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CASE SERIES AND REPORTS

Retropharyngeal lymphatic malformations: report of two successfully treated cases and review of the literature

Malformazioni linfatiche retrofaringee: 2 casi clinici trattati con successo e revisione della letteratura

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SUMMARY

Retropharyngeal lymphatic malformations (LMs) are exceedingly rare and have rarely been reported in the literature. This condition can be life threatening, and its management is particularly challenging. Over a two-year period, two patients who presented with symptomatic (dyspnoea, snoring) retropharyngeal LMs were treated in our hospital. Both patients were treated using radiofrequency ablation of LMs through a trans-oral approach and bleomycin sclerotherapy as adjunctive treatment. No major complications occurred following surgery. During follow-up, no recurrence was noted, and both patients were asymptomatic. Our result and the review of the literature suggests that radiofrequency ablation combined with bleomycin sclerotherapy can be a safe and effective treatment.

KEY WORDS: Radiofrequency ablation • Bleomycin • Retropharyngeal • Lymphatic malformation

RIASSUNTO

Le malformazioni linfatiche (LM) retrofaringee sono un'evenienza molto rara. Tali condizioni possono mettere in pericolo la vita del paziente e la loro gestione può essere talvolta molto complicata. Negli ultimi due anni, due pazienti con LM retrofaringee, entrambi sintomatici (dispnea e russamento) sono stati trattati nel nostro ospedale. Entrambi i pazienti sono stati trattati con ablazione mediante radiofrequenze attraverso un approccio transorale e scleroterapia con bleomicina come trattamento adiuvante. Non si sono verificate complicanze dopo il trattamento. I nostri risultati e la revisione della letteratura suggeriscono che l'ablazione con radiofrequenze, in combinazione con la scleroterapia con bleomicina, può essere un trattamento efficace e sicuro.

PAROLE CHIAVE: *Ablazione con radiofrequenze • Bleomicina • Malformazioni linfatiche retrofaringee*

Introduction

Lymphatic malformations (LMs) are congenital vascular anomalies that result from abnormal development of lymphatic vessels, which present in the head and neck in 48% to 75% of cases, most commonly presenting as asymptomatic posterior triangle masses [1]. Involvement of the upper airway is rare. The most common conditions include parapharyngeal extensions [2 3] and tongue LMs [2]. In addition, a few cases of LMs isolated to the larynx have been reported [1 2], as well as a few retropharyngeal cases [4-6]. This location is at risk of causing dyspnoea and dysphagia, and can potentially lead to acute respiratory distress in the case of rapid growth or intracystic bleeding. Removal or reduction of a lesion at this location is particularly challenging. In this study, we report on two new cases of symptomatic retropharyngeal LMs that were successfully managed with radiofrequency ablation combined with bleomycin sclerotherapy, and a review of the literature.

Case reports

We reviewed the medical records of two children diagnosed with retropharyngeal LMs who were treated in the Department of Otolaryngology Head and Neck Surgery at Children's Hospital of Shanghai during a two-year period. Clinical charts were reviewed for demographic characteristics, presenting signs, surgical technique and outcomes. Institutional review board approval was obtained from the Shanghai Jiao Tong University Research Compliance Office. Informed consent was obtained from the parents of all children.

Diagnosis was based on radiological exam, specifically a contrast-enhanced computed tomography (CT) scan that revealed a retropharyngeal abscess, but all diagnoses were confirmed by pathological examination. All patients were assessed by the senior otolaryngologist using the same surgical procedure under general anaesthesia with orotracheal intubation. First, the Boyle-Davis mouth gag was set up to access the posterior pharyngeal wall. After the retropharyngeal LMs were properly exposed (Fig. 1a), we used a hand-held radiofrequency ablation device (EvacXtra HP, ArthroCare ENT; CA, USA) with a power setting of 7 to perform the radiofrequency ablation of the cyst wall of LMs as much as possible, sparing the surrounding structures and the mucosa. Haemostasis was simultaneously achieved using a coagulation setting of 3. Blunt dissection in areas of concern or pulsation was used to avoid disrupting the carotid sheath within this region. Frozen section pathology revealed LMs characterised by dilated spaces containing flocculated lymph and bounded by fibrous septae. After the reduction was performed (Fig. 1b), we applied bleomycin (15 mg of bleomycin dissolved in 20 ml of normal saline) into the surgical cavity. The bleomycin solution was left in situ for 3 minutes for better penetration into and reaction with the cyst wall, and then the solution was removed. After completion, the pharyngeal mucosal flaps were re-approximated and closed with 3.0 Vicryl. All patients were extubated immediately after the procedure. All patients received an intravenous, five-day antibiotic course (ceftriaxone). During this time, the patients were given a soft diet and had no respiratory events.

