Abdominal aortic aneurysm (AAA) is known to be rarely accompanied by disseminated intravascular coagulation (DIC). We report a case of AAA with DIC. An 81-year-old man with abdominal pain referred to our hospital. Computed tomography demonstrated an AAA (maximum diameter: 90 mm). The patient underwent a laparotomy, and an abdominal aorta replacement was performed. At the 3-month follow-up, the patient underwent Helicobacter pylori eradication treatment for 1 week. After treatment, the platelet count dramatically increased. The mechanism by which H. pylori eradication therapy improves hematological parameters has not been elucidated; however, this noninvasive treatment effectively resolved DIC associated with AAA.

**Keywords:** abdominal aortic aneurysm, Helicobacter pylori, disseminated intravascular coagulopathy, consumptive coagulopathy

**Introduction**

Large abdominal aortic aneurysms (AAAs) often cause thrombocytopenia, coagulopathy, and disseminated intravascular coagulation (DIC).1,2 However, the strategy for preoperative intravenous conservative treatment is controversial.3,4 We report a case of a large AAA (maximum diameter: 90 mm) with thrombocytopenia who underwent emergency laparotomy for abdominal aorta replacement with a prosthetic vessel encased by an aneurysmal wall with the resolution of thrombocytopenia. Finally, we resolved thrombocytopenia after Helicobacter pylori eradication treatment as an outpatient.

**Case Report**

An 81-year-old Asian man with a history of ischemic heart disease and stent placement was brought to the emergency department at a hospital with complaints of abdominal pain and tarry stool. On admission, the patient was severely anemic and underwent emergency gastro-endoscopy that revealed an acute gastric mucosal lesion. Subsequent computed tomography (CT) scanning revealed a large AAA (maximum diameter: 90 mm). The patient was referred to our hospital for emergency surgery because of impending rupture. On examination, the body temperature was 35.8°C, pulse was regular, heart rate was 98 beats/min, and blood pressure was 162/92 mmHg; the patient also had truncal ecchymosis. Abnormal laboratory findings included a severely low hemoglobin count (Hb: 5.3 g/dL; normal range: 13.3–17.5 g/dL), critically low platelet count (2000/µL; normal range: 150000–350000/µL), and high level of D-dimer (6.51 µg/mL; normal range: 0.0–1.0 µg/mL). The patient’s initial data are shown in Table 1. The DIC score became 6 points which were indicative of acute DIC. CT revealed an infrarenal AAA (maximum diameter: 90 mm) without the evidence of any retroperitoneal hematoma (Fig. 1a). The following factors influenced therapeutic decision-making in this case. First, we were apprehensive of the negative effect of an emergency laparotomy during coagulopathy although the patient’s hemodynamics had remained stable. Second, it was essential for this elderly patient to recover from DIC that was caused by AAA for which replacement of the non-ruptured AAA with a prosthetic vessel had to be performed as early as possible. Third, we consulted
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thrombocytopenic cases such as DIC, pernicious anemia, thrombotic thrombocytopenic purpura, systemic lupus erythematosus, aortic aneurysms, and drug-induced thrombocytopenia. The patient recovered and was discharged after 1 month with an advice to undergo routine follow-up at the outpatient clinic. Two months after the operation, the patient’s PA-IgG decreased to 29.1 ng/10^7; however, his serum platelet count remained approximately 20000/µL. At the 3-month follow-up, PA-IgG had increased to 51.1 ng/10^7 (Fig. 2b) and the patient tested positive for H. pylori antibody-Ig G.
Discussion

A large AAA can cause various complications, such as chronic consumptive coagulopathy, DIC, and abnormalities of coagulation and the fibrinolytic system.\(^1,2\) When there is an aneurysm, platelets are used to make intraaneurysmal thrombi, especially the aneurysm is large. The distributed blood flow or much mural thrombosis causes DIC or coagulopathy. In this case, even if there was little mural thrombosis, the hemostatic imbalance may be triggered by exposure of the denuded aortic endothelial surface. Platelet adhesion at such atheromatous areas may stimulate coagulation factors. Abnormal flow in this larger aneurysmal sac may cause coagulation abnormalities.

Preoperative DIC is a severe complication; however, the therapeutic strategy in AAA with DIC remains controversial.\(^3,4\) Since Fine et al.\(^5\) reported a case of consumptive coagulopathy of a dissected aneurysm in 1967, there have been many reports on AAA-associated coagulopathy.\(^2,4\) Some reports indicate surgery for AAA enables correction of thrombocytopenia. Oba et al.\(^5\) opined that surgeons should not expend an undue amount of time to correct DIC preoperatively. In contrast, Gasabarrini et al.\(^5\) insisted that the detection of *H. pylori* infection should be considered in the clinical work-up of adults with typical ITP. Morimoto et al.\(^6\) reported an association between *H. pylori* infection and chronic ITP. Hino et al.\(^7\) reported on the prevalence of *H. pylori* infection and the effectiveness of its eradication in Japanese patients with chronic ITP. Kuwano\(^8\) reviewed various mechanisms for *H. pylori* role in ITP such as molecular mimicry, non-specific activation of the immune system, and modulation of monocyte/macrophage function. The development of *H. pylori*-associated ITP appears to depend on multiple factors. Especially cross-reactive antibodies are produced that react with both *H. pylori*-specific cytotoxic-associated gene A and platelet surface glycoproteins antigens through molecular mimicry. As a result of *H. pylori* eradication, activated systemic immune response decreased and platelet counts may recover. There are approximately 30 Japanese reports during 5 years. However, because of the high prevalence of *H. pylori* infection in Japan, eradication treatment has been approved by the Japanese health insurance system as a result of the recommendations from the Japanese Society for Helicobacter Research. Other East Asian countries have also adapted *H. pylori* eradication guidelines for the treatment of both gastric and extragastric diseases.

In this case, we inferred that there was some pathology because of the remnant aneurysmal wall, which was not completely removed in deference to the risk of hemorrhage caused by detachment of the surrounding tissue. Because of the presence of the aneurysmal wall, the serum PA-IgG...
levels would be positive. This was a later factor influencing the time to a further investigation: H. pylori antibody-Ig-G. Although there was no bleeding tendency postoperatively and no blood transfusions were necessary, the platelet value remained approximately 20000/µL (Fig. 2a). However, after H. pylori eradication therapy, the patient’s platelet counts increased to 117000/µL after 3 months (Fig. 2b). These data suggest that H. pylori infection was a contributory factor in the coagulopathy associated with a large AAA in this patient. The disorder that is clinical condition to be AAA with DIC may not completely deny the likelihood that ITP complicated accidentally. We definitively diagnosed DIC, and the abnormal low platelet level, coagulation disorder did not lead to final diagnosis of ITP. Furthermore, there is little diagnostic significance of PA-IgG in a diagnosis of ITP. However, from the results that H. pylori sanitation treatment succeeded, we need the further hematologic studies including the bone marrow examination in future. We cannot completely deny that potential ITP may be covered for a case of the AAA with DIC.

Conclusion

We obtained good following successful surgical repair of a large AAA associated with thrombocytopenia. Although surgery itself resulted in some improvement of thrombocytopenia, further resolution was obtained by H. pylori eradication therapy.

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Disclosure Statement

The authors declare no conflicts of interest.

Author’s Contribution

Study conception: TA
Data collection: DA, HO, HF, and KD
Analysis: TA and MT
Writing: TA
Critical review and revision: all authors
Final approval of the article: all authors

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