

## A Rare Case of Leech Therapy Induced Right Foot and Leg Cellulitis with Septic Shock

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### Abstract

A 57 year old female came to emergency department with complaint of pain and swelling over right foot and leg distally. On local examination there was multiple scar marks with redness and blisters formation. Patient was also giving complaint of discharge from the site since night yesterday. On further examination the patient was conscious and little drowsy but in arousable state. On further evaluation, the patient was hypotensive with tachycardia and tachypnoea.

Patient was known case of Arthritis and Hypothyroidism. On further assessment attendants gave history of Leech therapy over right foot and leg distally since 20 days prior coming to emergency department. The leech therapy was started at an Ayurvedic hospital for detoxification from steroid. Patient was on steroids since long time for arthritis and she was told in ayurvedic hospital that leech therapy will detoxify her blood and remove excess steroids from her body. Patient was immediately taken on to symptomatic supportive treatment with intravenous antibiotics, intravenous fluids and ionotropic support. All relevant investigations sent from emergency department and patient was admitted in Intensive Care Unit for observation. Patient was discharged after 5 days in haemodynamically stable condition.

**Keywords:** Cellulitis; Septic shock; Leech therapy (Hirudomedicinalis).

### INTRODUCTION

**Cellulitis:** It is a bacterial infection that is usually caused by streptococcus and sometimes staphylococcus. It usually affects dermis and subcutaneous tissues. A minor skin breach may serve as source of infection but it may occur without any injury to the skin. Cellulitis may be characterized as warm and erythematous skin with poorly defined

edge. Occasionally lymphatic vessels may be involved and patient may present with fever and feeling of tiredness and may be associated with lymphangitis and lymphadenopathy. Treatment is done with oral or intravenous antibiotics. Complication may include abscess formation, fasciitis, sepsis and even septic shock.

**Septic Shock:** Is defined as a fatal medical condition which is characterized by:

Persisting hypoperfusion despite initial fluid challenge. Mean arterial pressure <65 mmHg or systolic blood pressure <90 mmHg. Reduction of >40 mmHg of patient's normal range of systolic blood pressure. Lactate levels >4 mmol/L. Initially the infection may be caused due to fungi, viruses and parasites but bacteria (gram positive bacteria) are most common of them leading to primary infection. It can be located anywhere in the body but most

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commonly found in abdominal organs, urinary tract, lungs, brain and skin. It can also lead to MODS that is multiple organ dysfunction syndrome and can further lead to death. Such patients are generally admitted in intensive care unit. The mortality rate with septic shock is 25-50% approximately.

**Leech therapy:** *Hirudo medicinalis* is one of several different species of medicinal leeches used for therapy. General morphology of medicinal leeches is mostly same as of other leeches. They can be up to 20 cm in length, greenish brown in colour with darker shade dorsally. They have anterior and posterior suckers. While sucking out the blood they inject anticoagulant (hirudin) present in their saliva. Their saliva consists of 60 different proteins. These proteins serve as anticoagulants, platelet aggregation inhibitors, vasodilators, proteinase inhibitors. Their saliva may also have anesthetic property as leech bite is generally painless. The leech therapy was in trend in ancient times and their uses decrease as we became more advanced in medicinal field. Medicinal leech therapy made an international comeback in 1970's especially in the field of microsurgery, reconstructive surgery, varicose veins, thrombophlebitis, osteoarthritis and many other medical conditions. After detachment of the leech there is continued and steady bleeding from the wound left after, that is the therapeutic effect of leech therapy in association with anaesthetizing, anti-inflammatory and vasodilatory effect of leech saliva. Prolonged bleeding is the most common complication of leech therapy. Also some serious allergic reactions and bacterial infection may occur that can be managed by immediate medical treatment and may lead to hospital admission.

## CASE STUDY

A 57 year old female came to emergency department with complaint of pain and swelling over right foot and leg distally. On local examination there was multiple scar marks with redness and blisters formation. Patient was also giving complaint of discharge from the site since night yesterday. On further examination the patient was conscious and little drowsy but in arousable state. On further evaluation, the patient was hypotensive with tachycardia and tachypnoea.