Case #1

A 2-year-old boy presented with one month of snoring when sleeping. In one week, the snoring worsened, and he developed sleep apnoea. The patient was admitted to the regional hospital with inspiratory stridor. ORL examination revealed significant bulging on the posterior pharyngeal wall. Based on clinical history and laboratory tests (leukocytosis $13.5x10^9$/L), a retropharyngeal abscess was suspected. Decompression by needle aspiration was performed in the local hospital. Transoral aspiration of the retropharyngeal space produced 12 ml of blood and transparent fluid. Bacteriological examination of the aspirated fluid was positive for *Streptococcus*. Five days later, breathing difficulties returned, and the boy was referred to our department. On examination, retropharyngeal bulging persisted without stridor, and the patient was noted to snore at night. The patient required sedation prior to imaging, and he was intubated to ensure airway stabilisation. In the CT scan with contrast, cystic lesions were visible (Fig. 2a and b) in the retropharyngeal space from the nasopharynx to the level of C6 (48 mmx 23 mm x 45 mm)

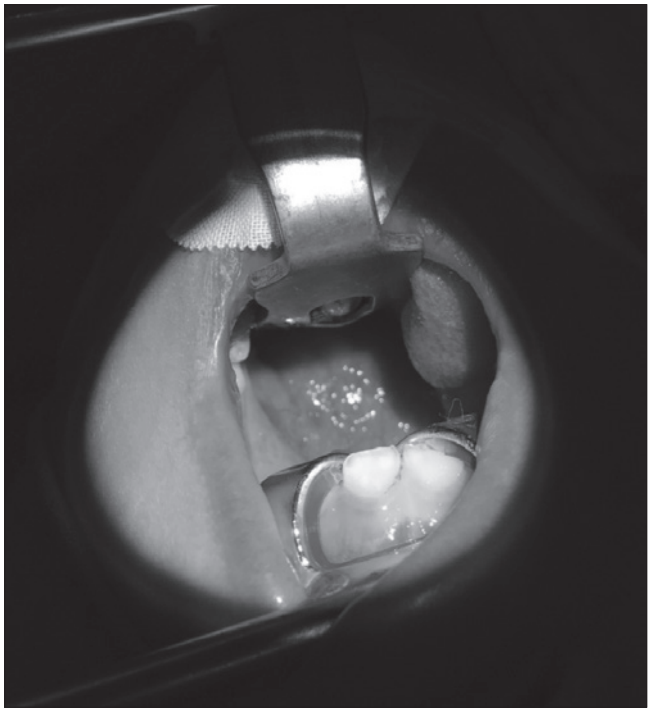

Fig. 1a. Surgical view of retropharyngeal LM, oropharyngeal mucosa overlying the left parapharyngeal space in case 1.

