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DISTRIBUTION AND CHARACTERISTICS OF HEMOSTASIS SYSTEM DISORDERS IN DISSEMINATED INTRAVASCULAR COAGULATION OF VARIOUS GENESIS

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Abstract: This scientific study presents data on the prevalence, global occurrence, causes, origin, and characteristics of hemostatic disorders in disseminated intravascular coagulation (DIC) of various genesis.

Keywords: hemostasis system, DIC syndrome, hypocoagulation, hypercoagulation.

Relevance of the problem. Disseminated intravascular coagulation (DIC) is an acquired syndrome characterized by widespread and uncontrolled activation of the coagulation process, resulting in the formation of fibrin within the blood vessels. DIC syndrome is a serious condition characterized by simultaneous activation of thrombosis and fibrinolysis, leading to microcirculatory disorders and multiple organ dysfunction.

According to the Scientific Committee of the International Society on Thrombosis and Haemostasis (ISTH), DIC is an acquired syndrome that occurs due to various causes and is characterized by loss of localization of coagulation activation within the vessels. Depending on the underlying cause, DIC may present as hypocoagulation or hypercoagulation, which significantly affects clinical outcomes and treatment strategies. The incidence of DIC is approximately 2.5 cases per 1000 individuals and has increased by 8.7% over the past twenty years. The diagnosis of DIC typically involves evaluating coagulation system markers; however, this method is not sufficiently precise. Therefore, it is crucial to differentiate DIC from diseases characterized primarily by platelet count abnormalities (2).

According to ISTH-DIC, JAAM-DIC, and SIC criteria, the overall proportion of positively diagnosed cases was 28% (95% CI: 24–34%), 55% (95% CI: 42–70%), and 57% (95% CI: 52–78%), respectively (6). The overall mortality rates were 44% (95% CI: 33–53%), 37% (95% CI: 29–46%), and 35% (95% CI: 29–41%) (6).

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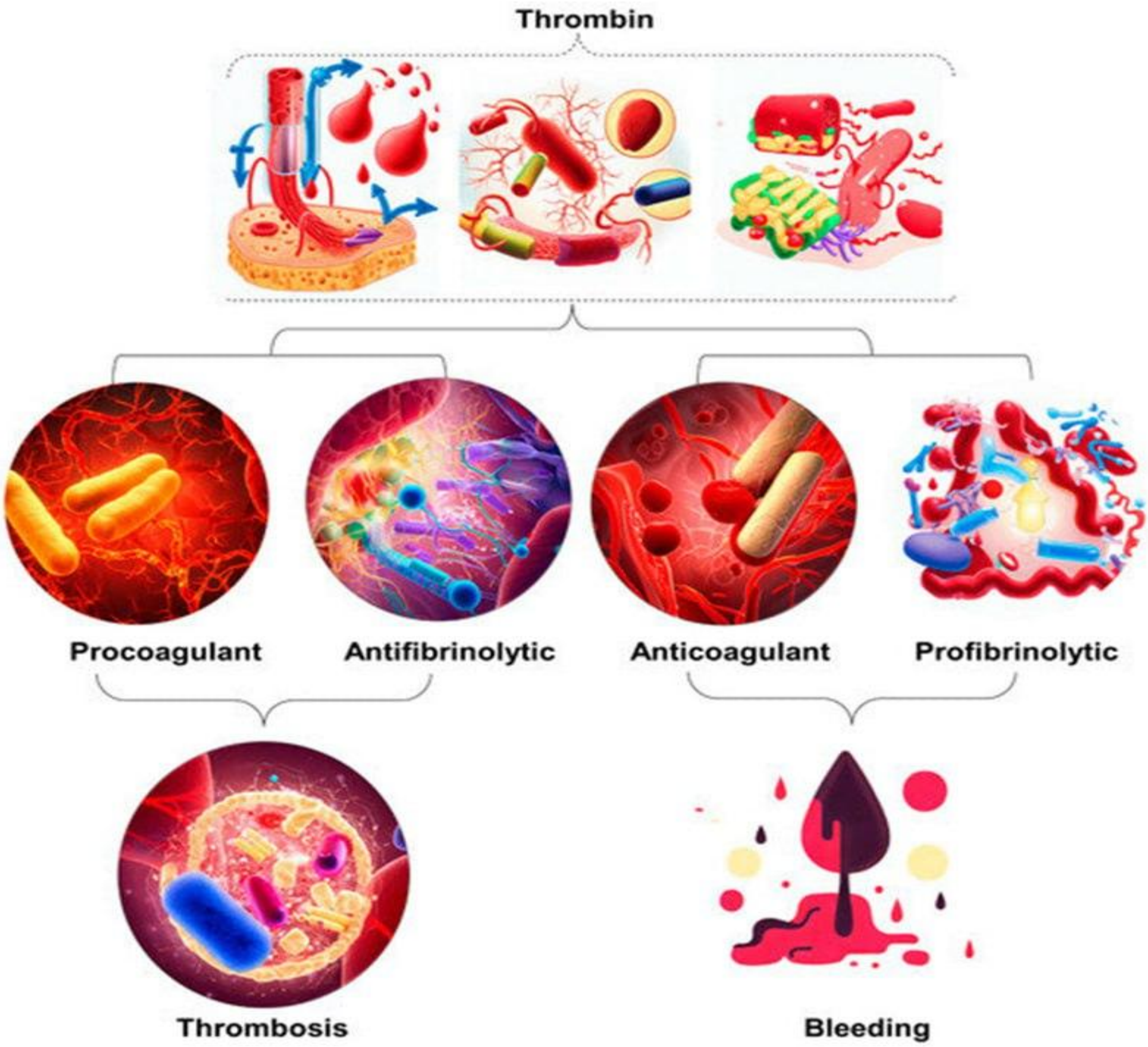

