

Water Drinking Habits and Leech Infestation

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ABSTRACT

Aims: To assess the common presentations of leech infestation in leech endemic areas of Pakistan and to establish its association with unsafe water drinking habits of the individual.

Design: It was a cohort study.

Place and duration of study: Study was carried out at Avicenna Hospital Bedian road Lahore between 20th March 2012 and 25th August 2014

Methods: 14 patients with leech infestation who reported to ENT department of Avicenna Hospital during the above period were selected for study. A specific comparison of their water drinking habits was made with a control group of 42 normal individuals who had come from the same leech endemic area as the first group and belonged to the same socio-economic class.

Results: 12 cases (83.4%) in the first group had *unsafe water drinking habit* i.e. they drank water directly from marshes without seeing its contents substituting cupped palm of hand for a drinking cup. This was in contrast to the control group where only 6 individuals (14%) gave a history of unsafe water drinking habits. Nose was the most common ENT site of leech infestation (71%) with epistaxis being the most prominent symptom. Other sites included hypopharynx (14%), nasopharynx (7%) and oropharynx (7%). All the 14 cases with leech infestation were males, 26.09 years being the mean age. The main objective of the study i.e., to establish a clear association between patient's unsafe water drinking habits and leech infestation in ENT region was statistically achieved with odds ratio being 36.

Conclusion: Epistaxis or any other related symptom must be taken with suspicion in leech endemic area. As this condition is closely associated with unsafe water drinking habits therefore the incidence of this infestation can be significantly reduced by educating the individuals to adopt safe water drinking habits.

Keyword: Leech, Water drinking habits, Epistaxis

INTRODUCTION

Leeches are blood-sucking worms with segmental bodies. They belong to the same classification of worms as earthworms and certain oceanic worms¹. Due to their blood sucking and other properties, leeches have been used for centuries in variety of medical conditions. Based on ancient concepts, bloodletting was considered as remedy of many diseases to a great extent. Leeches were placed at anus or in the nose to imitate bleeding of hemorrhoids or nose bleeds, which were considered natural resources of body to cope with disorders of humours. They were used around external ear and in ophthalmology for a variety of ailments². Even in modern medicine leeches have been described very frequently in literature for various medical procedures. Leeches used for this purpose were raised in the laboratory under sterilized conditions to prevent patients from infection. The two species of therapeutic leeches used were *Hirudo michaelseni* and *Hirudo medicinalis*³. These leeches have been used for relief of pain especially that of osteo-

arthritis⁴. Their blood sucking effect has been made use of in treating venous congestion in venous congested flaps in plastic surgery^{5,6}. They have also been described in re-plantation of avulsed pinna, substituting leech for venous anastomosis⁷, to rescue a traumatic nasal flap from venous congestion and loss⁸ and also in penile re-plantation⁹. Leech saliva has been described as having strong anti-coagulant properties enabling its use to reduce swelling of a swollen body part in variety of situations¹⁰. They have even been used in management of massive scrotal haematoma¹¹, Sublingual haematoma¹², and for post-operative life threatening macroglossia¹³. Pathological leech infestation has virtually been eradicated from the developed world mainly due to improved environmental and personal hygiene. Any case of leech infestation in developed world is therefore often viewed as a rare surprise¹⁴. However in certain remote areas of Pakistan where clean drinking water facilities are still not available, leech infestation in ENT region is still seen and reported¹⁵.

MATERIAL AND METHODS

This Cohort study was conducted at ENT department of Avicenna Hospital Lahore between 20th March

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2012 and 25th August 2014. Two groups of individuals were studied. The first group consisted of all the patients reporting to ENT department of Avicenna Hospital during the above period with leech infestation anywhere in ENT region. Fourteen cases of leech infestation reported to ENT department during this period and were thus included in this group. Most of them had come from remote areas of Lahore. All of them were incidentally males.

The second group consisted of 42 patients who consumed the same source of drinking water as the first group but did not get leech infestation.

