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Complications in Leech Therapy: How to Prevent and Manage Them

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Abstract

Medical Leech Therapy (MLT) is a traditional medical treatment method that utilizes leeches to bloodsuck and release saliva for the treatment of diseases. However, the use of living leeches for blood drinking may lead to a series of adverse reactions and complications, which may have a negative impact on the patient's health. This article provides a summary of the complications associated with leech therapy in recent years, along with corresponding mitigation measures. The information presented aims to offer medical practitioners using leech therapy a point of reference.

Searching Pubmed database in the past 15 years (2008 to 2023), English articles were retrieved with "Leech", "Leeche", "Leech Therapy", "Leeching", "Hirudinea", "Hirudineas", "Hirudotherapy" as keywords. We have identified a total of 19 articles that explicitly discuss complications of leech therapy and their corresponding management measures. The majority of the relevant articles consist of case reports. Among these, 6 articles documented post-treatment infections (46 cases), 3 articles reported skin allergies (42 cases), 4 articles described prolonged bleeding (7 cases), and 3 articles cutaneous pseudolymphoma (4 cases), while 4 articles covered various other complications (4 cases). We have summarized the treatment approaches for these complications. Leech therapy, as a traditional medical approach, does offer certain benefits for specific conditions or symptoms. However, its administration should be conducted under the supervision of medical professionals. It's imperative to emphasize the prevention of complications and the implementation of appropriate treatment measures to enhance the safety of leech therapy.

Keywords: *medical leech, leech therapy, complication, prevent ,Manage.*

1. INTRODUCTION

Medicinal Leech Therapy (MLT) is a treatment method of traditional medicine that applies medical leeches to treat diseases by attaching leeches to the diseased area and treating the related diseases through the saliva secreted by the leeches when they suck blood [1,2]. According to the literature, the first application of living leeches in medicine was in ancient Egypt.

The therapeutic application of leeches reached its peak in the 17th century [3,4]. However, with the development of modern medicine, the use of leeches in medicine has greatly decreased [5]. Nevertheless, leech therapy is still used in some cases by some physicians for the treatment of specific diseases, especially in rehabilitation after some orthopedic surgeries. Leech therapy mainly treats related diseases through the saliva secreted by leeches

when they suck blood, and in this process, three effects are produced, which are reflex effect, physical effect, and biological effect, among which the biological effect is the most important factor in leech therapy, and the biological effect is mainly produced by a variety of active ingredients contained in the leech saliva. However, leech saliva as a foreign substance may also bring various adverse reactions to patients and may even bring various dangers [6, 7, 8]. Therefore, this paper summarizes the complications and treatments of leech therapy through a literature review, aiming to improve the safety of leech therapy.

2. MATERIALS AND METHODS

English articles searched in the Pudmeb database with keywords "Leech", "Leeche", "Leech Therapy", "Leeching", "Hirudinea", "Hirudineas", "Hirudotherapy" etc. up to July 31, 2023, were identified. The literature was categorized and read to screen the literature that explicitly mentioned the complications of leech therapy and its therapeutic measures, and the collected results were analyzed and discussed.

3. RESULTS

19 related articles, mostly case reports, were until 2022 Based on the findings of Studies, articles were categorized into five categories of infection, prolonged bleeding, allergy, Cutaneous pseudolymphoma, and other complications.(Figure1)

