

Successful replantation of 2 digits in a patient with thrombocytosis after splenectomy

A case report

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Abstract

Introduction: Thrombosis is the most common complication of thrombocytosis, which can be particularly damaging to reattached digits. We present a guideline about digital replantation when thrombocytosis is expected.

Case presentation: We report a case of an 18-year-old man who sustained a traumatic amputation of two fingers and splenic rupture in a traffic accident. He underwent digital replantation the day after splenectomy when life-threatening conditions had been managed. The platelet count increased to over 1,300,000/mm³ and post-splenectomy reactive thrombocytosis was diagnosed. Hydroxyurea and anagrelide were administered to control the platelet count after consultation with a hematologist. The reattached fingers survived without any complication.

Conclusion: In patients with digital amputation, replantation can be attempted, even when thrombocytosis is expected, when requested by the patient. Furthermore, the platelet count should be actively controlled with medication to improve the survival rate of the reattached finger.

Abbreviations: cAMP = cyclic adenosine monophosphate phosphodiesterase, EDC = extensor digitorum communis, FDP = flexor digitorum profundus, PGE1 = prostaglandin E1.

Keywords: replantation, splenectomy, thrombocytosis, warm ischemia

1. Introduction

Digital replantation is one of the most challenging operations the plastic surgeon performs, requiring time- and labor-intensive microsurgery. However, not all patients with amputation undergo replantation. An absolute contraindication to replantation is acute life-threatening injury. Relative contraindications to replantation include systemic illness, poor anesthesia risk, mentally unstable patient, and prolonged warm ischemia time, among others.^[1] Whether to perform replantation or stump revision remains an open question. Moreover, the type of injury, smoking status, and age are also important factors when determining whether a patient is a candidate for digital replantation.^[1,2] However, there is no definite guideline about replantation when thrombocytosis is expected.

We present the case of an 18-year-old man whose amputated fingers survived after replantation despite reactive thrombocytosis after emergency splenectomy and 30 hours of warm ischemia.

Editor: N/A.

The authors declare no conflicts of interest.

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Medicine (2018) 97:22(e10951)

Received: 6 March 2018 / Accepted: 8 May 2018

<http://dx.doi.org/10.1097/MD.00000000000010951>

2. Methods

We obtained the patient's medical records and reviewed the related literature. Informed consent to participate in the study was obtained from the patient. This study was approved by the Chonnam National University Hospital Institutional Review Board.

3. Case report

An 18-year-old man presented to the emergency room of our hospital with abdominal and hand injuries due to a motorcycle accident. Physical examination and imaging studies revealed incomplete amputation of the left index and middle fingers (Fig. 1), in addition to a hemoperitoneum from a ruptured spleen. A general surgical team performed an emergency splenectomy under general anesthesia for the hemoperitoneum. After this life-threatening condition was managed and the patient had stable vital signs, finger replantation under brachial plexus block was planned.

After meticulous soft tissue debridement of the 2 fingers, open reduction, and bone fixation was performed using Kirschner wires (Fig. 2). After bone fixation, we sutured the flexor digitorum profundus (FDP) and extensor digitorum communis (EDC) of the index finger and EDC of the middle finger. The ulnar side digital artery, 2 dorsal veins, and 2 lateral digital nerves were then repaired in the index finger with end-to-end technique using Nylon 10-0 (monofilament polyamide 6, Ethilon, Ethicon). The ulnar side digital artery and 2 lateral digital nerves were repaired in the middle finger with end-to-end technique using Nylon 10-0. Vein grafts were performed in both fingers and skin closure was performed (Fig. 3A, B). The operation was technically successful but was performed after over 30 hours in warm ischemic conditions. We immediately started postoperative management with heparin 500 IU and prostaglandin E1 (PGE1) 10 µg/2 mL,



Figure 1. Preoperative photograph of the index and middle amputated fingers.

both once daily for 12 days, in addition to 500 mL dextran and warming with a heat lamp.

