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journal homepage: www.casereports.comSuccessful perioperative management of a patient with idiopathic thrombocytopenic purpura undergoing emergent appendectomy: Report of a case[☆]Yoshitaka Toyomasu^{a,b,*}, Rinshun Shimabukuro^b, Hatsuo Moriyama^b, Daihiko Eguchi^b, Koichi Ishikawa^b, Fumiaki Kishihara^b, Yasuro Fukuyama^b, Takashi Matsumata^b, Erito Mochiki^a, Hiroyuki Kuwano^a^a Department of General Surgical Science (Surgery I), Gunma University Graduate School of Medicine, 3-39-22 Showa-machi, Maebashi, Gunma 371-8511, Japan^b Department of Surgery, Nakatsu Municipal Hospital, 173 Shimoikenaga, Nakatsu, Oita 871-8511, Japan

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ABSTRACT

INTRODUCTION: Idiopathic thrombocytopenic purpura (ITP) is an autoimmune disease characterized by a low platelet count and normal bone marrow. Patients with ITP undergoing surgery are thought to have increased risk for postoperative complications because of their thrombocytopenia.**PRESENTATION OF CASE:** we report the case of a 66-year-old woman with ITP who required an emergency operation for acute appendicitis associated with disseminated intravascular coagulation. Preoperative therapy consisted of platelet transfusions only, and intraoperative hemostasis was achieved. Postoperatively, high-dose intravenous immunoglobulin (IVIg) therapy led to an increased, stable, and adequate platelet count and good hemostasis.**DISCUSSION:** The outcome of this case suggests that IVIg therapy is not always required for preoperative management of patients with.**CONCLUSION:** IVIg therapy may be useful for postoperative management after emergency surgery.

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1. Introduction

Idiopathic thrombocytopenic purpura (ITP) is characterized by a low platelet count that is the result of both immune-mediated platelet destruction and suppression of platelet production.^{1,2} In patients with ITP undergoing surgery, bleeding associated with a low preoperative platelet count can lead to unsuccessful outcome. When the preoperative platelet count is less than $5 \times 10^4/\text{mm}^3$, intensive perioperative management should be planned to avoid platelet depletion.^{3,4} Since Imbach and colleagues reported its successful implementation of high-dose intravenous immunoglobulin (IVIg) therapy in children with ITP, high-dose IVIg therapy has been

recognized to be very effective for the management of acute bleeding during surgery in which blood loss is anticipated.⁵

However, although intensive medical treatment using IVIg has been preoperatively administered to patients with low platelet counts, platelet counts have not increased to satisfactory levels in some patients.³ Moreover, some studies have found that emergency surgery for patients with less than $5 \times 10^4/\text{mm}^3$ platelets was successful without the administration of preoperative IVIg.^{6–8}

Here, we report on a patient with thrombocytopenia due to ITP who underwent surgery for appendicitis without receiving preoperative IVIg therapy. The positive outcome of this case suggests that preoperative IVIg therapy is not always required for management of surgical treatment in patients with ITP.

2. Presentation of case

A 66-year-old woman was brought to the emergency room of Nakatsu Municipal Hospital because of right lower abdominal pain. Six months previously, she had been diagnosed with acute appendicitis and treated by antibiotics. Her significant past history included ITP that was being treated over the past 4 years with 10 mg of oral adenocorticoids, and her platelet count was maintained at around $15 \times 10^4/\text{mm}^3$. Her family history was unremarkable. In the emergency room, her white blood

Abbreviations: ITP, idiopathic thrombocytopenic purpura; IVIg, intravenous immunoglobulin; WBC, white blood cell; CT, computed tomography; CRP, c-reactive protein; PT/INR, prothrombin time/international normalized ratio; FDP, fibrin degradation products; DIC, disseminated intravascular coagulation.

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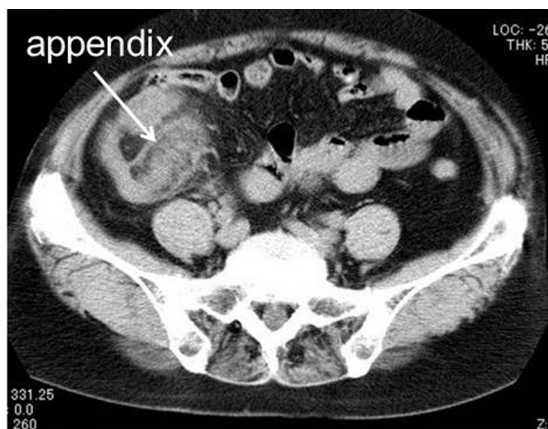


Fig. 1. Abdominal computed tomography revealed a swollen appendix, and the surrounding fat tissue showed increased density.

