CASE REPORT

Combination of compartmentalization Popescu’s sutures and sclerotherapy for the treatment of lymphovenous malformation of the face in a 3-year-old
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Abstract
Lymphovenous malformation (LVM) is a low-flow vascular malformation that arises from an error in morphogenesis in venous and lymphatic channels. They expand throughout life and involve multiple anatomical spaces and neurovascular structures demanding immediate treatment. Here, we report a case of LVM in a 3-year-old on the cheek treated with compartmentalization Popescu’s sutures and intralesional sclerosant injection.

Keywords: Compartmentalization Popescu’s sutures, intratumoral ligation, lymphovenous malformation, sodium tetradecyl sulfate, vascular malformation

Introduction
Vascular anomalies are lesions derived from vascular and lymphatic components with varied histological and clinical behavior. They usually occur in younger age with no sex predilection. These lesions grow proportional to the size of the individual and do not involute spontaneously. According to the classification given by Ethunanadhan and Mellor, they are classified as simple and combined lesions, further subdivided as low flow and high flow.

Venous malformations (VMs) that form two-third of all lesions can appear associated with lymphatic malformation. Lymphovenous malformations (LVMs) are low-flow combined lesions, as they are post-capillary lesions without arteriovenous shunts. Magnetic resonance imaging and contrast computed tomography are the investigations of choice. Gray scale and Doppler ultrasonography are useful in identifying solid or cystic lesions and to demonstrate the flow pattern.

Although surgery is a viable option, treatment modalities change with size, depth, location, nature of the vascular lesion, and age. We present a case of LVM on the cheek of a 3-year-old. It was treated with intratumoral ligation and intracompartmental injection of sclerosant – sodium tetradecyl sulfate (STS).

Case Report
A 3-year-old male patient reported to us with a complaint of swelling on the left side of the face for 2 weeks [Figure 1]. The history was suggestive of swelling that was gradual in onset, attained present size in a week and associated with common cold. The patient had reported with a similar swelling with no obvious cause 2 years back, which subsided on treatment with antibiotics. Hence, a similar treatment was administered which did not resolve the condition.

Extraoral examination revealed gross facial asymmetry on the left cheek region with shiny and tensed skin. On palpation, swelling was firm, compressible but lacked evident pulsation. On intraoral examination, swelling was noted on the buccal mucosal region with no vestibular obliteration. Fine-needle aspiration cytology showed dark venous blood.

Investigation with Doppler ultrasonography revealed mixed echogenicity presenting dilated venous feeder vessels with slow, monophasic flow and macrocystic lesions. Final diagnosis was determined as LVM of low-flow type.

Surgical technique
Under general anesthesia, surgical markings were made and blood was aspirated as the assistant squeezed circumferentially.
Using (2-0) vicryl suture, Popescu’s sutures were placed in concentric fashion [Figure 2]. About 3% STS (30 mg/2 ml) was injected into the compartments and pressure dressing given.

**Post-operative period**

Follow-up after a week revealed mild swelling on the surgical site. About 3% STS was injected intralesionally. Consequent follow-up showed minimal swelling with boggy consistency. Subsequent visit showed no visible swelling. Sutures were removed and 3% STS was injected. Lesion had completely regressed with well appreciable fibrosis after 2 months [Figure 3].

**Discussion**

Management of VM carries significant risk of morbidity and is largely dependent on the fluid dynamics of the lesion. In low-flow lesions with large vascular channels like that of LVM, total excision is a surgical challenge. A reliable alternative is decompressing the lesion.[4,6]

The novel technique of intratumoral ligation or compartmentalization technique was described by Popescu (1985). The primary aim is to downsize the lesion by occluding afferent and efferent vascular components and dividing them into compartments.[5,8] Large, curved needles with strong absorbable or non-absorbable suture materials are used. Deep bites with the underlying normal tissue having the same entrance-exit point resembling a vertical mattress suturing are done to establish blocks of tissue that can minimize the flow.[5]

Injection of sclerosants into compartments of the lesion is a proven treatment modality for VM.[6] STS that is injected into the compartments allows “pooling” of the concentrated agent that ensures maximal contact with the endothelial cells. This provokes severe inflammatory reaction leading to thrombosis and shrinks the vascular anomaly.[5]

Alakailly et al. and Saraf supported the use of 3% STS solution as direct intralesion injection to be simple, safe, and effective therapy for managing head-and-neck VM.[6,9] Sclerotherapy has shown to be effective for macrocystic lesions.[9] The ultimate goal of sclerotherapy is for the vessel to permanently disappear with obliteration of the lumen by fibrosis.[10]

Pilot study conducted by Chen et al. suggested that compartmentalization followed by injections of sclerotics OK-432 and Pingyangmycin provided a reliable alternative treatment for VM.[10] Similarly, we could achieve complete resolution of the lesion with our treatment.

**Conclusion**

A rare case of LVM of the face in a 3-year-old has been presented that may be associated with recurrent upper respiratory tract infection. Compartmentalization Popescu’s sutures and intralesion injection of 3% STS seem to be effective for low-flow lesions with low morbidity.
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