Case Report

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# Leech Application-related Upper Gastrointestinal Bleeding: A Case Report

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## ABSTRACT

Leech therapy (Hirudotherapy) is a method used in the treatment of many diseases since ancient times. Although many complications have been reported following the use of this method, no systemic life-threatening bleeding has yet been described. A-43-year-old male patient was diagnosed with upper gastrointestinal bleeding following leech application that he had received for infertility one week earlier. The complications of hirudotherapy typically spontaneously improve due to the local effects of this treatment. The most frequently reported complications are local infections, and less commonly allergies and prolonged local bleeding can occur. However, in this case report, we describe a life-threatening upper gastrointestinal bleeding as a new complication. Gastrointestinal bleeding appearing a week after leech therapy does not necessarily mean that leeches caused gastrointestinal bleeding in this case. Nevertheless, considering the development time of gastrointestinal bleeding, it can be deduced that it was possibly due to hirudotherapy. Patients should be informed about alarming symptoms that can indicate complications following leech application.

**Keywords:** Prolonged bleeding; Hirudotherapy bleeding; Hirudin bleeding; Complication of hirudotherapy.

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## Introduction

Upper gastrointestinal (GI) bleeding is defined as hemorrhage from the mouth to the ligament of Treitz. Common risk factors for upper GI bleeding include history of upper GI bleeding, anticoagulant use, high-dose nonsteroidal anti-inflammatory drug use, and older age [1]. Among the causes of upper GI bleeding are peptic ulcer bleeding, gastritis, esophagitis, variceal bleeding, Mallory-Weiss syndrome, and cancer [2]. The use of leeches for therapeutic purposes (hirudotherapy) was approved by the Food and Drug Administration in 2004 to ensure blood supply to the flap and salvage detached fingers, nose, and ears in plastic surgery. The complications of leech application typically improve due to the local effects on this treatment [3]. In the literature, the most frequently reported side effects

are local infections, with less common complications including allergies, prolonged local bleeding, and undesirable migration of the leech [4].

To the best of our knowledge, there is no reported case of successful leech application in the treatment of infertility. However, a 43-year-old male patient presented to our emergency department after having received leech therapy for this purpose. GI bleeding developed in the patient within a week after leech application. In this paper, we present this case to contribute to the literature.

## Case Report

A 43-year-old male patient presented with the complaints of fatigue for one day, fainting, cold sweats, and black stool for two days. The patient had no known disease or regular medication use. It was determined that he had received leech therapy in the lumbar and lower abdomen regions for infertility treatment a week earlier (Figures 1, 2). At the time of presentation, the patient's vital parameters were as follows: arterial blood pressure, 97/56mmHg; heart rate, 115/minute; oxygen saturation, 96%; and temperature, 35.3 °C. Sinus tachycardia was observed on electrocardiography. The patient was pale, cold, and sweaty on physical examination. Abdominal examination was normal. Melena was seen on rectal examination. There were five leech bites in the lumbar region and four leech bites in the suprapubic region. The hemoglobin value was 7.4 g/dl, mean erythrocyte volume was 89 fL, platelet count was 179 thousand u/L, activated partial thromboplastin time was 25.6 seconds, and prothrombin time was 1.1. The hemoglobin value was measured to be 6.1 one hour later. The liver and kidney function tests were normal. Hydration (saline at a rate of 500 mL per hour) and proton pump inhibitor infusion (pantoprazole, 80 mg intravenous push in 1 minute followed by 8 mg per hour) were given. Despite the intravenous supplementation of 0.9% saline infusion, hypotension persisted during his follow-up at the emergency department; therefore, group-specific erythrocyte and fresh-frozen plasma were ordered. The patient became stable during the infusion of the second unit of erythrocyte suspension. The patient was diagnosed with upper GI bleeding and admitted to the internal intensive care unit for follow-up and treatment. On gastroduodenoscopy, the gastric fundus, corpus, and antrum mucosa were hyperemic and edematous, while the pylorus and bulbus were deformed. During his follow-up at the hospital, no re-bleeding was observed. The patient was discharged without complications after seven days of follow-up.

## Discussion

In this paper, we presented a case of life-threatening upper GI bleeding after leech therapy was applied for infertility treatment. Prolonged bleeding in the leech-applied area has been frequently reported [3], but no life-threatening systemic bleeding has been described.

Although upper GI bleeding is more common in older men, it can also occur in middle-aged men, as in our case. The presence of peptic ulcers caused by helicobacter pylori, low-dose aspirin, and non-steroidal anti-inflammatory drugs is the most frequently implicated factor in the etiology of GI bleeding. However, our patient had neither regular medication use nor any previous ulcerated lesions or complaints. The development of upper GI bleeding after leech application suggested that the leech might have posed a risk for life-threatening bleeding in our patient with no previous risk factors.

Leeches deliver many bioactive substances to the host tissue during attachment [5]. The most famous of these proteins, hirudin, is a heparin-like molecule and the most potent natural inhibitor of thrombin [6]. Hirudin has anticoagulant effects, increases blood viscosity, and inhibits platelet adhesion [3]. A single bite of a leech disrupts the coagulation cascade, and patients treated with leeches may bleed hours or days later [7]. In our case, melena was found that developed five days after the leech application, in accordance with the literature.