Inclusion criteria:

1. All cases of leech infestation anywhere in ENT region were included for study in group I.
2. For inclusion in group II (control group), those disease free individuals were selected who came from same leech endemic area as the first group, belonged to same socio-economic class and had consumed the same source of drinking water in the preceding two months.
3. For each case of leech infestation included in group I, three normal individuals were selected for inclusion in control group II. Their selection was made by simple random sampling. As 14 patients of leech infestation were included in group I therefore 42 disease free normal individuals were included in group II.

Exclusion criteria: There was no exclusion criteria for group I and any patient reporting with leech infestation in ENT region was included in this group. However the following were exclusion criteria for group II

1. Females were excluded for inclusion in group II. This was done to make a perfect comparison with group I where all patients reporting with leech infestation were incidentally males.
2. Individuals below 10 years and above 55 years of age were not included in group II, so that the age distribution pattern of this group corresponded to that of group I.

Detailed history was taken from each patient of both groups. This included patient's socio-economic status, environmental hygiene, eating and drinking habits. Patients were specially inquired about the risk factors in their water drinking habits i.e., 1 – The history of drinking water directly from ponds and marshes in the preceding two months of onset of symptoms, 2 – Substituting cupped palm of hand for drinking glass or cup, 3 – Not inspecting the water held in palm of hand for suspended particles before drinking it. The individual who gave the history of all the above three was termed as having *unsafe water drinking habits*. On the other hand those who drank water in clear drinking glass or inspected the contents of water held in palm of their hand before

drinking were labeled as patients with *safe water drinking habits*. The habit of consuming boiled water at home was also inquired about. It was followed by detailed ENT examination. Haematological investigations were carried out in each patient to focus particularly on haemoglobin level. To determine statistical significance, odds ratio was calculated.

RESULTS

Twelve individuals in group I (83.44%) had unsafe water drinking habits. This was in contrast to group II where only 6 individuals (14%) had unsafe water drinking habits (Fig 1). A significant statistical correlation between unsafe water drinking habits and leech infestation seems evident with odds ratio being 36. The following other observations of interest were made during the study:

The age distribution of cases ranged from 10 years to 55 years (Range – 45 years) with a mean of 26.09 years and standard deviation of 7.131 years. All cases having leech infestation were males suggesting very high male predisposition that may partly be attributed to specific culture prevailing in that area.

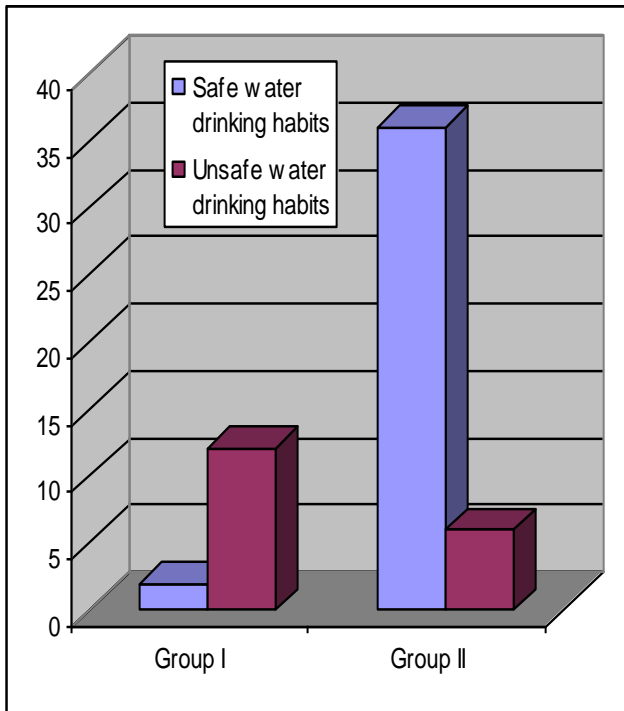
All patients were also inquired about habit of drinking boiled water at home. With the exception of two cases in group II, all cases in both groups did not use boiled water for drinking at home. Leech infestation therefore cannot be associated with habit of drinking water without boiling.

