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Meta Analysis of the Leech as a Live Foreign Body: Detection, Precaution and Treatment

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Abstract: Foreign body in the esophagus is a common emergency presentation. Foreign body aspirations comprise the majority of accidental deaths in childhood. Conventional x-ray imaging is usually obtained to aid the diagnosis during the initial evaluation. The decision for surgical intervention is usually based on a suspicious history, physical examination and radiologic findings. Rigid bronchoscopy is very effective procedure for inhaled foreign body removal with fewer complications. Proper use of diagnostic techniques provides a high degree of success and the treatment modality to be used depending on the type of the foreign body is mostly satisfactory. Live foreign body is a rare entity but common emergency presentation. The approach towards a patient with leech infestation comprises a thorough history and systematic examination followed by relevant investigations. However, there is considerable debate over the most appropriate treatment option for such patients. A living foreign body, or parasite, in the oro-or naso-pharynx is rare in Western countries, but in other parts of the world is a fairly common cause of problems. In the past 10 years 28 cases of foreign bodies due to infestation with leeches were treated in our departments. In all patients, 2-70 years old, the complaint was of recurrent episodes of epistaxis, blood-spitting, odynophagia, dysphagia, dyspnea and hemoptysis several days before admission. Examination showed a green-brown mass protruding from different naso- and oro-pharyngeal areas, which is in every case, was a blood-engorged leech. Treatment consisted of removing the leech by applying a forceps to the middle of the leech's body and giving a quick pull. Bleeding ceased immediately after removal of the leech. This review aims to develop a comprehensive approach towards patients presenting with foreign body ingestion by developing clinical practice guidelines. These guidelines address not only the initial evaluation of the patient but also the various management alternatives and their advantages, limitations and applicability in various scenarios, based upon a review of the literature.

Key words: Foreign bodies, leech, review literature, endoscopy, observation

INTRODUCTION

Foreign body in the esophagus is a common emergency presentation. Foreign body aspirations comprise the majority of accidental deaths in childhood (Nikaghlagh and Saki, 2003; Saki *et al.*, 2007). Conventional x-ray imaging is usually obtained to aid the diagnosis during the initial evaluation. The decision for surgical intervention is usually based on a suspicious history, physical examination and radiologic findings (Saki *et al.*, 2008). Rigid bronchoscopy is very effective procedure for inhaled foreign body removal with fewer complications. Proper use of diagnostic techniques provides a high degree of success, and the treatment modality to be used depending on the type of the foreign body is mostly satisfactory (Saki *et al.*, 2009).

Leeches are segmented worms and closely related to earthworms, that have been known as an ecto-parasitism to humans for thousands of years (Uygur *et al.*, 2003). They are blood-sucking hermaphroditic parasites that attach themselves to vertebrate hosts, bite through the skin and suck out a quantity of blood. When leeches feed, they secrete an anticoagulant, which helps them obtain a full meal of blood (Guerrant *et al.*, 2005). However, some cases of endo-parasitism are also seen particularly in rural population. In addition to the classic picture of leeches as an external parasite, these organisms can also reach internal body organs and cavities, including the upper respiratory, esophagus and gastro-intestinal tract (Bergua *et al.*, 1993; Kaygusuz *et al.*, 2001; Ghazzawi *et al.*, 2005). Infestation usually occurs by drinking infested water from quite streams, pools and springs.

Serious complications are expected like dyspnoea, hemoptysis or haematemesis (Bilgen *et al.*, 2002). Reports site of internal infestation include the post-nasal space, nose, larynx, oro-pharynx, vagina, bladder, rectum and hypopharynx (Khan *et al.*, 2004; Labadi and Jamal, 1997; Mohammad *et al.*, 2002; Pandey *et al.*, 2000; Fooanant *et al.*, 2006; Ghimire and Acharya, 2008; Paul and Islam, 2005). Leeches vary in shape from elongated and cylindrical to broad or ovoid. They may be black, brightly colored, or mottled; they have muscular suckers at both their anterior and posterior ends (Stickland, 2000). Their length varies from 5 mm to 45 cm (Guerrant *et al.*, 2005). Many different types of leeches occur worldwide. By attaching to mucous membranes and feeding inside these spaces, leeches cause the clinical syndrome known as internal hirudiniasis.

For over 2000 years, leeches were applied for many disorders as an adjunct to blood letting. In Europe the peak of their use falls between 1830 and 1850, but subsequent shortages led to a decline in their use. Today there is a real clinical application in that they are of great value to plastic surgeons when venous congestion of skin and muscle flaps is a problem (Wells *et al.*, 1993). Medical use of leeches also includes treatment of black eyes and hirudin is used in the treatment of inflammation of the middle ear (Seleznev *et al.*, 1992). Hirudin is also being developed for experimental use as a systemic anticoagulant and may prove useful in *in vitro* blood sampling.