Patient was known case of Arthritis and Hypothyroidism. On further assessment attendants gave history of Leech therapy over right foot and leg distally since 20 days prior coming to emergency department. The leech therapy was started at an Ayurvedic hospital for detoxification from steroid. Patient was on steroids since long time for

arthritis and she was told in ayurvedic hospital that leech therapy will detoxify her blood and remove excess steroids from her body. Patient was immediately taken on to symptomatic supportive treatment with intravenous antibiotics, intravenous fluids and inotropic support. All relevant blood investigations sent from emergency department and patient was admitted in Intensive Care Unit for observation. Patient was discharged after 5 days in haemodynamically stable condition.

## Course in the Hospital and Outcome

A 57 year old female came to emergency department with complaint of pain and swelling over right foot and leg distally. On local examination there was multiple scar marks with redness and blisters formation. Patient was also giving complaint of discharge from the site since night yesterday. On further examination the patient was conscious and little drowsy but in arousable state. On further evaluation, the patient was hypotensive with tachycardia and tachypnoea.

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patient was advised for admission in intensive care unit for wound debridement. Later on pus culture report suggestive of presence of Streptococcus Pyogenes. After pre anesthetic check-up a large wound debridement done. Post op period was remain uneventful. Patient was observed for 5 days daily dressings and limb elevation and was discharged after 5 days in haemodynamically stable condition.

## DISCUSSION AND THERAPEUTIC CONSIDERATIONS

There is wide variety of leeches existing but not all are used for medicinal purposes. Some of the medicinal leeches are *Hirudo Medicinalis*, *H. Orientalis*, *H. Troctina*, *H. Verbana*. Leech therapy was used frequently in ancient times but their use diminished with development in the field of allopathic medicine. As we discussed above that leech saliva contains many proteins which have beneficial effect for humans as it have properties of anticoagulant, anti-inflammation, vasodilatation, and anesthesia, which can be for treatment in many diseases for example in microsurgery, reconstructive surgery, varicose veins, thrombophlebitis, osteoarthritis. But we need to proceed with leech therapy very hygienically because in absence of hygiene or with wrong practice it can leech therapy can lead to severe allergic reactions and/or bacterial infection and serious conditions which can further lead to hospitalization and even death.

## CONCLUSION

*Why should an emergency physician be aware of poor outcomes related to Leech therapy:* As we discussed above that leech saliva contains many proteins which have beneficial effect for humans as it have properties of anticoagulant, anti-inflammation, vasodilatation, and anesthesia, which can be for treatment in many diseases for example in microsurgery, reconstructive surgery, varicose veins, thrombophlebitis, osteoarthritis. In India at many places peoples are taking Ayurveda treatment where leech therapy is used to treat them. If the patients don't get hygienic condition or if leech therapy is practiced in the environment that is not hygienic or if breeding of leeches used for treatment is not carried in medically approved conditions, it can all lead to cause sepsis, septic shock, severe allergic reactions, bacterial infections and other life threatening condition that can lead to hospitalization and even death. So if any patient coming with such background as an emergency

physician we have to always look for to rule out life threatening conditions for example sepsis, septic shock, cellulitis, abscess, hypotension etc and to proceed the treatment accordingly.

