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Treatment of a Sublingual Hematoma With Medicinal Leeches:

Report of Case

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Hirudotherapy (leech treatment) has been used in medicine for more than 2,000 years and reached its peak around the time of the Napoleonic Wars in the early 19th Century. In 1884 Haycroft[1] isolated a naturally produced substance from the saliva of the leech which he named hirudin. By the end of the century, however, the use of hirudotherapy had declined because of overharvestation and habitat destruction of the wild leech population.[2] More importantly its use did not fit into the new emerging ideas of modern medicine. Today leeches have been rediscovered by microsurgeons as a means of treating venous insufficiency, whether in pedicle or free flaps. They have also been used for replantation surgery where arterial input can be established but not venous drainage.[3] A review of the literature also reveals their use in the treatment of scalp avulsions,[4,5] periorbital hematomas,[6] and breast surgery.[7] The following is a case of hirudotherapy that was successfully used in the treatment of a potentially life-threatening sublingual hematoma. This treatment option had some advantages over surgical drainage.

Report of Case

A 34-year-old man was admitted to the Doncaster Royal Infirmary Accident and Emergency Department for a grossly swollen tongue. He reported that he had fallen off his settee, hit his face on a table 24 hours previously under the influence of alcohol, and had traumatized his tongue. Over the next day, after the initial injury, the patient's tongue had gradually increased in size and he found it difficult to swallow and his speech was severely affected. The patient was also complaining of increasing pain from his tongue and a continuous ooze of blood. The patient had been admitted to the hospital 8 months previously for alcoholic liver disease and depression.

On examination the patient was noted to be obviously unwell, pale, and clammy. He was pyrexic, with a temperature of 38.2°C. His tongue was swollen with small areas of necrosis on its dorsal surface, and displaced palatally by a large sublingual hematoma (Fig 1). There was no submandibular swelling, but marked reactive edema in the neck was present. The patient was distressed and agitated, but there was no evidence of dyspnea.

Blood was taken for a coagulation profile and hematologic examination. The results showed: hemaglobin, 11.4 g/dL (normal range, 13.0 to 18.0 g/dL); white blood cell count, 13.1 $\times$ 10^9/L (normal range, 4.0 to 11.0 $\times$ 10^9/L); platelets, 91 $\times$ 10^9/L (normal range, 150 to 450 $\times$ 10^9/L); prothrombin time, 14 seconds (reference range, 11.0 to 14.5 seconds); activated partial thromboplastin time; 29 seconds (reference range, 22 to 32 seconds); and fibrinogen, 3.5 g/L (reference range, 1.5 to 4.5 g/L). The patient was started on intravenous antibiotics and a reducing dose of chlormethiazole for his alcohol withdrawal symptoms, and arrangements were made for an emergency tracheostomy if needed.

Surgical drainage of the sublingual hematoma was rejected for the following reasons. First, surgical drainage could increase the swelling necessitating a tracheostomy and the safety of the tracheostomy tube could not be guaranteed during episodes of alcohol withdrawal symptoms. Second, bleeding occurs into the intrinsic muscles of the tongue rather than into a potential anatomic space and therefore evacuation of the hematoma may not be possible. It was therefore decided to treat the hematoma with medicinal leeches.

The leech, species *Hirudo medicinalis,* was applied to the hematoma for 2 hours twice a day for 2 days (Fig 2). At first the leeches were applied with the patient under light sedation using intravenous midazolam. Later this was found not to be needed because the patient was adequately sedated with the chlormethiazole.

After 4 days the hematoma was reduced sufficiently that the patient's airway was no longer at risk and he was transferred to the Psychiatric Department as an informed patient for detoxification and treatment of his chronic alcohol problem (Fig 3). The patient was seen a week later when the sublingual hematoma had resolved and the tongue had returned to nearly normal dimensions (Fig 4).

Discussion

A medicinal leech, once attached, will extract eight to nine times its body weight, approximately 20 mL of

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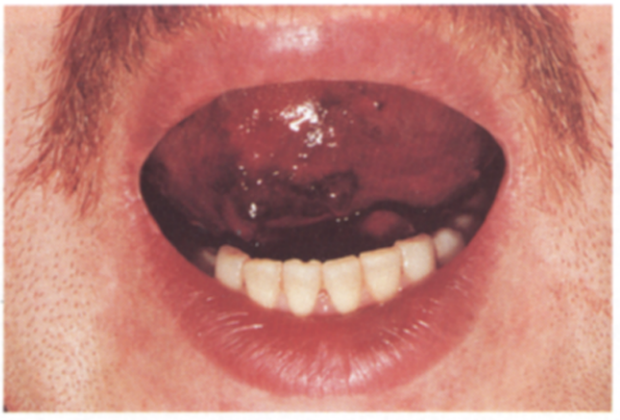

