

# Green-blue Inclusions in Leukocytes and COVID-19: A Sign of Looming Death

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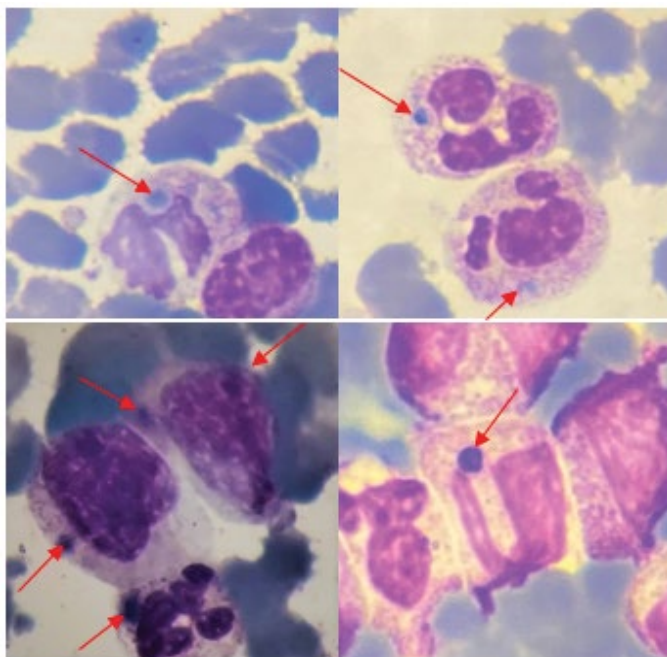
## Abstract

Green-blue Cytoplasmic Inclusions (GBI) in neutrophils and/or monocytes is a rare peripheral blood smears anomaly described in few case reports in patients with acute liver injury, lactic acidosis and recently with COVID-19. Referred to as "crystals of death", these inclusions are associated with a critical prognosis and death shortly time after identification. Herein, we report a case of GBI finding in neutrophils, monocytes, myelocytes and metamyelocytes cytoplasm's in a patient with COVID-19.

**Keywords:** COVID-19 • GBI • Myelocytes • Inclusions

## Case Image

A 78 years old man with a history of diabetes and high blood pressure was hospitalized for a severe acute respiratory syndrome COVID-19 in the unit intensive care requiring a mechanic ventilation. Laboratory tests showed an increased leucocytes number ( $94 \times 103/\mu\text{L}$ ) with a predominance of polymorphonuclear cells ( $92.4 \times 103/\mu\text{L}$ ), lymphopenia ( $0.8 \times 103/\mu\text{L}$ ),



**Figure 1:** Green-blue inclusions in monocytes, polymorphonuclear, myelocytes and metamyelocytes cytoplasm cells.

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aregenerative normochrome anemia (Hemoglobin=5.6 g/dL), normal platelets number, and elevated D-Dimere (6961 ng/mL). Biochemical report showed an elevated LDH (877 U/L), renal failure (urea=76.4 mmol/l, creatinine=277  $\mu\text{mol/l}$ ), CRP=90.97 mg/l, hyperkalemia=7.62mmol/L, hypernatremia=147mmol/L, high lactate (8 mmol/L) but with a normal hepatic function (Aspartate transaminase=38.2 UI/L, Alanine transaminase=24.9UI/L).

Peripheral blood smear examination revealed multiple Green-blue Inclusions (GBI) in polymorphonuclear, in monocytes but also in myelocytes and metamyelocytes cytoplasm cells. The patient died after 48 hours of his microscopic finding and 10 days after initial COVID-19 testing. Such blue-green inclusions called « crystals of death » were associated with a short-term mortality in 60% with a median of 3 days [1]. Most reports described this crystal inclusion as a critically anomaly in patients with tissue injury seen in liver failure and sepsis and recently described in rare cases of COVID-19 patients [1]. Many hypotheses suggest that GBI was rich of lipofuscin released from lysosomal degradation of necrotic hepatocytes phagocytized by polymorphonuclear cells and monocytes [2]. To our knowledge, this is the first report of GBI described in myelocytes and metamyelocytes cells of peripheral blood smear in COVID-19 patient. The pathogenesis of these inclusions is unclear and need more exploration of their etiology and clinical implications (Figure 1).

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Dr Ghachem and Dr Kaabar analyse and write the case. Dr Bachali contributed to the content revising.

## References

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