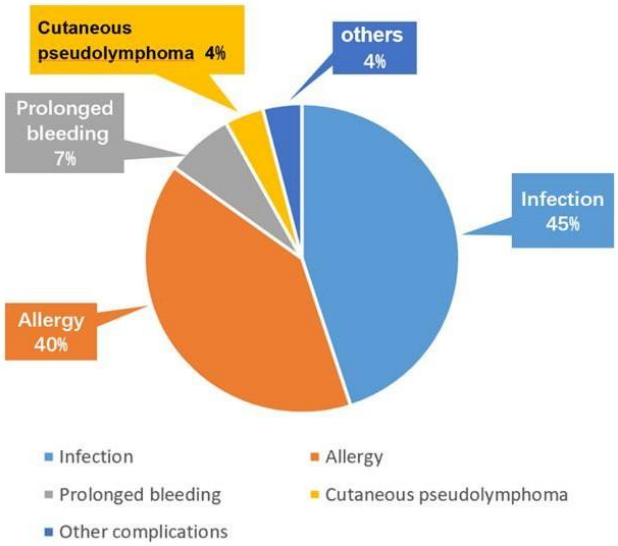

Figure 1. Frequency of Adverse reactions

Table 1. Statistical table of literature data

Complications	Articles number	Cases	Treatment methods	Year
Infection	6	46	Antibiotics and surgical treatment are used. It is recommended to consider prophylactic antibiotic use and the use of qualified medical leeches.	2012 2013 2014 2019 2022
Prolonged bleeding	4	7	Wound closure. It is Recommended to closely observe the wound condition and handle it promptly.	2009 2012 2020 2021
Allergy	3	42	Topical and oral administration of loratadine tablets. It is recommended to use antihistamines preventively.	2016 2014
Cutaneous pseudolymphoma	3	4	Oral administration of dexamethasone and topical	2013 2019 2020

				application of mometasone cream.	
Other	Kounis syndrome	1	1	----	2014 2016
	Syncope	1	1	Drink water before treatment	
	Enlarged local lymph nodes	1	1	----	
	Gangrenous pyoderma	1	1	Treatment with sulphasalazine enteric-coated tablets and prednisolone.	

4. INFECTION

After leech therapy, post-treatment complications involving infection were reported in 6 articles, encompassing a total of 46 cases. Four studies identified infections caused by Aeromonas hydrophila, one by Escherichia coli, and one by an unidentified pathogen All were bacterial infections after leech therapy [9-14]. The most common pathogen was Aeromonas hydrophila. Cases of Aeromonas hydrophilus infection were mostly seen in patients treated with leeches for skin flap congestion, and once the infection occurred, they were all more severe. The investigators recommended close observation of the patient's condition changes and anti-infective treatment with sensitive antibiotics. For instance, Abbas at the Department of Dermatology, Rasoul-e Akram Hospital, Iran University of Medical Sciences, Tehran, Iran, was successful in improving the infection status of patients after undergoing leech therapy by oral ciprofloxacin and topical application of 2% erythromycin solution [9]. A review of the literature showed that ciprofloxacin is a commonly used antibiotic for the treatment of leech-associated infections [15].

Despite the fact that antibiotics are a great tool in the treatment of leech-associated infections, we are still facing the problem of antibiotic resistance. Carman reported a case of ciprofloxacin-resistant Aeromonas hydrophila infection at the surgical site after leech therapy at David Geffen School of Medicine, where Aeromonas hydrophila in the intestinal tract of leeches used in the case had reduced susceptibility to ciprofloxacin [11]. Therefore, when using leech therapy, we may need to consider the use of other antibiotics to prevent leech infection problems. In addition, the use of qualified medical leech therapy is a fundamental measure to avoid bacterial infections.

5. ALLERGY

Our results showed some degree of allergic conditions in three articles mentioning leech therapy [16-18]. This specifically included varying degrees of itching and rash, edema, and localized redness of the skin. The itching was the most frequently reported condition, and Kosta et al. found that 37.3%-75% of patients treated with leeches experienced mild localized itching at the site of the "Y"-shaped bite, which could last from a few hours to three days [17].

In most cases of mild or even moderate itching, allergy symptoms improve on their own without any treatment. Cold compresses, such as those containing 5% potassium permanganate, 10% baking soda paste, and Fenistil gel, can be applied to the skin's irritated areas when there is significant itching. However, it is vital to take into account the use of local corticosteroids and oral antihistamine drugs in severe cases of generalized itching.

