



Case Series

Laboratory diagnosis of Disseminated Intravascular Coagulation (DIC): A case series

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Abstract

Background: Disseminated intravascular coagulation (DIC) is a complex acquired syndrome characterized by systemic activation of coagulation pathways, leading to widespread fibrin deposition in the microvasculature, consumption of platelets and coagulation factors, and subsequent bleeding tendency. Laboratory diagnosis is essential for confirming DIC, assessing its severity, and monitoring therapeutic response. The International Society on Thrombosis and Haemostasis (ISTH) has established standardized diagnostic criteria combining clinical findings with specific laboratory parameters to improve diagnostic accuracy [1,2]. This case series aims to illustrate and evaluate the utility and variability of these common laboratory parameters in the diagnosis of DIC across diverse patient cases.

Key words: Schistocytes ; Hemolytic Anemia; Thrombosis and Haemostasis; ISTH DIC scoring system

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1. Case Presentation

1.1. Case 1

A 32-year-old woman, gravida 2 para 1, presents to the emergency department with severe vaginal bleeding 2 hours after intrauterine fetal demise at 32 weeks of gestation. She is pale, anxious, and tachypneic. She complains of abdominal pain and has noticed oozing of blood from venepuncture sites.

Past medical history: Unremarkable.

Medications: None.

Allergies: No known drug allergies.

1.2. Case 2

A 58-year-old man with a history of metastatic pancreatic adenocarcinoma presents to the outpatient oncology clinic with easy bruising and mild fatigue over the past 2 weeks.

He denies active bleeding, hematuria, or melena. There is no recent surgery, trauma, or infection.

Past Medical History: Hypertension, diabetes mellitus type 2.

Current Medications: Low-molecular-weight heparin (for prior venous thromboembolism), metformin, lisinopril.

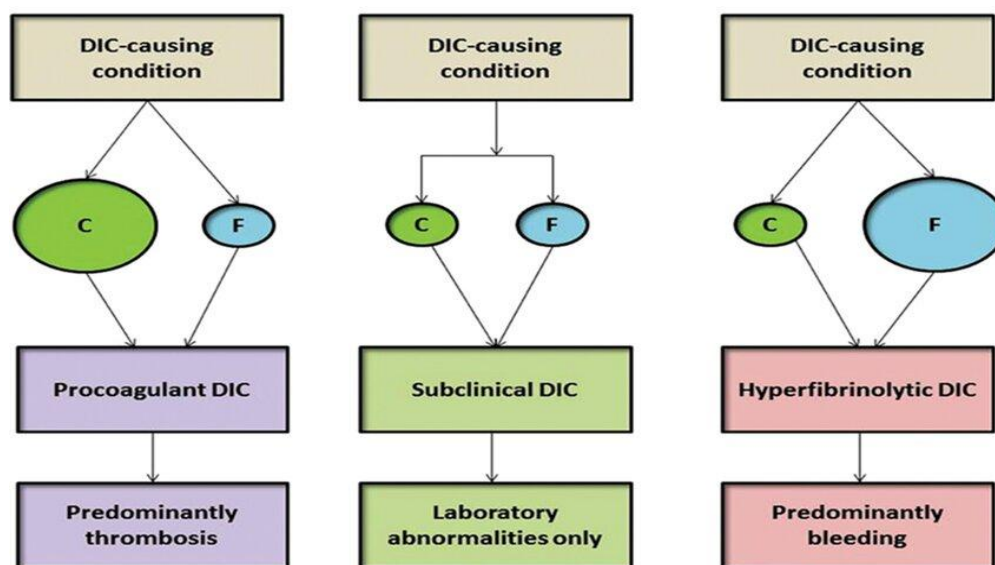
1.3. Lab findings in both the cases

- Anemia
- Thrombocytopenia
- Schistocytes in the peripheral smear
- Prolonged PT & aPTT
- Elevated D-dimer & Fibrin Degradation Products (FDP)

2. Diagnosis

Microangiopathic Hemolytic Anemia due to DIC – Overt (1st case) & Non-Overt (2nd case).

