Egypt, J. Plast. Reconstr. Surg., Vol. 43, No. 1, January: 1-5, 2019

Reduction of Venous Vascular Malformation of the Lip by Ligation Only (Transfixing Sutures)

EMAN N. MOHAMED, M.D.; HANY S. SETTA, M.D. and AHMAD ELSHAHAT, M.D.

The Department of Plastic Surgery, Faculty of Medicine, Ain Shams University

ABSTRACT

Background: Vascular malformations include diverse group of lesions that usually present with both diagnostic and therapeutic challenges. Venous vascular malformations are generally simple, low flow lesions with abnormal venous network. They are congenital lesions, but clinically they become more obvious during the adolescent period. Most of these lesions are improperly diagnosed due to confusion in terminology with other lesions such as hemangiomas, and other low flow vascular malformations that often results in improper management.

Aim of the Study: In this study, we aim to propose and assess reliability and reproducibility of a new modality in management of venous vascular malformation in the lip by ligation of the malformation using multiple transfixing sutures technique avoiding excision and hence avoiding distortion of anatomy, as the muscle is usually inevitably involved.

Patients and Methods: 15 patients with venous vascular malformation of the lip were included in this study. 9 females and 6 males with average age 28 (9-37) years old. Ligation of the venous malformation was done in all cases by transfixing sutures. Ligation could be done in single or multiple stages according to the size of the venous malformations.

Results: 14 patients had an uneventful postoperative period. Whereas, there was postoperative bleeding in one patient. The lesions were successfully managed with surgical ligation by transfixion only without excision, with no major postoperative complications. One year follow-up period revealed no recurrence.

Conclusion: Management of venous vascular malformations of the lip by using multiple transfixing sutures for ligation is a good surgical technique avoiding injury of the muscle during surgical excision, and thus preservence of functional and aesthetic outcome with minimal surgical intervention.

Key Words: *Hemangioma – Venous Vascular malformation – Lips – Ligation.*

INTRODUCTION

Vascular anomalies are heterogeneous group of congenital lesions with abnormal vascular development and may occur anywhere in the body, especially head and neck as commonest sites. There is a primary difference between a vascular tumor, growing by cellular hyperplasia, and a vascular malformation, representing a localized defect in vascular morphogenesis. However, in spite of the incidence rate of these lesions, their pathogenesis is still incompletely agreed upon and so the management of these lesions still remains debatable **[1]**.

Bleeding represents the dangerous characteristic feature of all vascular anomalies during surgical excision. Mulliken and Glowacki (1982) classification for vascular malformations is still used to assess these lesions until now. These lesions were categorized into vascular malformations and hemangiomas according to the vascular lesion's clinical picture, biological behavior, and histology **[2,3].**

Facial vascular lesions usually represent a societal problem for the patient and a challenge for the plastic surgeon **[4]**. Cultural factors and medical unawareness add to the delay in both diagnosis and management, which may lead to psychological problems for the patients. This classification has provided a common tool for discussion of the diagnosis and treatment options in patients with vascular malformations **[2]**.

Many treatment modalities exist. They include laser photocoagulation **[5]**, surgical excision, sclerotherapy and embolization and usually acombination of two or more of these techniques gives better results **[6]**.

When non-operative modalities fail, surgery is usually needed. For the lip, in particular, the distortion of normal anatomy is not possible to correct without surgical reduction. Debulking of small lesions can usually be done by different excisional

techniques including the vertical and horizontal wedge resections and elliptical excisions **[3]**.

For large vascular lesions of the lip, many techniques are available including rotation flaps , advancement flaps, switching flaps and regional flaps **[7]**. Some of these flaps are designed without regard for the facial aesthetics **[8]**. Other methods required incisions through nerves supplying the orbicularis oris andthe flaps to be used for lower lip reconstruction **[7]**. Local rotation flaps (e.g. fan flaps) commonly lead to a deformity of the labial commissure and cheeks in function.

In order to overcome these problems, reconstruction with the ligation technique using transfixing sutures only without excision is proposed in our work.

The technique of using multiple transfixing sutures was described once in the literature, only for management of venous vascular malformations of the oral cavity and tongue **[14]**. In our article it is first time to apply the same technique by using transfixing sutures for management of venous vascular malformations of the lip.

Aim of the work:

This study aims to present and assess the reliability and reproducibility of a new modality in management of venous vascular malformation of the lip by ligation of the malformation using multiple transfixing sutures technique without excision. So, avoiding injury of the orbicularis oris muscle during the excision, as the muscle is usually infiltrated by the malformation.