6. PROLONGED BLEEDING

Compounds such as hirudin, which is unique to leech saliva, is a potent anticoagulant with a strong anticoagulant effect [19] and has a short-lived antithrombin effect on the human body. Therefore, prolonged bleeding has become one of the most common complications in the application of living leech therapy.

In our analysis, a total of 4 cases were included in this category, involving 7 cases [20-23]. In general, bleeding from wounds produced after leech therapy can be stopped by compression of the wound with a compression dressing such as sterile gauze, which can achieve good results [12, 15]. However, when the bleeding persists for more than 48 hours and does not stop despite compression with a tight bandage, it has been reported in the literature that treatment is achieved by suturing the wound under local anesthesia[16].

The duration of bleeding after leech therapy is related to individual differences in the patient's constitution and their medical conditions, such as the presence of coagulation disorders, co-morbidities that cause bleeding, diabetes mellitus, and so on. Therefore, to avoid prolonged bleeding, it is important to know the patient's medical history and perform appropriate blood tests before leech therapy.

7. CUTANEOUS PSEUDOLYMPHOMA

Cutaneous pseudolymphoma is a rare complication of leech therapy, mostly reported in recent years. Our results showed a total of 4 cases of cutaneous pseudolymphoma induced by leech bites after living leech therapy [29-32]. Cutaneous pseudolymphoma is a lymphoproliferative disease with clinical manifestations or histopathology similar to cutaneous lymphoma but with benign biological behavior. For the treatment of cutaneous pseudolymphoma, Mozhdeh et al. used having patients take oral prednisolone and applying mometasone furoate cream, and Susanne et al. used mometasone furoate cream alone with good therapeutic results [29, 30].

8. OTHER COMPLICATIONS

Some complications are extremely rare but should not be ignored all the same. Anahita et al. reported a case of gangrenous pyoderma following leech therapy in a patient with ulcerative colitis [33]. Fortunately, the patient's symptoms improved with a combination of sulfasalazine enteric-coated tablets and prednisolone. Although complications such as Kounis syndrome[34], syncope[35], and enlarged local lymph nodes[36] have been reported in the literature, all of which are case reports, these experiences provide a good reference for recognizing the complications of leech therapy.

9. DISCUSSION

Leech therapy is one of the oldest therapies in the history of medicine. Leeches were officially authorized as a disposable medical device with venous stasis-relieving and anticoagulant qualities by the U.S. Food and Drug Administration in June 2004 [37]. The main indications for leech therapy are chronic joint diseases such as osteoarthritis and epicondylitis, and venous diseases [38]. However, the application of a living leech biting the human body for bloodletting therapy involves some risks that are difficult to control. Therefore the safety of leech therapy is controversial in modern medicine. This paper comprehensively analyzes 19 reported complications and their treatments resulting from the application of medical leech therapy, to provide a reference for clinicians to apply leech therapy and to improve the safety of leech therapy.

Studies have shown that leech therapy has thrombolytic, anticoagulant, circulation-enhancing, anti- inflammatory, and analgesic properties [39]. The results of the study showed that wound bleeding was the most common complication after the application of medicinal leech therapy. Generally, because leech saliva contains anticoagulant active compounds such as hirudin, wound bleeding brought about by leech bites during the application of leech therapy is unavoidable. In most cases, these wounds stop bleeding by applying pressure through sterile gauze for 12-24 hours. However, in a few cases, when bleeding persists uncontrollably for more than 48 hours, wound closure to stop bleeding. And if necessary, blood transfusion needs to be considered. Therefore, we suggest that when applying leech therapy, it should first be clarified whether the patient has blood-related diseases and leech therapy should be contraindicated in patients with coagulation disorders.