## REFERENCES

1. Judith E. Tintinalli, J. Stephan Stapczynski, O. John Ma, Donald M. Yealy, Garth D. Meckler, David M. Cline. Tintinalli's Emergency Medicine, 8th ed. United States: McGraw-Hill Education; 2016.
2. Utevsky, S.; Zigmajster, M.; Trontelj, P. (2014). "Hirudomedicinalis". IUCN Red List of Threatened Species. 2014: e.T10190A21415816. doi:10.2305/IUCN.UK.2014-1.RLTS.T10190A21415816.en. Retrieved 19 November 2021.
3. Buczyński, Paweł; Tończyk, Grzegorz; Bielecki, Aleksander; Cichońska, Joanna M.; Kitowski, Ignacy; Grzywaczewski, Grzegorz; Krawczyk, Rafał; Nieoczym, Marek; Jabłońska, Aleksandra; Pakulnicka, Joanna; Buczyńska, Edyta (April 2014). "Occurrence of the medicinal leech (*Hirudomedicinalis*) in birds' nests". *Biologia*. 69 (4): 484–488. doi:10.2478/s11756-014-0329-0. ISSN 0006-3088.
4. "Biology". *Sangues Medicinales*. Ricarimpex. Archived from the original on October 10, 2018. Retrieved November 26, 2012.
5. Brockbank, William (1952). *Portrait of a Hospital*. London: William Heinemann. p. 73.
6. Altman, Lawrence K. (February 17, 1981). "The doctor's world; leeches still have their medical uses". *The New York Times*. p. 2.
7. "Applications in General Medicine". *Sangues Medicinales*. Ricarimpex. Archived from the original on March 6, 2013. Retrieved November 26, 2012.
8. Salleh, Anna. A mechanical medicinal leech? ABC Science Online. December 14, 2001. Retrieved on July 29, 2007.
9. Fox, Maggie. "ENT Research Group Recognized for Mechanical Leech Project". Otoweb News. University of Wisconsin, Madison, Division of Otolaryngology. Archived from the original on December 11, 2006. Retrieved December 16, 2013.
10. "Product Classification: Leeches, Medicinal". [www.accessdata.fda.gov](http://www.accessdata.fda.gov). Retrieved 19 August 2019.
11. Sket, Boris; Trontelj, Peter (2008). "Global diversity of leeches (*Hirudinea*) in freshwater". *Hydrobiologia*. 595 (1): 129–137. doi:10.1007/s10750-007-9010-8. S2CID 46339662.
12. Fogden, S.; Proctor, J. (1985). "Notes on the