PATIENTS AND METHODS

This study involved 15 patients treated for venous vascular malformation of the lip. The study was conducted during the period between February 2016 and June 2017 in Ain-Shams University Hospitals. 9 were females and 6 were males, with age ranging from 9-37 years and an average age 28 years old.

The size of the lesions ranged from 1/2 to 3 Cm, reaching up to 10cm in 4 cases, affecting both upper lip and lower lip. 9 cases in the lower lip, 4 cases in the upper lip and only 2 cases both lips.

Three lesions extended to adjacent anatomic tissues. 1 case involved the oral commissure, whereas in two cases the lesions variably involved the inside of the cheek, floor of the mouth, and neck.

Difficulty in eating or drinking representing functional impairment, was present in 5 patients, where weight of the lesion interfered with oral competence was noticed in 3 cases.

Preoperative assessment included: Oral appearance, sensation and function; where the patients were evaluated opening the mouth, puckering the lips, smiling and blowing the cheeks. Photography was done preoperatively and postoperatively. This procedure should not be done on patients receiving anticoagulant therapy or aspirin. They are contraindicated before the procedure because of their effect on platelet aggregation in blood clotting.

All patients were operated on using ligation by multiple transfixing sutures technique. The first step was to mark out the extent of the vascular anomaly, also in small lesions, it was important to determine the extent of the lesion by palpation. In large lesions assessment was done by MRI.

Operative technique: The operation was performed under general anesthesia. Followed by injection of diluted adrenaline 1: 200,000. The angles of the mouth were preserved. Incision was done near the vermillion border associated with either subcutaneous or submucosal dissection to target the lesion directly. Then we begin using multiple transfixing sutures aiming at ligation of the venous malformation without excision to preserve the muscle function, as excision may cause excision of part of the muscle which may lead to dysfunction.

Intra-lesional absorbable ligatures of vicryl 2/0 were used for intraoral extensions of venous lesions, aiming at obliteration of the vascular spaces and thus initiating coagulation cascade and eventually fibrinous adhesion.

Hemostasis was done meticulously, and compression was done as well. The overall bleeding was controlled throughout the operation. Vascularity of the lips was checked and assured at the end of the operation. Antiseptic mouth washes and a bland diet were recommended postoperatively.

All patients had uneventful postoperative anesthesia recovery. In cases of large venous malformations, another second or third stage was needed within 6 months.

RESULTS

In this study, 15 cases with venous vascular malformations involving the lips were treated by ligation only (transfixing sutures).

All cases had marked reduction in the bulk of the malformation with satisfaction in both aesthetic and functional aspects (Figs. 1- 4).

(A) (B)

Fig. (1): (A) Female patient 12 years old presented with vascular venous malformation of the upper lip involving the oral commissure and submandibular region. (B) Same patient 3 months postoperative follow-up after transfixing sutures of the lip.

(A) (B)

Fig. (2): (A) Female patient 29 years old with venous vascular malformations of both upper and lower lips. (B) Same patient 3 months postoperative follow-up after transfixing sutures of both upper and lower lips.

(A) (B)

Fig. (3): (A) Male patient 15 years old with vascular malformation of the upper lip. (B) Same patient 3 months postoperative follow-up after transfixing sutures.

(A) (B)

Fig. (4): (A) Male patient 33 years old with venous vascular malformation of the lower lip and chin. (B) Same patient with 3 months postoperative follow up after transfixing sutures of the lip.

The operation time ranged from 30 minutes to one hour with average 40 minutes for all cases. 14 patients had uneventful postoperative period. Whereas, postoperative bleeding was happened in one case which was managed by reoperation immediately with hemostasis by adding more transfixing sutures, with no need for blood transfusion.

No major complications as necrosis or infection was present, except postoperative edema and for one patient with dehiscence of the vermilion border which healed with conservative management, and another patient with hypertrophic scar that was also managed conservatively.

Postoperative assessment included lip movements, lip competence, muscle function, lip sensation and lip aesthetics.

Lip movements including opening of the mouth, blowing the cheeks, puckering the lips, and other movements were restored to normal. The lip was with intact commissures and adequate buccal sulcus in all cases. No drooling of saliva was seen during examination or reported by patients assuring lip competence (3 cases). Muscle function was tested by ability to pucker against resistance which was positive in all cases indicating retained orbicularis function. Functional improvement after 6 months in eating and drinking (5 cases) also indicated the retained orbicularis function.