cell (WBC) count was $13,300/\text{mm}^3$ (Neutro: 88.5%), C-reactive protein (CRP) was 3.3, and platelet count was $2.3 \times 10^4/\text{mm}^3$. Abdominal computed tomography (CT) revealed a mass arising from the appendix and localized abscess formation (Fig. 1). She was admitted to the hospital with the diagnosis of relapsed appendicitis, and broad-spectrum antibiotic coverage was begun. The next day her temperature increased to 38°C and her WBC count to $27,300/\text{mm}^3$ (Neutro: 91.3%), CRP to 8.3, and the platelet count decreased to $0.4 \times 10^4/\text{mm}^3$ (Fig. 2). The prothrombin time/international normalized ration (PT/INR) decreased to 1.46, the fibrin degradation products (FDP) increased to $6.1 \mu\text{g}/\text{mL}$, and the fibrinogen was $353 \text{ mg}/\text{dL}$. Because her thrombocytopenia was thought to be a result of severe ITP or disseminated intravascular coagulation (DIC) associated with severe appendicitis, surgery was planned to take place before IVIg treatment. The patient received 10 units of platelet concentrates before surgery and an additional 10 units of platelet concentrates 1 h after surgical procedure was begun, to avoid problems with anesthesia and prevent excessive blood loss. The appendectomy was performed with a blood loss volume of 248 mL and without placement of a drainage tube. Fig. 3 shows the swollen appendix and abscess. On the first postoperative day, the patient’s WBC decreased, and the platelet count also decreased to $0.2 \times 10^4/\text{mm}^3$. The PT-INR increased to 1.64, the FDP increased to $14.5 \mu\text{g}/\text{mL}$, and fibrinogen was $237 \text{ mg}/\text{dL}$. IVIg treatment (20 g/day for 5 days) plus platelet transfusions were begun to treat the patient’s ITP, and gabexate mesylate plus plasma transfusions were administered for her DIC. The following day, the platelet count increased to $2.7 \times 10^4/\text{mm}^3$



Fig. 3. Macroscopic view of the resected swollen appendix. An abscess can be seen.

and her coagulation parameters improved. On the third postoperative day, her platelet count was $7.2 \times 10^4/\text{mm}^3$ and the coagulation factors had returned to normal levels. The patient subsequently made uneventful recovery and was discharged on the 14 days after her operation.

3. Discussion

Perioperative bleeding in patients with low platelet counts is a major risk for patients and an important surgical challenge. The mean platelet volume of ITP patients increases as the platelet count decreases, and the larger platelets are assumed to be younger and more reactive.^{9–11} Therefore, the bleeding time of ITP patients is usually shorter than expected for the degree of thrombocytopenia, and the severity of bleeding in ITP patients is less than that seen with comparable degrees of thrombocytopenia in bone marrow failure.¹² Several methods have been proposed to elevate the preoperative platelet count to the “safe” level. The survival time of transfused platelets is short, but the increase in platelet count can be expected to last for around 1 week following immunoglobulin infusion.¹³ Therefore, IVIg is an important agent for preoperative management of a planned surgical procedure. However, this treatment is not always effective, and a significant increase in the platelet count is usually not achieved until 2–3 days following initiation of treatment.^{5,14} Also, we can administer IVIg as postoperative therapy instead of preoperative therapy. Considering the possibility of its side effects (an allergic response, liver dysfunction, and acute meningitis, etc.), we choose to administer IVIg not as preoperative, but as postoperative therapy for our patient. This treatment enabled us to perform emergency surgery and achieve a good postoperative course.

Although the duration of hemostatic levels following transfusion is not long enough to be beneficial to ITP patients because of rapid destruction of the transfused platelets, an immediate increase in the platelet count can be achieved. A rapid increase in platelet count is important for emergency surgical operations. Some studies have demonstrated that platelet transfusions can allow successful emergency surgeries for patients with ITP without the administration of preoperative IVIg.^{6–8}

In the normal patient, transfusion of a single platelet concentrate would be expected to increase the platelet count to approximately $7000\text{--}11,000/\text{mm}^3/\text{m}^2$ body surface area, with a platelet half-life of about 4 days.^{15–18} Although platelet survival is shortened in ITP as a result of platelet destruction, Harker et al. found identical recovery values in patients with ITP; however, platelet survival as determined by peripheral platelet count, was reduced to 48–230 min.¹⁹ Baldini et al. concluded that there are only 2 major indications for platelet transfusions in patients with ITP: (1) temporary arrest of an acute life-threatening hemorrhage, or (2) as preparation for

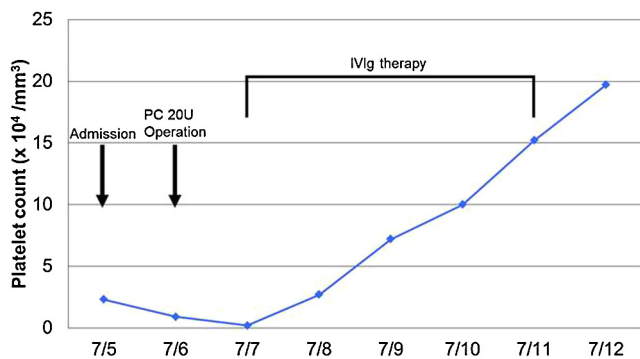


Fig. 2. Platelet counts during the clinical course. Immunoglobulin therapy was administered on the first postoperative day. The platelet count then gradually increased, and a maximum count ($19.7 \times 10^4/\text{mm}^3$) was seen on the eighth postoperative day.

surgery.²⁰ He recommended transfusing platelet concentrations 1–2 h before performing surgery.

Our patient received 10 platelet concentrates before surgery and 10 additional platelet concentrates 1 h after the procedure had begun. With this protocol, we were able to control bleeding during surgery.

No cases of appendicitis associated with ITP have previously been reported. We believe that the association of appendicitis and ITP was incidental in this case.

4. Conclusion

We have reported a patient with thrombocytopenia due to ITP who had undergone emergency surgery for appendicitis without receiving preoperative IVIg therapy. We believe that platelet transfusions are necessary for preoperative management of emergency surgical treatment for patients with thrombocytopenia, and that IVIg therapy is not always required for preoperative management. IVIg therapy seems to be suitable for postoperative management of emergency surgery in patients with ITP.

Conflicts of interest

Yoshitaka Toyomasu and other co-authors have no conflict of interest.

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Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

Y.T., R.S., H.M., D.E., K.I., F.K., Y.F., and T.M. are concerned in clinical treatment of the patient. Y.T., E.M., and H.K. edited and revised manuscript.

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