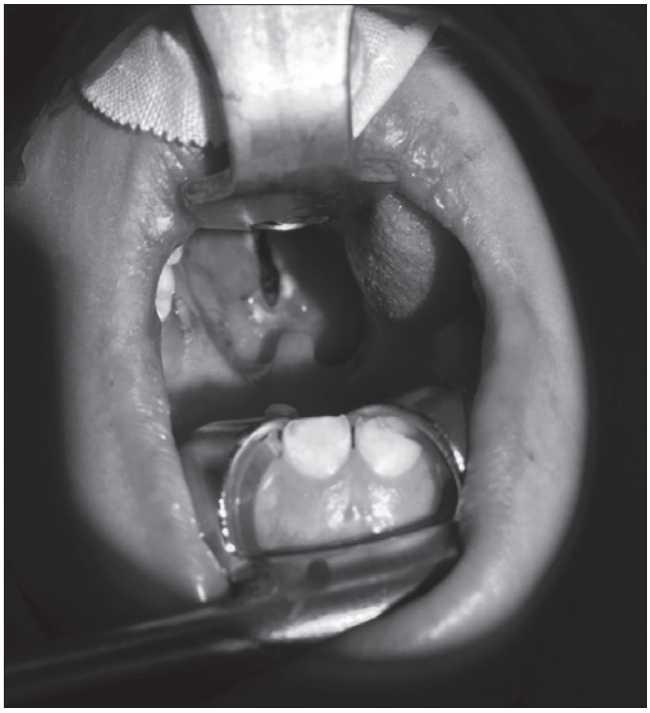

Fig. 1b. Surgical view of the reduction was made after removal of the retropharyngeal LM in case 1.

that spread to the left lateral neck. Cystic lesions were also noted around the vessels in the trigonum jugular. Surgery was performed following our protocol. Oral feeding was initiated on the first postoperative day. The patient remained in hospital for five days. Spectacular improvement of symptomatology was noted. No clinical or radiological regrowth was noted over 23 months of follow-up. No adjuvant procedure was necessary.

Case #2

A 6-year-old girl experienced snoring since birth. At four years of age, the snoring worsened, and she developed sleep apnoea. At six years of age, her dysphagia increased rapidly. On physical examination, obvious bulging was noted adjacent to the posterior wall during swallowing. Flexible endoscopy revealed a smooth mucosa-covered mass on the posterior wall of the pharynx. Contrast CT scan (Fig. 3) revealed a well-defined, low-density soft tissue mass with an enhanced rim and multiple septations. Marked anterior displacement and narrowing of the glottic and supraglottic airway were noted; the mass did not extend into the chest. A diagnosis of macrocystic lymphatic malformation was confirmed. Oral feeding was initiated on the postoperative day. No respiratory distress was noted in the following days. The duration of hospitalisation was five days. No clinical symptoms appeared during the 16-month follow-up.

Discussion and review of the literature

Lymphatic malformations are low-flow embryological vascular anomalies theorised to develop from mesenchymal progenitor cells. As a subcategory of vascular malformations, LMs can be classified morphologically as macrocystic, microcystic, or mixed. Macrocystic lesions are classically described as cystic spaces of at least 2 cm^3, microcystic lesions of less than 2 cm^3 and mixed lesions are associated with both macrocystic and microcystic components [7].

Retropharyngeal locations are rarely observed, and only a few cases have been reported in the literature. Management of this location can be challenging for the otolaryngologist. Differential diagnosis of retropharyngeal lymphatic malformation includes haemangioma, vascular malformation, congenital and acquired cystic lesions, abscess and lipoma. Radiographic examination is useful not only in differentiating LMs from the other masses (haemangioma, congenital cysts, abscess and lipoma) but also in delineating the actual extent of LMs. CT scans may reveal a discrete or poorly defined water-density mass with an enhanced rim after intravenous contrast [6].

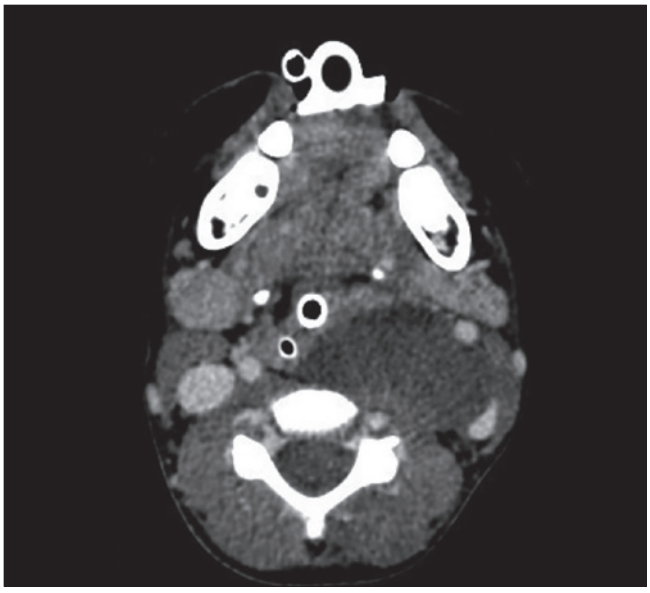

Fig. 2a. Contrast axial CT scan showing a left parapharyngeal and retropharyngeal voluminous macrocystic lymphatic malformation causing significant narrowing of the supraglottic airway.

