News Release

Title

Identification of key parameters of septic coagulopathy

Key Points

- **In septic coagulopathy, the degree of platelet depletion has been shown to quantitatively represent the pathophysiology.**
- **A decrease in platelets of more than 11% was found to increase the risk of thrombosis as well as the risk of death and bleeding**
- **This research is expected to lead to the development of precision medicine that targets coagulation abnormalities in sepsis patients.**

Summary

A research group led by Assistant Professor Daisuke Kasugai, Lecturer Yukari Goto at Department of Emergency Medicine, Nagoya University Hospital, Dr. Masayuki Ozaki, the Director of Intensive Care Unit, Komaki City Hospital, Professor Shigeyuki Matsui, Department of Biostatistics, Nagoya University Graduate School of Medicine, and Professor Naoyuki Matsuda, Department of Emergency and Intensive Care Medicine, Nagoya University Graduate School of Medicine, has found that the relative degree of platelet depletion in sepsis quantitatively indicates the pathogenesis of Disseminated Intravascular Coagulation (DIC).

Sepsis is a life-threatening condition in which organ damage occurs due to an excessive biological response to infection. Many patients die from this disease in intensive care units (ICUs) around the world.

It is known that DIC causes a decrease in platelets, and until now, absolute platelet count has been used as the international standard for the diagnosis of DIC. In this study, using an ICU database of 200,000 patients in the U.S., the researchers found that the "degree of platelet depletion" in sepsis is related to the risk of death, bleeding and thrombosis, and that this relationship is independent of the "absolute platelet count. The results of this study are expected to lead to the development of precision therapy, prophylactic treatment, and elucidation of the pathogenesis of DIC by focusing on the relative rate of platelet decrease.

This research result was published in the international scientific journal Scientific Reports (electronic version dated July 7, 2021 UK time).

Research Background

Sepsis is a condition in which the body's vital organs malfunction due to an excessive biological response to infection. It is one of the major conditions experienced in the intensive care unit (ICU), and many people have died from this disease worldwide. Although many clinical trials have been conducted to treat this condition, only a few have led to the development of effective treatments, and there is currently no breakthrough therapy.

Thrombocytopenia has been known to be associated with mortality in sepsis. Disseminated Intravascular Coagulation (DIC), the formation of tiny blood clots in vital organs in sepsis, is thought to cause organ damage, in combination with a decrease in platelets. For this reason, thrombocytopenia is used internationally as one of the diagnostic criteria for coagulopathy due to sepsis. On the other hand, it has been speculated that the degree of platelet decrease (how fast it occurs) reflects the pathogenesis of DIC, but since there is weak established evidence for this, the degree of platelet decrease has not been considered as a diagnostic criterion internationally, except for the "JAAM-DIC criteria" in Japan. Clinical trials of several therapeutic agents for DIC have been conducted using the international DIC criteria, but there is no treatment for which sufficient evidence has been established for a specific effect.

Research Results

This study examined the pathological significance of the "degree of platelet depletion" in sepsis using data from approximately 200,000 patients in 335 ICUs in the United States. The results showed that the degree of platelet depletion correlated with the risk of death in sepsis, independent of the absolute final platelet count, and that the risk of death increased as the degree of depletion increased. Furthermore, for the first time in the world, it was found that a greater decrease in platelets was associated with an increased risk of thrombosis as well as bleeding.

Research Summary and Future Perspective

It was found that the rate of platelet decrease more accurately indicates the pathogenesis of coagulopathy in sepsis.

The results may be useful in developing precise and preventive treatments for septic coagulopathy.

Publication

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