The various sites of leech infestation, their main symptoms and method employed for their removal have been summarized in Table I. Epistaxis was the commonest symptom of leech infestation in our study and nose was the common site of leech lodging (70.1 %). Diagnosis was simple on anterior rhinoscopy as leech was seen holding to nasal mucosa. Its free end moved on teasing with a probe. It was removed by simply holding it from the free end using a forceps and maintaining a gentle pull. The leech gradually loosened its grip on the mucosa once the pull was maintained for a few seconds, and was then removed. In most cases there was no residual bleeding from the mucosa.

Hypopharynx was the next common site of leech lodging in our study (14%). In one of the two cases of 'hypopharyngeal leeches', the leech was holding to the posterior surface of epiglottis while in the other it was holding to the upper surface of the vocal cord. Patient presented with dyspnoea, throat pain and blood stained saliva in both the cases. Indirect laryngoscopy could be performed only in one patient, in which the free end of leech was seen moving up and down slightly with respiratory air current. In both these cases the anesthetist removed leech after

giving inhalational anaesthesia and visualizing the vocal cords while holding the tongue down by Macintosh laryngoscope. Leech was then removed by holding it from the free end with a Macgill forceps. Endotracheal tube was not passed in both the cases, as after removal of leech no further manipulation was considered necessary.

Fig 1: Graphic representation between water drinking habits and leech infestation



One patient had leech holding on to nasopharynx (7%) and one to anterior faucial pillar (Oropharynx). Post-nasal trickle of blood was the main symptom in the former case while blood stained saliva in the later. The diagnosis was suspected on posterior rhinoscopy in former and on simple inspection of throat in the later case. In the former case removal was carried out by retracting the palate, holding the free end of leech with Negus forceps while visualizing it in mirror and then pulling it out under GA. In later case removal was simply done by pulling the leech after grabbing it with forceps. Haemoglobin level was found low (below 10mg/dl) in six of the 14 patients, and this can be attributed partly to chronic blood loss due to suction of blood by the leech and partly to low socio-economic status of the patients resulting in poor diet and malnutrition.

Table I: Various sites of Leech infestation in ENT along with main symptoms and technique employed for removal (Total Cases 14)

Site	n	Main Symptom	%age	Technique for removal
Nose	10	Epistaxis	71	Grabbing by forceps and removal
Hypo-pharynx	02 Epiglottis- 1 & Vocal cord- 1	Pain & dyspnoea	14	Direct laryngoscopy & removal (Under GA)
Oro-pharynx	01	Blood stained saliva	07	Grabbing by forceps and removal
Naso-pharynx	01	Post Nasal trickle of blood	07	Posterior rhinoscopy and removal (Under GA)

Table II: List of randomly selected reported cases of Leech infestation

No.	Year	Site	Main Symptoms	Reported By	Reference No.
1	2005	Nose	Epistaxis	Siddiqui TS, Qureshi I	15
2	2005	Nose	Epistaxis	Chow CK, Wong SS	16
3	2005	Eye	Ocular symptoms	Lewis G, Coombes A	17
4	2004	Nose	Epistaxis	Kruger C, Malleyeck I	18
5	2003	Nose	Epistaxis	Demioen K, Caliskan U	19
6	2002	Nasopharynx	Post nasal blood trickle	Bilgen C, Karia B	20
7	2002	Epiglottis	Hoarseness, dyspnoea	Gracia AC, Martin AM	21
8	2002	Hypopharynx	Hoarseness	Sharma S, Goyal A	22
9	1998	Eye	Ocular symptoms	Auw-Haedrich C, Keim A	23
10	1997	Eye	Ocular symptoms	Alcelik T, Cekic O	24
11	1995	Vagina	Post menopausal bleed	Makasha A	25
12	1993	Nose	Epistaxis	Bergua A, Vizmanos F	26
13	1992	Trachea	Haemoptysis	Ahmedzadeh A	27
14	1990	Oesophagus	Haematemesis	El-Awad ME, Patil K	28
15	1989	Nose	Epistaxis	Gupta SC	29
16	1989	Nose	Epistaxis	Golz A, Zohar S	30
17	1965	Nose	Epistaxis	Kaker P, Sawhney KL	14