MATERIALS AND METHODS

Data collection: The literature was primarily searched through some databases: (PUBMED, OVID, EBSCO, WILEY, SCOPUS, COCHRANE. and PROQUEST) using a number of reported cases worldwide. The terms leech, hirudiniasis and foreign body were utilized in the search, to obtain the list of relevant articles. Most of the results came from PubMed (64 articles), while Wiley produced 5 results and the Cochrane database did not reveal any results of significant relevance (Table 1). The articles with relevant and significant findings were then adapted and used in writing this review. The aim of this review was report the leech infestation in past 10 years who were treated in our departments as we as discuss internal hirudiniasis and related differential diagnoses and review medical literature related to this condition.

Pathophysiology: The effects of leech infestation are dependent on the site of lodgment, degree and duration of obstruction. Upper airway involvement varies from complete obstruction with hypoxia and cardio-respiratory compromise to partial obstruction with coughing, wheezing, drooling, stridor and respiratory distress. This

pathological condition is extremely rare in urban areas, but endemic in rural regions; and it may have serious, even lethal complications. Leeches generally live in fresh water lakes, ponds or rivers. Much different type of leeches occurs worldwide. Those that attack man divided into two classes: land leeches and aquatic leeches (Guerrant *et al.*, 2005). Land or terrestrial leeches commonly live in tropical rain forest, where they may be found on stones and leaves (Bilgen *et al.*, 2002). Aquatic leeches live exclusively in fresh water. Infesting people drunk from these streams. Leech infestation commonly occurs in low socioeconomic class, particularly in people mostly use cupped palm of their hand to drink water directly from ponds and marshes. Land leeches have powerful jaws that can penetrate the skin in order to attach themselves anywhere on the external surface of the body. They are in contrast to aquatic leeches, which have weak jaws and require soft tissue, such as the mucous membrane of the upper aero-digestive tract, to feed on. Aquatic leeches are rare foreign bodies in the upper respiratory tract (White, 2003).

Diagnosis approach towards patients: Leech has been found in the nose, nasopharynx and oral cavity. The most common mode of presentation is nasal infestation causing intermittent epistaxis and nasal obstruction (Bergua *et al.*, 1993). Fatal dyspnoea, haemoptysis or haematemesis can occur due to endoparasitic infestation (Khan *et al.*, 2004; Iraqi and Squali, 1999). The leeches have been taken with contaminated drinking water and colonized at upper respiratory tract causing difficulty in breathing, respiratory stridor and blood stained saliva (Ghazzawi *et al.*, 2005; Mohammad *et al.*, 2002). Hoarseness of voices, pain and sensation of foreign body in the throat is also possible with leech infestation in the larynx (Mohammad *et al.*, 2002). A leech in the oral cavity usually presents with spitting of blood and a feeling of foreign body as that of present case. Examination under anaesthesia (direct laryngoscopy and pharyngoscopy) is essential and performed as an emergency for diagnosis and removal of the leech.

When a leech is present in the nasal cavity or nasopharynx, patients may present with epistaxis, nasal obstruction and the sensation of a moving foreign body in the nasal cavity. When it is in the oral cavity patients present with spitting blood and the feeling of a foreign body. The presence of a leech in the larynx gives rise to airway obstruction and a change in the voice (Mohammad *et al.*, 2002; Cundall *et al.*, 1986). The diagnosis of a leech as a foreign body may be confirmed after extraction and identification of its species. Therefore, otolaryngologists should pay special attention to patients who have these presenting symptoms and who have a history of recent contact with fresh water lakes or streams (Uygur *et al.*, 2003). The possibility of leech

Table 1: Characteristics of included available literatures including technique and patient groups