- Feeding of Land Leeches (*Haemadipsazeylanica* Moore and *H. picta* Moore) in GunungMulu National Park, Sarawak". *Biotropica*. 17 (2): 172–174. doi:10.2307/2388511. JSTOR 2388511.
13. Siddall, Mark E. (1998). "Glossiphoniidae". American Museum of Natural History. Retrieved 1 May 2018.
  14. Meyer, Marvin C. (July 1940). "A Revision of the Leeches (Piscicolidae) Living on Fresh-Water Fishes of North America". *Transactions of the American Microscopical Society*. 59 (3): 354–376. doi:10.2307/3222552. JSTOR 3222552.
  15. "Leeches". Australian Museum. 14 November 2019. Retrieved 3 June 2020.
  16. Meir, Rigbi; Levy, Haim; Eldor, Amiram; Iraqi, Fuad; Teitelbaum, Mira; Orevi, Miriam; Horovitz, Amnon; Galun, Rachel (1987). "The saliva of the medicinal leech *Hirudomedicinalis*—II. Inhibition of platelet aggregation and of leukocyte activity and examination of reputed anaesthetic effects". *Comparative Biochemistry and Physiology C*. 88 (1): 95–98. doi:10.1016/0742-8413(87)90052-1. PMID 2890494.
  17. Siddall, Mark; Borda, Liz; Bureson, Gene; Williams, Juli. "Blood Lust II". Laboratory of Phylohirudinology, American Museum of Natural History. Retrieved 15 December 2013.
  18. "Proverbs 30:15 | Ellicott's Commentary for English Readers". BibleHub. Retrieved 27 April 2018.
  19. Payton, Brian (1981). Muller, Kenneth; Nicholls, John; Stent, Gunther (eds.). *Neurobiology of the Leech*. Cold Spring Harbor Laboratory. pp. 27–34. ISBN 978-0-87969-146-2.
  20. Lamarck, Jean-Baptiste (1818). *Histoire naturelle des animaux sans vertèbres ... précédée d'une introduction offrant la détermination des caractères essentiels de l'animal, sa distinction du végétal et des autres corps naturels, enfin, l'exposition des principes fondamentaux de la zoologie*. Volume 5. Vol. 5. Paris: Verdière.
  21. Phillips, Anna J.; Dornburg, Alex; Zapfe, Katerina L.; Anderson, Frank E.; James, Samuel W.; Erséus, Christer; Moriarty Lemmon, Emily; Lemmon, Alan R.; Williams, Bronwyn W. (2019). "Phylogenomic Analysis of a Putative Missing Link Sparks Reinterpretation of Leech Evolution". *Genome Biology and Evolution*. 11 (11): 3082–3093. doi:10.1093/gbe/evz120. ISSN 1759-6653. PMC 6598468. PMID 31214691.
  22. Thorp, James H.; Covich, Alan P. (2001). *Ecology and Classification of North American Freshwater Invertebrates*. Academic Press. p. 466. ISBN 978-0-12-690647-9.
  23. Buchsbaum, Ralph; Buchsbaum, Mildred; Pearse, John; Pearse, Vicki (1987). *Animals Without Backbones* (3rd ed.). The University of Chicago Press. pp. 312–317. ISBN 978-0-226-07874-8.
  24. Mory, Robert N.; Mindell, David; Bloom, David A. (2014). "The Leech and the Physician: Biology, Etymology, and Medical Practice with *Hirudineamedicinalis*". *World Journal of Surgery*. 24 (7): 878–883. doi:10.1007/s002680010141. hdl:2027.42/42411. ISSN 0364-2313. PMID 10833259. S2CID 18166996.
  25. anon (2016). *Medicine: The Definitive Illustrated History*. Dorling Kindersley. p. 35. ISBN 978-0-241-28715-6.
  26. Adams, Stephen L. (1988). "The Medicinal Leech: A Page from the Annelids of Internal Medicine". *Annals of Internal Medicine*. 109 (5): 399–405. doi:10.7326/0003-4819-109-5-399. PMID 3044211.
  27. Michalsen, A.; Moebus, S.; Spahn, G.; Esch, T.; Langhorst, J.; Dobos, G.J. (2002). "Leech therapy for symptomatic treatment of knee osteoarthritis: Results and implications of a pilot study". *Alternative Therapies in Health and Medicine*. 8 (5): 84–88. PMID 12233807.
  28. Sawyer, R. T. (1970). "Observations on the Natural History and Behavior of *Erpobdellapunctata* (Leidy) (Annelida: Hirudinea)". *The American Midland Naturalist*. 83 (1): 65–80. doi:10.2307/2424006. JSTOR 2424006.
  29. Sig, A. K.; Guney, M.; UskudarGuclu, A.; Ozmen, E. (2017). "Medicinal leech therapy – an overall perspective". *Integrative Medicine Research*. 6 (4): 337–343. doi:10.1016/j.imr.2017.08.001. PMC 5741396. PMID 29296560.
  30. Gelder, Stuart R.; Gagnon, Nicole L.; Nelson, Kerri (2002). "Taxonomic Considerations and Distribution of the Branchiobdellida (Annelida: Clitellata) on the North American Continent". *Northeastern Naturalist*. 9 (4): 451–468. doi:10.1656/1092-6194(2002)009[0451:TCADO T]2.0.CO;2. JSTOR 3858556.
  31. Haycraft, John B. (1883). "IV. On the action of a secretion obtained from the medicinal leech on the coagulation of the blood". *Proceedings of the Royal Society of London*. 36 (228–231): 478–487. doi:10.1098/rspl.1883.0135.
  32. Dziekońska-Rynko, Janina; Bielecki, Aleksander; Palińska, Katarzyna (2009). "Activity of selected hydrolytic enzymes from leeches (Clitellata: Hirudinida) with different feeding strategies". *Biologia*. 64 (2): 370–376. doi:10.2478/s11756-009-0048-0.
  33. Fischer, Karl-Georg; Van de Loo, Andreas; Bohler, Joachim (1999). "Recombinant hirudin (lepirudin) as anticoagulant in intensive care patients treated with continuous hemodialysis". *Kidney International*. 56 (Suppl. 72): S46–

- S50. doi:10.1046/j.1523-1755.56.s72.2.x. PMID 10560805.
34. Smith, Douglas Grant (2001). Pennak's Freshwater Invertebrates of the United States: Porifera to Crustacea. John Wiley & Sons. p. 305. ISBN 978-0-471-35837-4.
35. Schnell, Ida Bærholm; Thomsen, Philip Francis; Wilkinson, Nicholas; Rasmussen, Morten; Jensen, Lars R. D.; Willerslev, Eske; Bertelsen, Mads F.; Gilbert, M. Thomas P. (2012). "Screening mammal biodiversity using DNA from leeches". *Current Biology*. 22 (8): R262-R263. doi:10.1016/j.cub.2012.02.058. ISSN 0960-9822. PMID 22537625