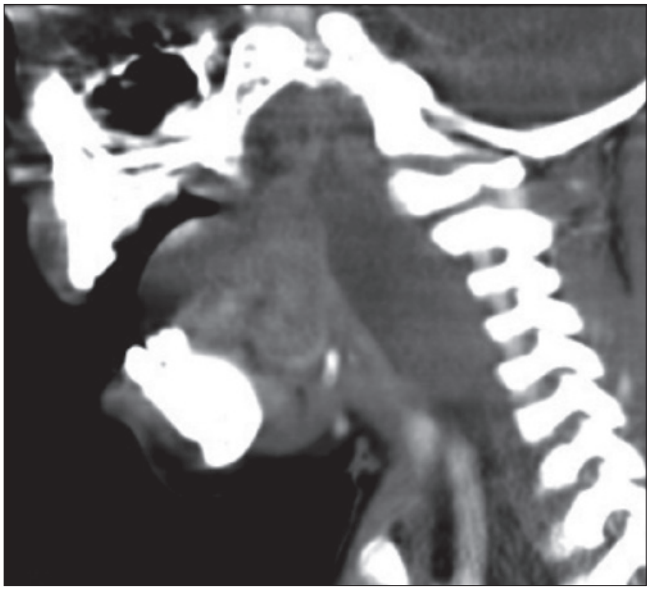

Fig. 2b. Contrast sagittal CT scan showing retropharyngeal lymphatic malformation from the nasopharynx to the level of C6.

Adams et al. [8] systematically reviewed and reported that both surgery and sclerotherapy may be effective for treatment without any clear evidence as to which modality is superior. Bleomycin is an antitumour agent that was discovered in 1965 that can cause non-specific inflammatory reactions leading to fibrosis of cysts. Various studies have produced promising results using bleomycin sclero-

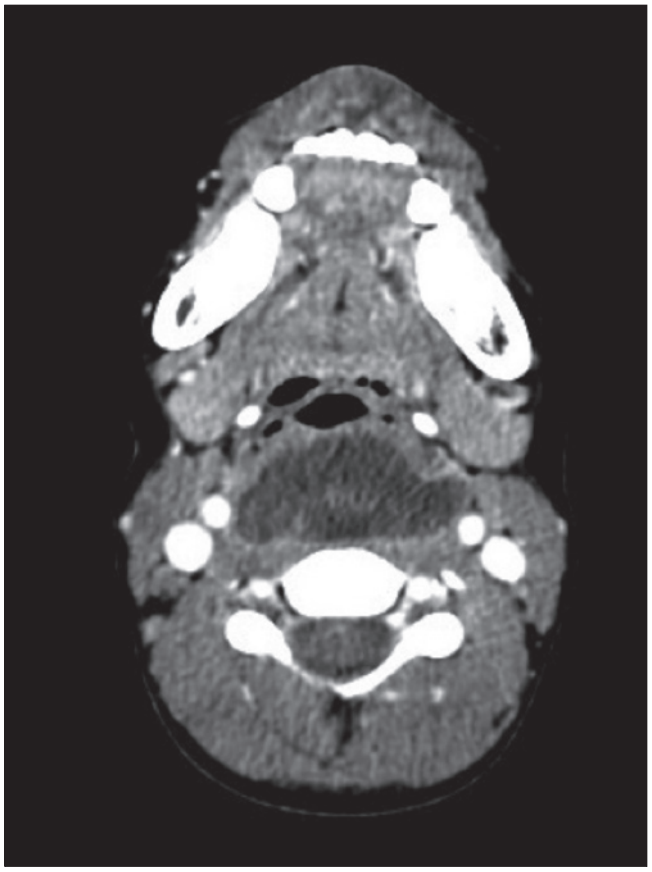

Fig. 3. Contrast axial CT scan showing a well-defined low density soft tissue mass (retropharyngeal voluminous macrocystic LM) with an enhancing rim and multiple septations, causing significant narrowing of the supraglottic airway.