Author/date	No. of patients	Country	Age (year)	Gender	Symptoms	Duration	Site of attachment	Removing technique	Infestation due to
Foanant <i>et al.</i> (2006)	1	China	11	M	Congestion in the left nasal cavity and occasional epistaxis	1 day	Nasal cavity	Alligator forceps, using a local anesthetic	Swimming in a pond
Ghimire and Acharya (2008)	2	Nepal	63/38	M/M	Recurrent, painless, left-sided nasal bleeding	5 month	Nasal cavity	Forceps after 10% lidocaine spray	Drinking water from the spring
Montazeri <i>et al.</i> (2009)	1	Iran	11	M	Sore throat and fresh blood in the mouth	2 weeks	Posterior wall of the oropharynx	Blunt forceps after 10% lidocaine spray	Swimming in a lake
Kruger <i>et al.</i> (2004)	1	Germany	15	F	Chest pain, coughing, intermittent hemoptysis, fever, pallor and vomiting	1 week	Pharynx and upper esophagus	Involuntarily through forceful vomiting	Drinking water from the spring
Kaygusuz <i>et al.</i> (2001)	4	Turkey	7/35/ 8/42	M/M/ F/M	Spitting blood and inspiratory stridor, dysphagia and the feeling of a foreign body in his throat	1 day/ 3 months/ 1 day/ 2 weeks	Larynx	Forceps with local anesthesia in two cases and general anesthesia in the other two	Drinking water from the spring
Razi (2007)	1	Iran	55	M	Oral blood spitting and hemoptysis	2 weeks	Nasopharynx behind the uvula	After applying 5% xylocaine spray by forceps	Drinking water from the spring
Satyawati <i>et al.</i> (2002)	1	India	4	F	Bilateral epistaxis	-----	Nasal	Negative suction	Playing in these water pools
Mohammad <i>et al.</i> (2002)	1	Syria	6	M	Cough, hemoptysis, sensation of suffocation and stridor	1 month	Larynx	Blunt forceps after general anesthesia	Drinking water from the spring
Bilgen <i>et al.</i> (2002)	1	Turkey	13	M	Nasal obstruction	4 months	Nasopharynx	Dissected instrumentally and spitted out	Swimming in a contaminated pool
Ghazzawi <i>et al.</i> (2005)	1	Jordan	35	M	Hemoptysis and blood	2 weeks	Floor of the mouth	A pair of forceps vomiting	Drinking water from the spring
Bult <i>et al.</i> (2006)	1	Pakistan	29	M	Sensation of foreign body in the throat, haematemesis, blood stained saliva, sore throat	2 days	Oro-pharynx	Patient pulled out a leech from the back of the tonsillar bed	Drinking spring and rainy collected water from a pond
Ağın <i>et al.</i> (2008)	1	Turkey	5	F	Vomiting fresh blood, epistaxis and pallor	3 days	Pharynx	By an otolaryngologist under local anesthesia	Drinking water from the spring
Garcia <i>et al.</i> (2002)	1	Spain	76	F	Slight blood emissions from the mouth	2 days	Epiglottis	Under local anesthetic via indirect laryngoscope and with a pair of larynx biopsy tweezers	Drinking water from the spring
Tseng and Ho (2002)	2	Taiwan	65/9	M /F	Progressive epistaxis, nasal obstruction and an itchy sensation of a moving foreign body t	1 month/ 3 weeks	Nasal cavity	Injected a lidocaine solution directly into the body of the worm with a syringe and forceps	Washed his face with spring water/playing in a stream
Chow <i>et al.</i> (2005)	1	China	55	F	Unilateral left-sided epistaxis and nasal obstruction	3 weeks	Left nostril	After applying 5% xylocaine spray by forceps	Washed her face in the stream water, but denied any aspiration of stream water during swimming
Cundall <i>et al.</i> (1986)	6	Kenya	-	-	Feeling of something in the throat, epistaxis and hemoptysis	-	Pharyngeal	After applying 5% Xylocaine spray by forceps	Drinking water from the spring
Makiya <i>et al.</i> (1998)	1	Japan	55	M	Nosebleed, copious running snivels foreign body sensation in the nasal cavity	-	Nasal cavity	Forceps	Drinking water from the spring
Rao <i>et al.</i> (1986)	1	India	-	-	Nosebleed, foreign body sensation in the nasal cavity	-	Nasal cavity	After applying 5% xylocaine spray by forceps	Drinking spring and rainy collected water from a pond
Raza <i>et al.</i> (2006)	14	Pakistan	26.09*	M	Vomiting fresh blood, epistaxis and pallor	-	Nasal cavity, Hypopharynx, nasopharynx, oropharynx	By an otolaryngologist under local anesthesia	Drank water directly from marshes
Demirören and Caliskan (2003)	1	Turkey	3	M	Severe anemia and a history of hematemesis	2 days	Nasal cavity	After applying 5% xylocaine spray by forceps	Drinking water from the spring
Boye and Joshi (1994)	1	Saudi arabia	-	M	Respiratory problems	-	-	-	Drinking water from the spring

Table 1: Continued

Author/Date	No. of patients	Country	Age (year)	Gender	Symptoms	Duration	Site of attachment	Removing technique	Infestation due to
El-Awad and Patil (1990)	1	Saudi arabia	-	-	Hematemesis and melaena	-	Posterior pharyngeal wall	After applying 5% xylocaine spray by forceps	Drinking water from the spring
Golz <i>et al.</i> (1989)	17	Israel	9-27*	-	Mild epistaxis and blood-spitting	Several days	Nasopharynx behind the soft palate	After applying 5% xylocaine spray by forceps	Drunk water from brooks
Present study	28	Iran	2-70*	MF	Blood-spitting and vomiting, epistaxis, dysphagia, dyspnea, hemoptysis and melaena	1-10 days	Larynx/nasal cavity, Hypopharynx, nasopharynx, oropharynx	Forceps with local anesthesia in eleven cases and general anesthesia in the other 17	Drunk water from brooks/Swimming

