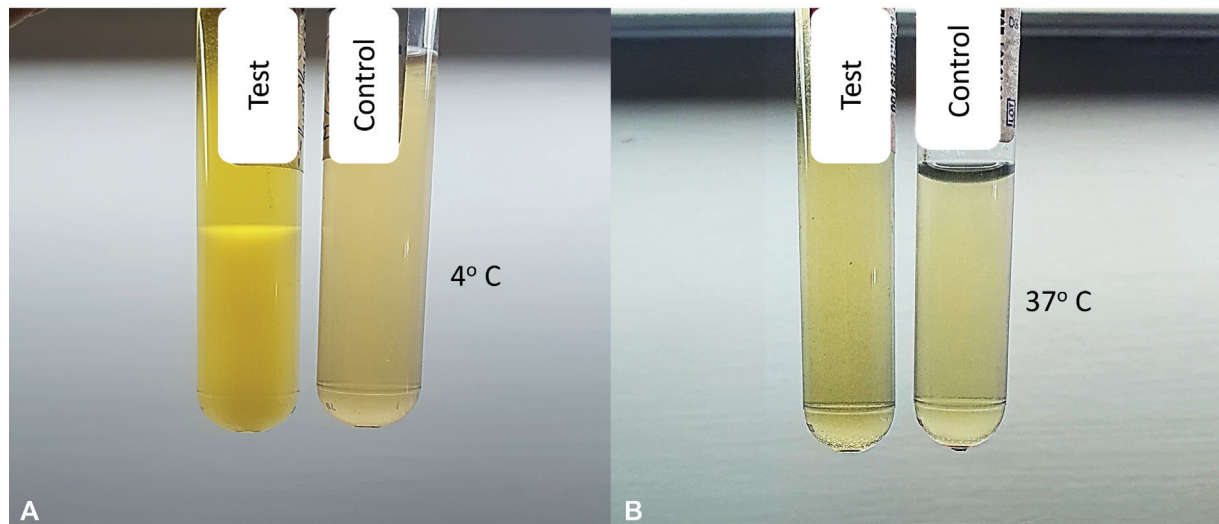
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**Fig. 2** (A) Qualitative test for cryoglobulin showing cryoglobulin deposits in the patient's serum at 4°C. (B) Disappearance of the deposits after warming at 37°C.

absence of deposits at 37°C (► **Fig. 2B**). Further workup showed elevated serum cryoglobulin (880.8 mg/L), low C3 (109.10 mg/dL), near-normal C4 (3.02 mg/dL), and antineutrophil cytoplasmic antibodies—proteinase 3 positive, supporting the diagnosis. She was negative for hepatitis C virus, hepatitis B virus, and human immunodeficiency virus. Renal function tests revealed elevated urea (112 mg/dL) and creatinine (6.32 mg/dL) levels. The patient improved following treatment with steroids, cyclophosphamide, and plasmapheresis.

Cryoglobulin deposits on peripheral smear serving as an initial manifestation of the underlying disease process have been reported previously.<sup>2-4</sup>

The purpose of this case is to remind the importance of manual screening of peripheral smears in an era of automation. Findings, as observed in our case, can pave the way for early identification and treatment of clinically unsuspected cases.

#### Informed Consent

Waiver of consent has been obtained.

Ethical Approval  
Obtained.

Conflict of Interest  
None declared.

#### References

- 1 Qian X, Ling Y, Wang L, Liang H, Wang H. Remarkable pseudo-leucocytosis induced by mild cryoglobulinemia. *Clin Chem Lab Med* 2020;58(11):e291–e293
- 2 Lesesve JF. Cryoglobulin deposits on a blood smear. *Blood* 2012; 120(09):1764. Doi: 10.1182/blood-2012-01-398198
- 3 Kumar N, Das R, Chandra D, Malhotra P. Cryoglobulinemia as an initial manifestation of underlying hematological malignancy: a rare occurrence in India. *J Lab Physicians* 2014;6(02): 127–129
- 4 Wang F, Wang G, Wang X. Cryoglobulin crystals deposited in a peripheral blood film and phagocytosed by neutrophils. *Br J Haematol* 2021;195(04):484