Aeromonas hydrophila is a common Gram-negative bacterium belonging to the genus Aeromonas, which is a member of the Pseudomonas family. It is widely distributed in the natural environment and can be found in various habitats such as soil, water bodies, and plant rhizospheres. Additionally, it is a symbiotic bacterium in the gut of leeches [40]. Antibiotics have revolutionized modern medicine in just over 100 years since the introduction of the first antibiotic, salvarsan, in 1910 [41]. Fluoroquinolones and ciprofloxacin are important antibiotic drugs, of which ciprofloxacin is widely recognized as a prophylactic measure in patients receiving leech therapy to prevent Aeromonas hydrophila infections in the intestines of leeches [42, 43]. In addition to Aeromonas hydrophila infections, there are a number of common pathogenic bacterial infections that may be due to the use of non-purified leeches. Alternatively, bacterial infections may result from patient comorbidities such as diabetes mellitus and improper post- treatment care. However, it is worth noting that although feeding medicinal leeches with ciprofloxacin can eliminate Aeromonas hydrophila in the intestine of leeches to a certain extent, this method may lead to a decrease in the sensitivity of Aeromonas hydrophila in the intestine of leeches to ciprofloxacin, resulting in drug resistance. Therefore, when using leeches, we should consider using a combination of antibiotics to prevent Aeromonas hydrophila infections, such as fluoroquinolones or tetracyclines. In addition, strengthening daily wound care after applying leech therapy, such as flushing the wound with hydrogen peroxide and covering the wound with a sterile dressing until healing, are also effective measures to avoid wound infection.

When applying leech therapy, leech saliva enters the human bloodstream. Leech saliva contains dozens of components such as hirudin, carboxypeptidase inhibitors, acetylcholine, and histamine-like substances [44]. Although these ingredients may play a positive role in certain human diseases, they can also cause allergic reactions such as rashes and itching. In this regard, we recommend that patients be given anti- allergy medications such as loratadine prior to in-living leech treatment to prevent the development of allergic symptoms. For itchy areas, hormonal ointments can be applied to the itchy areas. For certain allergy-prone patients, living leech treatment should be used with caution.

Proper selection of the treatment site is also important to avoid adverse effects. Leeches are usually used on different parts of the body, mostly on lesions. However, it is not reasonable to use leeches on sensitive areas such as the eyes, the face (leech-induced scars are aesthetically displeasing), or certain areas where bandaging is not convenient, which we do not think should be used as a site for leech treatment. Seyed- Hashem et al. reported a case of leech therapy directly on the eye which resulted in a subconjunctival hematoma [45]. Although, after topical antibiotics and corticosteroid medication, this patient experienced improved relief of symptoms.

Although many cases have shown that leech therapy is magical and efficient for some diseases, in some cases, leech therapy is prohibited. The contraindications of leech therapy include arterial insufficiency, hemophilia, hemorrhagic constitution, hematological malignancies, diabetes, anemia, hypotension, and sepsis. The use of leech therapy is not recommended during pregnancy and lactation, unstable medical conditions, history of leech allergy or severe hypersensitivity, susceptibility to scarring, and use of anticoagulants and immunosuppressants [46]. Gunalp et al. reported the development of ulcers, necrosis, and other symptoms and gangrene and other wounds as a result of leech bite in a patient with peripheral arterial disease who was treated with leeches [47]. In China, Gan Xiuhua and others reported a case of an elderly man with a history of diabetes mellitus who developed ulceration of the hand after treatment with leeches, forming a chronically infected cavity-type wound, in which cell culture of the wound secretions revealed Streptococcus measles twins, Streptococcus constellatus subspecies. The wound healed completely after more than 40 days of debridement and anti-inflammatory treatment[48]. These cases tell us that leech therapy should be carried out in strict compliance with diagnostic and therapeutic protocols and that clinicians using leech therapy must be aware of the contraindications to leech therapy and post- treatment care, which are crucial to the safety of leech therapy.

In summary, we need to weigh the risks and benefits of choosing leech therapy. When applying leech therapy, enough attention should be paid to complications. Leech therapy must be applied under the supervision of a physician and positive measures must be taken to minimize complications and improve the safety of leech therapy.

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