Figure 1. Ahsanullah Unar. Published: 22 September 2023

Currently, DIC is recognized as a life-threatening acquired condition involving systemic activation of the coagulation system, impaired fibrinolysis, and endothelial damage (4). One of the key updates in the 2025 revision is the staged classification of DIC, which includes the pre-DIC stage, the early DIC stage, and the overt DIC stage (4). DIC is also divided into thrombotic and hemorrhagic phenotypes. The thrombotic form is characterized by microvascular thrombosis and organ dysfunction, whereas the hemorrhagic form manifests as bleeding due to consumption of coagulation factors (4).

Among critically ill patients with DIC, the 28-day mortality rate ranges from 20% to 50%, which is significantly higher than in critically ill patients who do not meet full DIC criteria.

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Early diagnosis and timely, adequate treatment of DIC are crucial factors for patient survival. DIC is not only a decompensated coagulation disorder but also includes early stages of systemic coagulation activation (5).

DIC can develop in various critical conditions, but the most common underlying cause is sepsis (5). The pathophysiology of sepsis-induced DIC is multifactorial: in addition to activation of coagulation and suppression of fibrinolysis, activated leukocytes, platelets, and vascular endothelial cells initiate inflammatory processes known as “immunothrombosis” (5).

Sepsis remains one of the main causes of admission to intensive care units in developed countries, including Japan, and is associated with a high mortality rate. Studies show that patients with DIC have even higher mortality rates, yet the treatment approaches for DIC are not fully established (7).

One of the main challenges in treating sepsis-associated DIC is the lack of specific therapeutic approaches beyond addressing the primary infectious process (5). Sepsis-related DIC is a dynamic process that initially begins with coagulation abnormalities and may progress to sepsis-induced coagulopathy (5).

Because DIC not only causes organ dysfunction but is also a strong prognostic factor, early detection is of paramount importance (2). Background conditions such as infection, cancer, or obstetric complications can trigger the onset and progression of DIC. Timely and accurate diagnosis of both DIC and the underlying disease is crucial for prognosis (1).

Disorders of hemostasis are an integral part of DIC and develop progressively. The main concept of DIC is systemic activation of the coagulation system accompanied by vascular endothelial injury. DIC represents a critical stage in disease progression and requires continuous monitoring.

Hemostatic disturbances, including reduced coagulation factors due to hemodilution, shock, or hyperfibrinolysis, are commonly observed in trauma-related DIC. The syndrome can be classified as acute or chronic. Acute DIC develops rapidly as a result of sudden activation of the coagulation system and requires immediate treatment (3).

Among the selected patients, individuals of various age groups and genders were included, allowing for a deeper analysis of the clinical course of DIC. The study results were statistically processed, and key diagnostic indicators were analyzed in relation to the stages of DIC development.

When analyzing the clinical and laboratory data of patients diagnosed with DIC, it was found that most had decreased platelet counts, increased fibrin degradation products, and prolonged prothrombin time. These changes indicate the active stage of DIC.

Among patients, 68% had the acute form of DIC, while 32% had the chronic form. The most common underlying causes were sepsis (46%), severe trauma (28%), and oncological diseases (16%). In 10% of cases, the etiology of DIC remained unknown. In patients with

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severe DIC, organ dysfunction—particularly renal and hepatic impairment—was frequently observed. The mortality rate reached 38%, highlighting the importance of early diagnosis and effective treatment of DIC.

The conducted study demonstrated that DIC is a severe clinical condition that develops due to various causes such as sepsis, trauma, and cancer. The main pathogenesis of the disease is closely associated with systemic activation of the coagulation system, impaired fibrinolysis, and endothelial damage.

The results also emphasize the need for regular monitoring of coagulation parameters and an individualized approach to patient management. Therefore, early diagnosis, accurate assessment, and development of effective therapeutic strategies for DIC remain priority directions in modern medical practice.

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