FIGURE 1. Sublingual haematoma on admission.

blood. Once the leech has fallen off an additional amount is lost via slow but continuous flow. The effects of blood loss are caused by five separate chemicals present in the saliva of the leech. The antithrombotic substance of the leech is the small protein, hirudin, which prevents clot formation. Hyaluronidase, a mucolytic enzyme, causes a spreading effect and further prevents drainage. *Aeromonas hydrophilia* found in the gut of the leech produces antibiotics to prevent spoiling and aid digestion of the ingested blood. Also present is a vasodilator that maintains capillary blood flow and a prostagladin that reduces swelling.[8] The leech will only attach to a viable tissue sample and is a good marker of tissue vitality. In situ, leeches tend not to move until they have finished feeding, after which they promptly fall off. It is very important that the leeches are kept under close observation while the patient is undergoing hirudotherapy. Psychiatric assessment should always be considered whenever the use of leeches is contemplated, so that emotional strengths can be enhanced and weakness addressed. Routine psychotic and pharmological treatment techniques should be applied as needed.[9]

FIGURE 2. Hirudotherapy.

FIGURE 3. Sublingual hematoma after 48 hours of hirudotherapy.

FIGURE 4. Tongue 1 week post-hirudotherapy.

The most common complication of hirudotherapy is bacterial infection. The most commonly isolated pathogen is the endosymbiotic *A hydrophilia* found within the leech. Most investigators would agree that this can be prevented with a second or third generation cephalosporin.

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Osteomeatal Complex Obstruction and Sinusitis Following Le Fort I Osteotomy

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The Le Fort I osteotomy has been used to correct a variety of dentofacial abnormalities. Since it was first described by Von Langenbeck in 1859, surgical techniques have improved so that postoperative complications are kept to a minimum. In a review of 410 patients treated with the Le Fort I osteotomy, Otterloo et al discussed the intraoperative and early postoperative complications of the Le Fort I osteotomy, specifically hemorrhage, nerve damage, osteotomy position, necrosis, and exacerbation of maxillary sinus disease, but no mention is made of complications associated with iatrogenic damage to the maxillary sinus osteum.[1] Demas and Sotereanos in 1989 discussed the effect of turbinectomy and maxillary repositioning on the nasolacrimal apparatus, but again there was no discussion on possible damage to the maxillary osteum.[2] Our review of the literature of the past 15 years did not show any cases of maxillary osteum damage following a Le Fort I osteotomy. We present a case in which a patient developed extensive maxillary sinus disease as a result of damage to the maxillary osteum following a Le Fort I osteotomy.

Report of Case

A 40-year-old woman with no previous history of sinusitis was referred to the Oral and Maxillofacial Surgery clinic at the University of Maryland, Baltimore, for evaluation of persistent symptoms following a Le Fort I osteotomy with advancement, bilateral sagittal ramus osteotomy, nasal septoplasty, and placement of malar implants. According to the operative note, the Le Fort I osteotomy was performed in a standard fashion following a maxillary vestibular incision. The cuts were made through the lateral maxillary sinus walls with a reciprocating saw. Using a guarded chisel, the medial and nasal walls were osteotomized on both sides. A vomerine chisel was inserted down the midline of the nasal structures. Finally, the pterygoid chisel was inserted bilaterally and the posterior maxilla was fractured from the pterygoid plates. The maxilla was next down-fractured and plated.

Following the surgery, the patient complained of persistent discharge from her right nostril, cheek pain, dull pain in her right eye with associated headaches, early morning facial swelling, puffiness, and postnasal drainage. The patient was treated with multiple courses of antibiotics and steroids without resolution of her symptoms. A computed tomographic (CT) scan showed opacification of the right maxillary sinus and ethmoids, as well as involvement of the left maxillary and ethmoid sinus. Follow-up CT scans showed a right maxillary density consistent with an antral-choanal polyp extending into the right nasopharynx through a defect in the medial wall of the maxillary sinus. Evaluation of the coronal CT suggested a partial transection of the right inferior turbinate (Fig 1 *arrow*).

After evaluation by the staff at the University of Maryland, along with consultation from the Otolaryngology, Head and Neck Surgery Department, it was decided that the patient would benefit from endoscopic sinus surgery along with removal of the maxillary fixation bone plates and screws. Under general anesthesia, the maxillary fixation plates and screws were removed through a vestibular incision. Intraoperatively it was noted that all plates and screws were loose and encased in a thick capsule of fibrous tissue. During endoscopic sinus surgery, it was noted that the natural osteum of the maxillary sinus was occluded by inflammatory disease on both sides. However, the right maxillary osteum was totally occluded by the posterior/superior portion of the inferior turbinate, which had been divided in half and had rolled inward toward the natural osteum of the sinus. The natural osteum was enlarged with a curved probe and the

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