therapy. Bleomycin sclerotherapy is frequently used for macrocystic disease and has become an attractive treatment option because it is less invasive, leaves minimal scarring and carries minimal risk of collateral damage to surrounding neurovascular structures [9 10]. Olímpio et al. [11] reported a cross-sectional study in which the proportion of patients considered cured after the first therapeutic approach was 44% in the surgery group and 29% in the bleomycin group. Although the favourable rate was higher in the surgical group, they encountered two serious intraoperative complications and suggested that surgical excision be reserved either for the resection of remaining fibrotic tissue after sclerotherapy or as a first-line therapy for LMs localised outside the cervico-facial region, where the risk of injuring vascular structures is smaller.

In our two cases, the cystic lesions in the retropharyngeal space spread to the lateral neck were also noted around/nearby the vessels in the trigonum jugular; complete resection of the lesion is challenging in extensive lesions because of potential complications such as carotid artery damage. Moreover, the lesion in the airway is also a particularly sensitive area, and both our patients complained of breathing difficulties when brought to our department; the voluminous masses causing significant narrowing of the supraglottic airway could be seen in CT scans. The lesion in the airway should be relieved as soon as possible. We performed surgical excision using radiofrequency ablation, and we agree that complete excision is not always possible because the cyst wall is very thin, and the lesion is often infiltrative and involves critical neurovascular structures. However, we were still able to carefully perform the procedure by radiofrequency ablation, and we tried to open up every "cell" of the lesion and remove the fluid inside. We attempted to remove as much cyst wall as possible, but when it adhered to critical structures, such as the carotid artery, we could perform marsupialisation only.

In the recent literature, radiofrequency ablation has been described as a new surgical option for the removal of vascular malformations, such as LMs [12-15]. Radiofrequency ablation produces a controlled increase in temperature within tissue, resulting in denaturation and obliteration of the directed site. After surgical excision, we used 20 ml bleomycin aqueous solution (15 mg/20 ml) to wash the surgical cavity and induce a non-specific inflammatory reaction that would help to promote adhesion of cyst walls and fibrosis of the lesion. Following this bleomycin irrigation, all the contents were aspirated again. It has been reported that local complications of intralesional bleomycin include oedema, and major post procedure oedema in the airway cannot be tolerated. We chose bleomycin irrigation (bleomycin aqueous solution was left in situ for 3 minutes for better penetration into and reaction with the cyst wall, and then the solution was removed) instead of bleomycin injection in lesions, as we thought injection of bleomycin into the lesion might increase the risk of post-injection swelling, creating a risk of acute respiratory distress for patients with masses in retropharyngeal locations. There has been no uniformity in the dose of this drug in the reported series. In our opinion, a lower dose of bleomycin is safer for paediatric patients. Our aim is to produce the minimum effective dose of bleomycin in the retropharyngeal LMs.

As reported in our cases, we used this technique for retropharyngeal LMs, and treatment objectives include reducing symptomatology, such as dysphagia, and providing a safe airway. These patients either presented with emergency symptoms (case #1) or a long history of persistent symptoms (case #2). Our procedure allowed for fast improvement of symptomatology. As such, our result confirmed the efficacy of radiofrequency ablation com-

bined with bleomycin irrigation for retropharyngeal LMs. This improvement was confirmed over the follow-up period as no regrowth was noted in either case, and no adjuvant procedure was necessary for either patient. In addition, it is easy to achieve cavity lavage with bleomycin solution, and this procedure has the advantage of facilitating bleomycin irrigation after the contents of LMs were removed. Another advantage is the minimally invasive character of the procedure, avoiding the risk of damaging critical neurovascular structures, and thus associated with reduced morbidity.
In summary, radiofrequency ablation combined with bleomycin sclerotherapy in the management of retropharyngeal lymphatic malformations is a simple and cost-effective treatment option. It allows fast recovery with minimum morbidity and a short hospital stay. Further study will be necessary to fully validate these findings and treatment indications in the long term.

Acknowledgements

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Conflict of interest statement

None declared.

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