DISCUSSION

Leech is an aquatic animal found in fresh water lakes, ponds or rivers. A leech can grow to be 5-400 millimeters in length. It has a somewhat-flat body, with 34 segments, similar to that of a worm. Another name for a leech is bloodsucker. Leeches belong to a group called Hirudinea. Their special features include a sucker at each end of its body, one is usually bigger than the other, its mouth is in the front sucker. Its body width is wider than its height, it has no jaws or teeth, it has colorless blood and its reproduction is similar to aquatic worms. Out of 63 species of freshwater leeches, about 25% are predacious, not parasitic¹. Leech tries to stay away from light. It likes to be close to decomposing materials and sometimes venture onto land. Fresh water leeches have no breathing systems such as lungs or gills. Instead, they breathe through their skin. Some species feed on blood, others feed on decaying plant and animal debris. It eats by attaching its suckers to its food source. Leeches move by swimming gracefully in an up-and-down motion. They move quickly by attaching suckers from one end to another¹.

Leech infestation commonly occurs in low socio-economic class particularly those living in areas where clean drinking water facilities are not available and people mostly use cupped palm of their hand to drink water directly from ponds and marshes i.e. unsafe water drinking habits. When water is taken in this way hairy thin leech can easily get into the body without being noticed. Blood is the leech's favorite diet and therefore likes to suck blood. Once it gets in the body, it searches for a site where it can suck abundant blood and also be able to get adequate atmospheric oxygen. Its natural choice thus becomes the ENT region where it is able to find both these luxuries. Within the ENT region the nasal cavity, especially the mucosa of nasal septum with its abundant blood supply is the most preferred site. It uses its suction cups located at its either ends for attachment to site. It can however shift from its primary site of attachment to a new site by attaching the suction cup of its free end to another site and then releasing the site of attachment of its other end. Once it is firmly attached to a site where it is able to suck abundant blood, it gradually swells up to the thickness of a thick wool fiber. As this condition is now virtually non-existent in the developed world therefore not much case series are available. Only isolated case reports are found for comparison. Table II shows 17 reported cases of leech infestation that were selected by random selection, for comparison with our study. Among them 13 cases had leech infestation in ENT region and 4 had leech infestation in non-ENT regions. It can be seen from the table

that among the sites in ENT region nose was the most favored site with 8 reported cases and epistaxis was the most common presenting symptom (61.53%). 4 cases had leech infestation in other ENT regions i.e., one each (7.69%) in epiglottis²⁰, nasopharynx²¹, hypopharynx²², tracheobronchial tree²⁷ and upper oesophagus²⁸. A comparison with our study shown in table I suggest almost the same ratio with nose being the most favored site (70%) followed by hypopharynx i.e., leech attached to epiglottis in one case (7 %) and to vocal cord in the other (7%), nasopharynx (7%) and oropharynx (7%). The 4 reported cases of leech infestation in non-ENT sites shown in table II include 3 cases in the eye^{17,23,24} and one in vagina²⁵. However they were ignored while making comparison as our study was conducted exclusively in ENT region. Its prevalence among males may be attributed to the fact that the areas of its prevalence are those where the females are usually confined to their houses and rarely go out, and thus seldom drink water directly from pond. For this reason leech infestation in ENT region has mostly been reported in males with only a few cases in females¹⁸. Blood examination may show anaemia due to prolonged blood loss (42.2% cases in our study) following preventive measures are suggested to prevent leech infestation.

Substituting cupped palm of hand for drinking water directly from ponds and marshes should be avoided. If this is absolutely necessary due to cultural or economic constraints, the contents of water held in palm of the hand must be examined before drinking to exclude any thread like suspended particles in it. As far as possible, water should be taken in clear glass, and it must be ensured before drinking that it is free of suspended particles. This possibility must be kept in mind by doctors working in leech endemic areas while dealing with any case of unexplained epistaxis.

CONCLUSION

Leech infestation in ENT region primarily occurs due to unsafe water drinking habits in the leech endemic areas. Usual victims are males from poor socio-economic class residing in underdeveloped areas with unavailability of clean drinking water. Any case of unexplained epistaxis in these areas must therefore be dealt with suspicion and managed accordingly. Switching over to safe water drinking habits can minimize the risk of having this infestation.

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