The different types of DIC



Source

Erez, Offer et al., (2022). DIC in Pregnancy – Pathophysiology

3. Discussion

Lab diagnosis

Clinical laboratory plays a vital role in diagnosing the subclinical DIC and saving the lives of patients. The parameters which aid in the diagnosis are:

3.1. Platelet Count

Thrombocytopenia is one of the earliest and most consistent laboratory abnormalities in DIC. Platelet counts typically decrease due to consumption and destruction within the microcirculation. A declining platelet count over time is more indicative of DIC than an isolated low value [3]. Counts below $100 \times 10^9/L$ are common, and progressive reduction supports the diagnosis [4].

3.2. Prothrombin Time (PT) and Activated Partial Thromboplastin Time (aPTT)

Prolongation of PT and aPTT reflects consumption of clotting factors and depletion of fibrinogen, factors V and VIII. PT is usually more prolonged than aPTT because of greater depletion of extrinsic pathway factors. The degree of prolongation correlates with the severity of coagulopathy [5]. In chronic or compensated DIC, these parameters may remain within normal limits [6].

3.3. Fibrinogen Level

Fibrinogen, an acute-phase reactant, is usually decreased due to consumption in DIC, though it may remain normal or even elevated in early or chronic phases owing to hepatic synthesis in inflammatory states [7]. A fibrinogen level below 1.0 g/L strongly supports the diagnosis of DIC, particularly in combination with other abnormal parameters [8].

3.4. Fibrin Degradation Products (FDPs) and D-dimer

Increased fibrinolytic activity in DIC leads to elevated levels of FDPs and D-dimer, which are sensitive indicators of fibrin formation and breakdown. Elevated D-dimer is a hallmark of DIC, though it lacks specificity since it can be raised in other conditions such as sepsis, trauma, or malignancy [9,10]. High FDP and D-dimer levels reflect the systemic fibrinolysis associated with microvascular fibrin deposition.

3.5. Peripheral Blood Smear

Examination of the peripheral smear often reveals schistocytes (fragmented red cells), indicating microangiopathic hemolytic anemia resulting from mechanical damage to erythrocytes in fibrin-laden capillaries [11]. The presence of schistocytes supports the diagnosis but is not pathognomonic.

3.6. Anti-thrombin and Protein C Levels

Consumption of natural anticoagulants such as anti-thrombin and protein C occurs during DIC, leading to decreased levels. Reduced anti-thrombin concentration correlates with disease severity and poor prognosis [12]. Measurement of these markers can help assess the extent of coagulation activation and consumption.

3.7. ISTH Scoring System

The ISTH DIC scoring system combines several laboratory parameters — platelet count, PT prolongation, fibrinogen level, and FDP or D-dimer concentration — into a quantitative diagnostic score [2]. A score ≥ 5 is consistent with overt DIC, while a lower score suggests non-overt or evolving DIC. Serial testing enhances diagnostic sensitivity and helps monitor disease progression.

Parameter	Laboratory Abnormality	Scoring
Platelet count	$\geq 100 \times 10^9/L$ (0); $< 100 \times 10^9/L$ (1); $< 50 \times 10^9/L$ (2)	0–2
Elevated FDP/D-dimer	Moderate (2); Strong (3)	0–3
Prolonged PT	< 3 s (0); 3–6 s (1); > 6 s (2)	0–2
Fibrinogen (g/L)	> 1.0 (0); ≤ 1.0 (1)	0–1
Total score ≥ 5 = Overt DIC		

4. Additional/Confirmatory Tests

- Thrombin–Antithrombin Complexes (TAT), Prothrombin Fragment: Indicate ongoing thrombin generation [13].
- Soluble Fibrin Monomer Complex (SFMC): Reflects intravascular fibrin formation.
- Factor Assays: Reduced levels of factors V and VIII can help differentiate DIC from liver disease, where factor VIII is typically elevated [14].

4.1. Interpretation and Monitoring

No single laboratory test is diagnostic of DIC; interpretation must consider clinical context and serial results. The combination of thrombocytopenia, prolonged coagulation times, elevated D-dimer, and low fibrinogen strongly supports the diagnosis. Continuous monitoring is essential for assessing therapeutic response and prognosis [15].

5. Conclusion

Laboratory diagnosis of DIC relies on dynamic assessment of coagulation and fibrinolytic parameters. The ISTH scoring system provides a standardized approach integrating platelet count, PT, fibrinogen, and fibrin-related markers. Early recognition through careful laboratory evaluation is critical for prompt management and improved patient outcomes

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