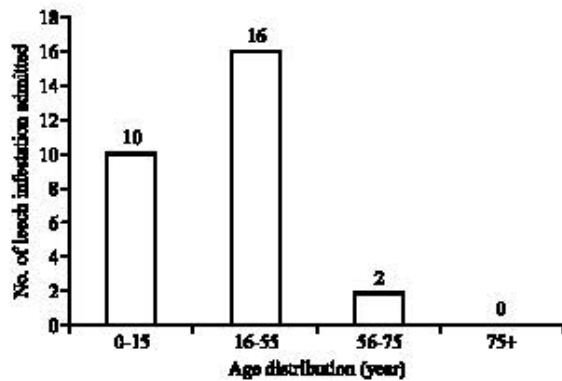


Fig. 1: The age distribution in leech infested patients

endoparasitism should not be overlooked in patients, especially children, presenting with epistaxis and a history of recent immersion in freshwater lakes or streams in areas where aquatic leeches are commonly found. Diagnosis is easy when a leech is in the nasal cavity. However, when it is lodged in the nasopharynx, examination of the patient under general anesthesia may be required, especially in small children (Bilgen *et al.*, 2002).

We retrospectively reviewed 10 years of experience in which 1923 patients (936 adults and 986 children) had undergone foreign body extraction from upper airway, larynx, pharynx and upper end of esophagus, at Imam Khomani and Apadand Hospitals between January 1999 and October 2008. Out of 1923, only 28 cases (25 adults and 8 children; 11 female and 23 males), with mean age of 26.63 year diagnosed as leech infestation. Sign and symptoms were in decreasing order dysphagia, cough, dyspnoea, hemoptysis and hematemesis. Radiography was done in two projections to neck and thorax just before arrival to the operation room to confirm the site of attachment (Table 2). All patients underwent leech extraction within 4-8 h of admission. All procedures were approved by international guidelines, the Institute Research Ethics and Use Committee of Ahwaz Jondishapour University of Medical Sciences (AJUMS). The age distribution among study group has shown in Fig. 1. On physical examination a black objects



Fig. 2: (a) Engorged leech in oropharynx, b removed leech, (b) Live leech in right sided palate

were seen in the site of infestation of all patients. The site of infestation was different among all cases.

Safe removal approach and management: Techniques for the removal of nasal leeches vary from using forceps for immediate extraction to the use of various substances to tranquilize the leech or relieve pain as the parasite is being removed (Fig. 2a, b) (Kruger *et al.*, 2004; Razi, 2007; Satyawati *et al.*, 2002; Butt *et al.*, 2006; Ađin *et al.*, 2008; Garcia *et al.*, 2002; Tseng and Ho, 2002; Chow *et al.*, 2005; Golz *et al.*, 1989). Removal of leeches from the larynx can be performed by direct laryngoscope, with the patient under general or topical/ local anesthesia. If a leech is in

Table 2: Data about all 28 patients with their symptoms and duration of existence

