

## The use of leeches in a case of post-operative life-threatening macroglossia

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### Abstract

A case of severe macroglossia, following intraoral surgery, causing respiratory distress is described. Because conventional therapy appeared inadequate, leeches were used and proved an efficient method of reducing this life-threatening swelling of the tongue.

**Key words:** Macroglossia, post-operative complication; Leeches

### Introduction

Traumatic swelling of the tongue is a relatively rare complication of surgical procedures. Only five cases of severe macroglossia after cleft palate repair have been reported (Lee and Kingston, 1985; Bell *et al.*, 1988; Patane and White, 1989).

Conventional therapy with steroids and antibiotics is not always successful and a life-threatening airway obstruction can occur.

Leeches can be used for the treatment of severe macroglossia causing airway obstruction, due to venous congestion, following a combined plastic surgery/ENT procedure.

### Case report

A healthy eight-year-old white boy, with several congenital craniofacial abnormalities, was scheduled for cleft palate repair and transpalatal reconstructive surgery for unilateral choanal atresia. A Dott's mouth gag – tongue depressor remained in the oral cavity during the entire six hours procedure. At the end of this procedure the child was awakened and the trachea was extubated. Two hours post-operatively he developed a severe swelling of the tongue with respiratory distress. The child was reintubated with difficulty and transferred to the intensive care unit (Figure 1). Because of the nasal siliconic tubes, to secure the choanal opening, and the enormous enlarged tongue, blocking the oropharynx, no nasal or oral feeding tube could be installed. Three days post-operatively total parenteral nutrition was accomplished by an intravenous femoral catheter. The child was fully sedated and paralysed, in case he should extubate himself as reintubation would be very difficult and mechanical ventilation would become necessary. Ultrasonographical examination of the protruding tongue showed oedematous homogenous swollen tissue without evidence of focal abnormality. He

was treated with diuretics, steroids and antibiotics for five days but no significant reduction in the macroglossia was observed. Instead of this the immobile protruding tongue became further compressed by the teeth.

On the sixth post-operative day leeches (Biopharm Technology Ltd, UK) were used in an attempt to decongest the tongue. Before their application an extra dose of antibiotics (amoxycillin/clavulanate 500/50 mg) was given intravenously. Two inch long leeches were applied to the child's tongue which had been cleaned with soap and warm water, to remove all substances with strong odour or taste (because this could have discouraged the leeches from biting) and to enhance vasodilatation. A wet gauze with a hole in the middle was placed on the tongue to form a barrier in order to prevent the leech from wandering. The leeches' head (anterior sucker) was steered to the hole



FIG. 1  
Front view of the massive protruding macroglossia.

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FIG. 2

Application of a leech to the swollen tongue; lateral view.



FIG. 3

Front view of patient after leech therapy: The tongue is replaced in the oral cavity.

in the gauze. Once the leech was attached, it remained in place and slowly filled with blood (Figure 2). It loosened spontaneously (average time 15 minutes) after application when it had filled itself with blood (an average of 5 ml).

In the post-bite period each bite was encouraged to bleed by the gentle removal of any locally formed clot. Six hours later, during which 27 leeches were applied, the swelling of the tongue was markedly reduced and could easily be replaced in the oral cavity (Figure 3). The tongue oedema was reduced further during the next few days.

During the procedure and the day after, the child was constantly monitored by noninvasive blood pressure measurement, ECG, pulse oximetry and temperature registration. Blood samples were taken at regular intervals. No abnormalities were observed. The haemoglobin concentration decreased from 6.7 to 5.5 mmol/l and the total blood loss was estimated at 300 cc. The child was subsequently extubated three days after treatment and transferred to the children's ward. An oral feeding tube was inserted for two more days, because of mild swallowing problems and he was discharged home two days later.

### Discussion

Macroglossia is defined as a resting tongue that protrudes beyond the teeth or alveolar ridge (Riter *et al.*, 1958). It can be divided into two broad categories: congenital and acquired (van der Waal and Pindberg, 1986). The acquired type sometimes presents as an emergency and can become life-threatening. Renehan and Morton (1993) made an aetiological classification of acquired acute enlargement of the tongue. The four categories were: haemorrhage, oedema, infection and infarction.

The absence of focal abnormalities during ultrasonographical examination demonstrated that the macroglossia in our patient was due to oedema. Oedema can be the result of an alteration in vascular permeability (exudate) and can be seen in allergy and angio-oedema. Oedema can also be the end result of venous and lymphatic obstruction (transudate). Compression by an oral ventilation tube or mouth gag – tongue depressor, can cause imbalance of hydrostatic–oncotic pressure in the vascular bed of the tongue. It has been suggested that the development of macroglossia is related to the length of the surgery time (Patane and White, 1989). Following long surgical intraoral

procedures, especially when a mouth gag or tongue depressor is used, the mouth and tongue should be examined prior to extubation (Patane and White, 1989). When no oedema is seen the patient needs close observation during the first post-operative day. When any oedema is present the trachea should remain intubated and a nasogastric feeding tube should be put in place. If the patient is already extubated and reintubation is not possible a tracheostomy is necessary to restore a free airway. The swelling has to be controlled. Conventional therapy with corticosteroids and antibiotics may fail to decrease the oedema. A vicious cycle can occur when the tongue gets so huge that it is filling the mouth and becomes strangulated between the teeth. Saah *et al.* (1993) reported a spectacular reduction of a traumatic macroglossia after arresting this cycle of venous congestion by active manual replacement of the tongue into the oral cavity. In our patient all usual treatment modalities failed to diminish the swelling of the tongue.

In search of a new treatment Brink and Hagewind (1994) reported a case in which leeches were used therapeutically to reduce an acute enlargement of the tongue, due to a capillary leak syndrome. Notwithstanding the different aetiology we too successfully used leeches in our patient. Leeches (*Hirudo medicinalis*) have probably been used in medicine since the time of the ancient Greeks (Adams, 1988). In the 19th century the use of leeches fell into disrepute. They are now making a fast comeback because of their superb decongestant properties (Rao *et al.*, 1985). Leech saliva contains an anticoagulant called hirudin, a histamine-like vasodilator that promotes local bleeding, a local anaesthetic that makes the bite painless and an enzyme, hyaluronidase, that promotes the local spread of the other leech salivary secretions into the bite wound (Kraemer *et al.*, 1988). The leeches' main therapeutic benefit is not only the average 5 ml of blood removed during biting but also the fact that each bite wound continues to bleed for several hours.

As with conventional therapies complications can occur. Continued bleeding after removal of the leech is not uncommon. If bleeding is severely prolonged, haemoglobin levels should be checked daily. The avoidance of leeching in patients known to have a bleeding diathesis such as haemophilia is advised. The organism *Aeromonas hydrophilia* lives symbiotically in the gut of the leech. It helps to perform the task of digestion. Infections with this bacterium have been described after leech therapy, but are

rare (Whitlock *et al.*, 1983). Nevertheless, antimicrobial prophylaxis should be used during the application of leeches (Hermansdorfer *et al.*, 1988). The area around leech bite wounds should also be routinely observed for local infection and swabs should be taken if necessary. To avoid the risk of infection and transmissible diseases (e.g. hepatitis B) leeches are not re-used. They are killed by immersion in 70 per cent alcohol. When not carefully watched a leech can migrate and enter any nearby orifice causing obstruction and bleeding.

In this case, however, treatment with leeches provided an efficient manner of reducing a life-threatening transudative oedematous tongue and restoring the airway without any complications.

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