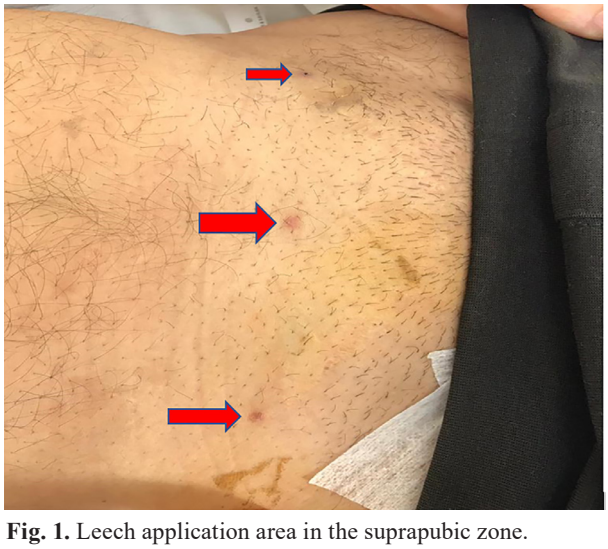

**Fig. 1.** Leech application area in the suprapubic zone.

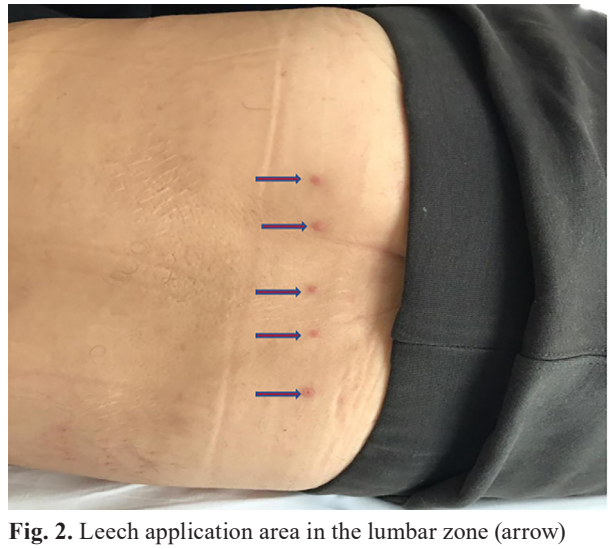

**Fig. 2.** Leech application area in the lumbar zone (arrow)

Similarly, this application involves the possibility of bleeding development due to acetylcholine in leech secretion that increases blood viscosity with a histamine-like molecule by suppressing platelet functions through calin, apyrase, and decorsin and acting as an anticoagulant through the factor 10a inhibitor, destabilase, new leech protein-1, Whitide, and Whitman in [7]. In our patient, the hemoglobin count was measured as 7.4 g/dl at the time of his presentation to the hospital. Shitaye & Shibabaw and Malihe *et al.* [8, 9] reported hemoglobin values to be as low as 3.1 g/dl in their pediatric patients. In the geriatric population, a female patient with a hemoglobin value of 4 g/dl was reported to have bleeding due to vaginal infestation [10]. Similarly, our middle-aged patient had a low hemoglobin level and required erythrocyte suspension infusion.

In a case reported by Zengin *et al.* [11], 130 leech bites were detected, and the prolonged prothrombin time and activated partial thromboplastin time were prolonged. A 19-year-old male patient described by İkizceli *et al.* [12] did not have any change in laboratory parameters, such as platelet count, prothrombin time, and activated partial thromboplastin time, although he developed bleeding from the leech application site that lasted for up to 18 hours. Similarly, in our case, the prothrombin time and activated partial thromboplastin time were in normal ranges. However, normal prothrombin and activated partial thromboplastin times may not exclude severe coagulation disorders. Hirudin and similar bioactive substances secreted by leeches can disrupt coagulation without affecting the results of coagulation tests.

In a patient that presented with stage 3 shock due to bleeding after leech application, Güven [13] stated that bleeding stopped after fresh frozen plasma and tranexamic acid treatment. In our case, the patient was given one unit of erythrocyte suspension and fresh frozen plasma and became stable while receiving the second unit of erythrocyte suspension. Cases benefitting from primary suturing after local bleeding have been previously reported [12, 13]. However, there is still a need for further studies on bleeding control after leech therapy.

Although it is not possible to conclude that the use of leeches causes GI bleeding in all patients receiving hirudotherapy, the development of GI bleeding one week after leech application in our case suggests that it was a related complication. Many algorithms have been developed to describe an adverse effect of an application or drug. Although none of these algorithms show 100% causality, the best indicator of causality within the hospital is the World Health Organization-Uppsala Monitoring Centre (WHO-UMC) system [14]. According to the WHO-UMC causality indicator, life-threatening bleeding after leech application can possibly be considered as an adverse effect [15]. Therefore, the possibility of life-threatening bleeding due to leech application should be kept in mind, and patients receiving leech therapy should be informed about possible complications and alarming symptoms that may pose a life risk due to bleeding.

## Declarations

**Ethics approval and consent to participate:** Informed consent was obtained from the patient.

**Consent for publication:** The authors provide consent for publication.

**Conflict of interests:** None declared.

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**Authors Contributions:** UCD: Conceived the case report; UCD: Managed the patient, contributed to materials and data collection UCD, SO, KB, MG: Drafted the manuscript. All the authors substantially contributed to the revision of the manuscript.

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