Case	Infestation type	Age (years)	Gender	Symptoms	Duration (days)	Site of attachment	Length of leech (cm)
1	Drinking infested water from the spring	45	Female	Bleeding from palate and gum	4	Palatal and alveolar	5
2	Drinking infested water from the spring	40	Female	Right sided epistaxis and blood-spitting from mouth	8	Right choanal	4
3	Drinking infested water from the spring	51	Female	Blood-spitting from pharynx	3	Posterior pharyngeal wall	3
4	Drinking infested water from the spring	29	Male	Blood-spitting from mouth	6	Right sided pyriform sinus	4
5	Drinking infested water from the spring	5	Female	Hematum, sore throat and melena	20	Cricopharyngeal and upper esophagus	8
6	Drinking infested water from the spring	50	Male	Blood-spitting from mouth and Sensation of foreign body in the throat	7	Laryngeal surface of epiglottis	2
7	Drinking infested water from the spring	42	Female	Odynophagia, dysphagia, blood-spitting from mouth	10	Oro-pharynx	10
8	Swimming in a stream	42	Female	Odynophagia, dysphagia, blood-spitting from mouth	5	Right glottis	1.5
9	Drinking infested water from the spring	42	Male	Hoarseness and blood-spitting from the throat	7	Laryngeal surface of epiglottis	2.5
10	Drinking infested water from the spring	4	Female	Hemoptysis	3	Oro-pharynx	2
11	Drinking infested water from the spring	15	Male	Dyspnoea and blood-spitting from mouth	1	Right vocal cord	1.5
12	Drinking infested water from the spring	26	Male	Hematemesis	3	Interarytenoid	2
13	Drinking infested water from the spring	4	Male	Epistaxis and blood-spitting	3	Posterior nasopharyngeal wall	4
14	Drinking infested water from the spring	12	Male	Hoarseness	10	Glottis and sub-glottis	2.5
15	Drinking infested water from the spring	36	Male	Hemoptysis and sore throat	7	Posterior pharyngeal wall	3
16	Drinking infested water from the spring	11	Male	Epistaxis and blood-spitting from mouth	7	Posterior nasopharyngeal wall	2.5
17	Drinking infested water from the spring	27	Male	Hoarseness	3	Posterior nasopharyngeal wall	1
18	Drinking infested water from the spring	10	Female	Epistaxis, vomiting and blood-spitting from the throat	3	Posterior nasopharyngeal wall	2
19	Drinking infested water from the spring	25	Male	Sore throat, sense of having a foreign body, blood-spitting from mouth	4	Medial surface of Ary-epiglottic fold	1.5
20	Drinking infested water from the spring	50	Female	Dysphagia and blood-spitting from mouth	10	Laryngeal surface of epiglottis	3
21	Drinking infested water from the spring	18	Female	Dyspnoea, cough and blood-spitting from mouth	5	Sub-glottis	1.5
22	Drinking infested water from the spring	43	Male	sense of having a foreign body	1	Posterior pharyngeal wall	1
23	Drinking infested water from the spring	70	Male	Epistaxis	4	Right choan	2
24	Drinking infested water from the spring	58	Male	blood-spitting from mouth	7	Right sided pyriform sinus	4
25	Drinking infested water from the spring	19	Male	blood-spitting and vomiting from mouth	2	Cricopharyngeal and upper esophagus	1.5
26	Drinking infested water from the spring	4	Male	Dyspnoea	4	Glottis and sub-glottis	1.5
27	Drinking infested water from the spring	2	Male	Epistaxis and blood-spitting from mouth	2	Laryngeal surface of epiglottis	1
28	Drinking infested water from the spring	5	Female	Epistaxis	3	Posterior nasopharyngeal wall	2.5

the nares or upper pharynx, it can be detached by applying 30% cocaine, 1:10,000 adrenalin, or dimethyl phthalate to it. Another method is irrigation with strong saline, vinegar, turpentine, or alcohol. It is difficult to grasp a leech with forceps because it has a soft and slippery skin, which ruptures easily (Pandy *et al.*, 2000). Firm traction should not be used when pulling a leech off because parts of its mouth may remain behind, leading to continuation of bleeding and secondary infection (Uygur *et al.*, 2003).

Site of infestation: Reported sites of internal infestation include the nose, nasopharynx, larynx, vagina, urethra and bladder, gastrointestinal tract and rectum (Table 3) (Katbab *et al.*, 2006; Shirzadeh, 2005; Alcelik *et al.*, 1997; Aali, 2002; Aribarg and Phupong, 1999; Saha *et al.*, 2005; Uygur *et al.*, 2003). The clinical picture is protean and depends mostly on the exact site of involvement. The nose has been reported to be the most common site of involvement and epistaxis is the most common sign

encountered. Laryngeal and hypopharyngeal infestation may manifest as an emergency with signs of acute airway obstruction. Anemia, which may be severe and even life-threatening, is a common finding.

The strong attachment of the leech to the mucus membrane combined with its soft and slippery body make it difficult for the medical practitioner to get a good hold of the leech and remove it with force. If the leech is in the nares or upper pharynx, it can be paralyzed with cocaine and extracted directly. A hypertonic sodium chloride solution or lidocaine can also be administered; the former causes the leech to release its hold and the latter paralyzes it (Ardehali *et al.*, 2006). Direct laryngoscopy under general anesthesia is essential for both diagnosis and removal of the leech (Bergua *et al.*, 1993). In adults a rapid and careful surgical intervention under local anesthesia may be successful.