The platelet count started to increase the following day due to the effects of splenectomy, and exceeded the normal range on the fifth day. Post-splenectomy reactive thrombocytosis was diagnosed. The platelet count increased to over $1,300,000/\text{mm}^3$. We prescribed hydroxyurea and anagrelide to control the platelet count after consultation with a hematologist. A combination of hydroxyurea 1000 mg and anagrelide 1.0 mg was given twice a day. The platelet count returned to normal range 3 weeks after surgery.

Thrombosis is a common complication caused by an increased platelet count, but did not occur. The attached digits survived (Fig. 4) and the patient was discharged in satisfactory condition. Finger mobility and sensation returned to some extent with regular rehabilitation treatment.

4. Discussion

Reactive thrombocytosis is a condition in which the platelet count is increased by causes including inflammation, hyposplenism, asplenia, hemorrhage, iron deficiency, and drugs, among others. Splenectomy is also one of the major causes of reactive thrombocytosis. After splenectomy, the platelet count exceeds the normal range. However, excessive platelets can cause complications such as gastrointestinal bleeding or thrombosis. Treatment of reactive thrombocytosis includes platelet-reducing



Figure 2. Immediate postoperative radiograph.

medication and platelet pheresis.^[3] Over time, thrombocytosis resolves to some extent, and medication can be decreased or stopped.

Hydroxyurea reduces the platelet count and is used to prevent thrombosis, commonly in tandem with low-dose aspirin. Anagrelide is an orally administered imidazole-quinazoline derivative, and operates by a mechanism in which cyclic adenosine monophosphate phosphodiesterase (cAMP) is selectively inhibited to block platelet function.^[4]

The normal platelet count ranges between $150,000/\text{mm}^3$ and $450,000/\text{mm}^3$. In the present case, the platelet count increased to over $1,300,000/\text{mm}^3$ after splenectomy. Typically, arterial and venous circulation-related complications occur after splenectomy. Such complications include thrombosis, thromboembolism, vascular smooth muscle remodeling, vasospasm, and atherosclerosis.^[5] These are particularly damaging to reattached digits that are susceptible to thrombosis. The digital artery is prone to ischemia, which leads to necrosis in the extremity. This case was not an exception. The reattached digits were susceptible to ischemia due to thrombocytosis. To prevent this, hydroxyurea and anagrelide were administered after consultation with the department of hematology.

Immediate replantation was impossible due to splenectomy and the need to treat concomitant life-threatening traumatic



Figure 3. Postoperative photographs of the reattached fingers (A, B).

injury. Finger replantation was delayed, leading to a 30-hour warm ischemic time. Typically, only 12 hours under warm ischemic conditions or 24 hours under cold ischemic conditions is allowed for finger replantation. The success rate of replantation decreases if the ischemic time extends beyond these limits.^[6] Although the ischemic time was prolonged, the operation was attempted because the patient was young and the amputated fingers were functionally critical index and middle fingers; more importantly, the vital signs became stable after emergency splenectomy.

Several factors contributed to the survival of the replanted digits in this case. The first was venorrhaphy, which has been reported by many studies to increase the success rate of replantation.^[7] The second was the use of hydroxyurea and anagrelide. Other factors, such as use of heparin, PGE1, a heat lamp, and proper postoperative management also contributed to the survival of both digits in this case.^[4,7]

Even though thrombocytosis was expected, replantation succeeded. The results in our case may offer insights into methods that will guide policy-making strategies for better outcomes in patients with digital amputation.

5. Conclusion

Replantation can be attempted, even when thrombocytosis is expected, when requested by the patient. Furthermore, the platelet count should be actively controlled with medication to improve the survival rate of the reattached finger. These findings can be applied to the replantation of other body parts such as the hand, forearm, and upper arm.



Figure 4. Postoperative photograph at 3 months.

Author contributions

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