After the patient was given a local anesthetic, the object was removed using alligator forceps and a rigid

Table 3: Characteristics of included available literatures including site of infestation and worldwide reported cases

Site of infestation	No. of reported cases (percentage of total)	Gender		Mean age of presentation (year)	Range of presented ages (year)	Average of duration (days)
		Male	Female			
Ocular	3 (2.7%)	3	0	50.0	27-65	2.33
Vaginal	13 (11.8%)	0	13	5.8	5-12	12.00
Rectal	2 (1.8%)	1	1	3.5	2-5	2.50
Gastrointestinal	2 (1.8%)	2	0	19.0	3-35	9.50
Urethral	1 (0.9%)	-	-	-	-	-
Aero-esophageal	89 (81%)	27	62	15.69	2-79	11.50
Total						110.00

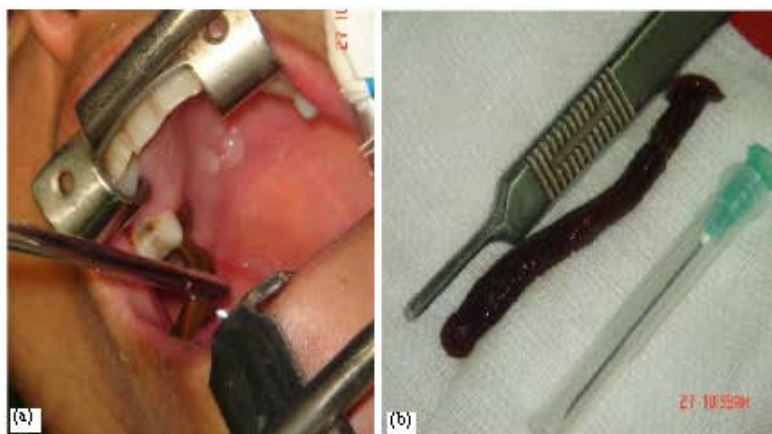


Fig. 3: (a) Applied forceps and leech between the forceps; (b) The leech seen in Fig. 2a: it was 3-5 cm long and dark greenish in color (closer view of the parasite)

endoscope. Removal was done by applying a forceps to the middle of the leech's body and giving a quick pull (Fig. 3a, b).

DISCUSSION

A leech is rare foreign body in the upper respiratory tract. Leeches generally live in brooks, streams or lakes. When water is drunk from these areas the leeches can infest the human body; they can then be located anywhere in the upper respiratory tract from the nose to the larynx, adhering to the mucus. They may enter the body via the excretory openings of individuals who drink or bathe in infested waters (Makiya *et al.*, 1988; Raza *et al.*, 2006; Gupta, 1980). The nose has been reported to be the most common site of involvement and epistaxis is the most common sign encountered (Al-Hadrani *et al.*, 2000). The presentations of pharyngeal hirudiniasis are sore throat, hematemesis and hemoptysis, sense of having a foreign body, dysphagia and melena. Laryngeal and hypo-pharyngeal infestation may manifest as an emergency with signs of acute airway obstruction (Demiroren and Caliskan, 2003). Anemia, which may be severe and even life-threatening, is a common finding (Litch and Bishop, 2000).

Our patient experienced passive flow of fresh blood into the oral cavity (without a history of vigorous coughing, epistaxis or gastrointestinal symptoms). Painless loss of blood into the oral-nasal cavities of our patients was the result of local analgesic substances secreted by the parasite and its site of attachment at the posterior oropharynx. The strong attachment of the leech to the mucus membrane combined with its soft and slippery body make it difficult for the medical practitioner to get a good hold of the leech and remove it with force. If the leech is in the nares or upper pharynx, it can be paralyzed with cocaine and extracted directly. A hypertonic sodium chloride solution or lidocaine can also be administered; the former causes the leech to release its hold and the latter paralyzes it (Ardehali *et al.*, 2006). The leech can then be removed easily. Leech-induced infection is a documented complication of both skin infestation and the therapeutic application of these organisms (Montazeri *et al.*, 2009). However, to the best of our knowledge, there is no report of such infectious complications following internal infestations in the medical literature. Spain was the only European country for which we found cases (four) of this condition reported in the medical literature. Considering this vast geographical distribution and the low socioeconomic

status and relatively low sanitation and healthcare services of most of the countries reporting leech infection, the rarity of the condition seems to be a reflection of under diagnosis rather than a true low prevalence. This report highlights the importance of considering leech infestation and other types of parasitic pharyngitis as possible etiologies in pediatric patients presenting with hemoptysis, sore throat and anemia, especially in areas of poor sanitation.

CONCLUSION

Leech infestation should be considered in the differential diagnosis particular in leech-endemic areas. Every attempt should be made to locate the source of bleeding and discomfort sense that does not respond to simple compression. Endoscopic evaluation of the aero-esophagus cavity is mandatory in recurrent of complications, particularly when the cause is not obvious.

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REFERENCES

- Ağın, H., F.Y. Ayhan, G. Gülfidan, D. Çevik and H. Derebaşı, 2008. Severe anemia due to the pharyngeal leech *Limnatis nilotica* in a child. *Türkiye Parazitoloji Dergisi*, 32: 247-248.
- Aali, B.S., 2002. Leech as a rare cause of vaginal bleeding in an adolescent. *Ann. Saudi Med.*, 22: 111-111.
- Al-Hadrani, A., C. Debry, F. Faucon and A. Fingerhut, 2000. Hoarseness due to leech ingestion. *J. Laryngol. Otol.*, 114: 145-146.
- Alcelik, T., O. Cekic and Y. Totan, 1997. Ocular leech infestation in a child. *Am. J. Ophthalmol.*, 124: 110-112.
- Ardehali, B., K. Hand, C. Nduka, A. Holmes and S. Wood, 2006. Delayed leech-borne infection with *Aeromonas hydrophilia* in escharotic flap wound. *J. Plast Reconstr. Aesthet. Surg.*, 59: 94-95.
- Aribarg, A. and A. Phupong, 1999. Vaginal bleeding in Thai children due to the leech. *J. Trop. Med. Parasitol.*, 22: 77-79.
- Bergua, A., F. Vizmanos, F.J. Mozon and R.M. Blasco, 1993. Unavoidable epistaxis in the nasal infection of leeches. *Acta Otorrinolaringo Esp.*, 44: 391-393.
- Bilgen, C., B. Karci and U. Uluoz, 2002. A nasopharyngeal mass: Leech in the nasopharynx. *Int. J. Pediatr. Otorhinolaryngol.*, 64: 73-76.
- Boye, E.S. and D.C. Joshi, 1994. Occurrence of the leech *Limnatis paluda* as a respiratory parasite in man: Case report from Saudi Arabia. *J. Trop. Med. Hyg.*, 97: 18-20.
- Butt, T., F. Saeed and M.A. Chohan, 2006. Leech infestation in oro-pharynx. *Pak. J. Pathol.*, 17: 42-44.
- Chow, C.K., S.S.Y. Wong, A.C.W. Hom and S.K.P. Lau, 2005. Unilateral epistaxis after swimming in a stream. *Hong Kong Med. J.*, 11: 110-112.
- Cundall, D.B., S.M. Whitehead and F.O. Hechtel, 1986. Severe anaemia and death due to the pharyngeal leech *Myxobdella africana*. *Trans. R. Soc. Trop. Med. Hyg.*, 80: 940-944.
- Demiroren, K. and U. Caliskan, 2003. Unexpected result in the etiological approaching to an anemic case: A leech infestation. *Pediatr. Hematol. Oncol.*, 20: 547-550.
- El-Awad, M.E. and K. Patil, 1990. Haematemesis due to leech infestation. *Ann. Trop. Paediatr.*, 10: 61-62.
- Foontan, S., W. Puntasri, M. Manorot and S. Niwasabutra, 2006. A leech in the nasal cavity: Case report. *Chiang Mai Med. Bull.*, 45: 27-30.
- García, A.C., A.M. Martín, C.A. De Luna-Gijón, M.A.S. Anaya and A.R. Mondéjar, 2002. Leech in the epiglottis: An unusual discovery in our times. *Am. J. Otolaryngol.*, 23: 91-92.
- Ghazzawi, I., F. Zuraiqat, O. Burqan and M. Najada, 2005. Leech infestation causing upper gastrointestinal bleeding. *JRMS*, 12: 47-49.
- Ghimire, A. and A. Acharya, 2008. Unusual cause of unilateral epistaxis: Nasal leech infestation. *J. Nepal Med. Assoc.*, 47: 38-40.
- Golz, A., S. Zohar, S. Avraham, H.Z. Joachims, J. Danino and D. Merzbach, 1989. Epistaxis caused by leeches. *Harefuah*, 117: 141-143.
- Guerrant, R.L., D.H. Walker and P.F. Weller, 2005. *Tropical Infectious Diseases, Principles, Pathogens and Practice*. 2nd Edn., Churchill Livingstone, Philadelphia, pp: 1341.
- Gupta, S.C., 1980. Nasal hirudiniasis in Kumaon Hills. *India. Trop. Geogr. Med.*, 32: 303-305.
- Iraqi, M.R. and F.Z. Squali, 1999. Hematemesis and respiratory airway obstruction due to leeches. *Arch. Pediatr.*, 6: 479-480.
- Katbab, A., V. Ghassemifar and M.H. Roozitalab, 2006. Bloody tears caused by ocular leech infestation. *Asian J. Ophthalmol.*, 8: 164-165.

- Kaygusuz, I., ^a. Yalçın and E. Keleş, 2001. Leeches in the larynx. *Eur. Arch. Otorhinolaryngol.*, 258: 455-457.
- Khan, N., M. Akhtar, M.A. Chohan, T. Ahmed and W. Azim, 2004. Leech in the hypopharynx: An unusual cause of bleeding from throat. *Biomedica*, 20: 77-80.
- Kruger, C., I. Malleyeck, H. Ole and E. Olsen, 2004. Aquatic leech infestation: A rare cause of severe anemia in an adolescent Tanzanian girl. *Eur. J. Pediatr.*, 163: 297-299.
- Labadi, M.H. and M.N. Jamal, 1997. Leeches in the larynx. *J. Laryngol. Otol.*, 111: 980-981.
- Litch, J.A. and R.A. Bishop, 2000. Saturated aqueous sodium chloride solution for the removal of leeches. *Trop. Doct.*, 30: 102-102.
- Makiya, K., M. Tsukamoto, M. Horio and Y. Kuroda, 1988. A case report of nasal infestation by the leech, *Dinobdella ferox*. *J. UOEH*, 10: 203-209.
- Mohammad, Y., M. Rostum and B.A. Dubaybo, 2002. Laryngeal hirudiniasis: An unusual cause of airway obstruction and hemoptysis. *Pediatr. Pulmonol.*, 33: 224-226.
- Montazeri, F., A. Bedayat, L. Jamali, M. Salehian and G. Montazeri, 2009. Leech endoparasitism: Report of a case and review of the literature. *Eur. J. Pediatr.*, 168: 39-42.
- Nikakhlagh, S. and N. Saki, 2003. Esophageal foreign bodies in children. *Sci. Med. J.*, 38: 18-23.
- Pandy, C.K., R. Sharma, A. Baronia, A. Agarwal and N. Singh, 2000. An unusual cause of respiratory distress: Live leech in the larynx. *Anesth. Analg.*, 90: 1227-1228.
- Paul, A.K. and N. Islam, 2005. Vesicle hirudiniasis: An unusual cause of bleeding from the urethra. *J. Ultrasound Med.*, 24: 1731-1733.
- Rao, K.P., Y.K. Grover and A.K. Mitra, 1986. Nasal hirudiniasis. *J. Indian Med. Assoc.*, 84: 55-56.
- Raza, S.N., S.M. Shabbir and A. Ul-Haq, 2006. Leech infestation and its association with water drinking habits. *J. Coll. Physicians Surg. Pak.*, 16: 175-178.
- Razi, E., 2007. Aquatic leech infestation: A rare cause of hemoptysis. *Case Rep. Clin. Pract. Rev.*, 8: 125-127.
- Saha, P.K., S. Roy, D. Bhattacharya, P. Mukherjee, T. Naskar and A. Bhuiya, 2005. Leech bite: A rare gynecologic emergency. *Medscape Gen. Med.*, 7: 73-73.
- Saki, N., S. Nikakhlagh, F. Safai and M. Peyvaste, 2007. Esophageal foreign bodies in children. *Pak. J. Med. Sci.*, 23: 854-856.
- Saki, N., S. Nikakhlagh and M. Tahmasbi, 2008. Diagnostic accuracy of conventional radiography for esophageal foreign bodies in adults. *Iran. J. Radiol.*, 5: 199-204.
- Saki, N., S. Nikakhlagh, F. Rahim and H. Abshirini, 2009. Foreign body aspirations in infancy: A 20-year experience. *Int. J. Med. Sci.*, 6: 322-328.
- Satyawati, S., K. Singhal and A. Dass, 2002. Multiple live leeches from nose in a single patient: A rare entity. *Indian J. Otolaryngol. Head Neck Surg.*, 54: 154-155.
- Seleznev, K.G., E.A. Shchetinina, N.P. Trophimenko, G.I. Nikonov and I.P. Baskova, 1992. Use of the medicinal Leech in the treatment of ear diseases. *ORL J. Otorhinolaryngol. Relat. Spec.*, 54: 1-4.
- Shirzadeh, E., 2005. Red eye due to leech in the eye. *Iran J. Med. Sci.*, 30: 197-198.
- Stickland, G., 2000. *Hunters Tropical Medicine and Emerging Infectious Disease*. 8th Edn., W.B. Saunders Company, Philadelphia, pp: 95.
- Tseng, C.C. and C.Y. Ho, 2002. Removal of a nasal leech: A safe and effective method. *Otolaryngol. Head Neck Surg.*, 132: 814-815.
- Uygur, K., H. Yasan, L. Yavuz and H. Dogru, 2003. Removal of a laryngeal leech: A safe and effective method. *Am. J. Otolaryngol.*, 24: 338-340.
- Wells, M.D., R.T. Manktelow, J.B. Boyd and V. Bowen, 1993. The medicinal leech: An old treatment revisited. *Microsurgery*, 14: 183-186.
- White, G.B., 2003. Leeches and Leech Infestation. In: *Mansons Tropical Diseases*, Cook, G. and A. Zumla (Eds.). 21st Edn., W.B. Saunders Co., London, pp: 1523-1525.