Slight reduction of sensation observed in the lips which improved with time and was comparable to the other unoperated lip in cases of involvement of only one lip.

Considering the aesthetics of lips; scars were hidden in the vermillion border and by time the majority becoming unapparent within 6 months. Also there was preserved labiomental and nasolabial folds. Lip aesthetics were excellent and the

psychological burden was relieved and revealed by the high satisfaction of the patients.

However, the bluish discoloration and venous malformation persisted in some cases (4 cases) which necessitated second stage intervention after 6 month.

DISCUSSION

Vascular enlargement of the lower lip may be due to hemangiomas or vascular malformation. Because of their complexity and variability, it is important to accurately diagnose, classify the history of the lesion to prepare the family for the specific treatments available and the reasonable expectations **[9]**.

Vascular malformations arise from inborn errors of vascular morphogenesis with normal endothelial cycle. Unlike hemangiomas they usually present at birth, grow proportionally with the child, and rarely regress. Hence, delay of treatment is not recommended. They may be divided, into two groups; low-flow and high-flow vascular malformations. Venous vascular malformations are low-flow vascular malformations **[10,11]**.

Venous malformations are soft, bluish. They may get worse with age. Long-term deformity can cause depression and other psychological disturbances **[12]**.

Enlargement of the lesion tends to be more evident at the vermilion border and intraorally on the mucosal side. The mucosa offers little resistance and becomes ballooned with the lesion. The treatment options **[6]**, include pulsed dye laser sclerotherapy, percutaneous embolisation with fibrin glue and surgery **[10,13]**.

Debulking of small vascular lesions can be done by a variety of excisional surgical techniques such as elliptical excisions as well as vertical and horizontal wedge resections **[4]**. Whereas for large vascular lesions, many techniques are available including advancement flaps, switching flaps, rotation flaps and regional flaps **[7]**.

However, some of these flaps are done regardless of the facial aesthetics **[8]**. Some of these techniques required incisions through the nerve supply of the orbicularis oris muscle and the flaps used for lower lip reconstruction **[7]**. Local rotation flaps, for example fan flaps, commonly lead to distortion of the cheeks and the labial commissure in function.

In another study, compartmentalization was used to treat large vascular malformations. Large non-absorbable sutures divided the lesion into multiple compartments to provide a more effective environment for the sclerosing agents used **[15]**.

The lips have an important functional and aesthetic role. In surgery of the deformed lips, visible scars, apparent mouth deformity, a deformed commissure, and microstomia are dissatisfying factors for the patients.

In one study, transfixion technique was described for the management of vascular malformations of the oral cavity. The study was conducted on 7 patients (2 cases in the buccal mucosa, 5 cases in the tongue). The procedure was done using local infiltration anesthesia. It consists of interlacing polyglycolic acid sutures (Dexon) multiple times until the vascular malformation becomes bloodless.

The vascular malformation progressively becomes necrotic in appearance with area covered by granulating tissue that then turns to a well-organized scar within 30-40 day. The results in his study were, all seven patients with the vascular malformation completely eliminated without major long-term complications. Except for a temporary retractile scar in only one patient, and another patient with postoperative edema **[14]**.

Whereas in our study, 15 patients were included in the study. All patients were presented with venous vascular malformation of the lip (upper, lower or both). Ligation by multiple transfixing sutures was done without excision. So, there was no distortion of the anatomy as there was no excision of the muscle. Also, closure of the incision was done so, avoiding the down time of healing by granulation and secondary intention.

In this study, 14 patients had an uneventful postoperative period. Whereas, there was postoperative bleeding in one patient which was managed immediately, with no major postoperative complications nor recurrence. Another advantage is that it preserves the insertion of the buccinator muscle and other small muscles (zygomaticus, risorius, and depressor anguli oris) keeping the angle of the mouth intact. These muscles are essential for the function of the cheeks and the oral commissure, and if their arrangement is changed by surgery, the facial expressions and the personality of the face are changed **[16,17]**.

Moreover in our study, it proved to be a time saving operation with less bleeding and no need for blood transfusion (may be more suitable for

patients with advised short anesthesia time for any associated comorbidities) which was not discussed before in previous studies.

Lip ligation only by transfixing sutures for venous vascular malformation of the lips offers a reliable tool for management of these deformities with high postoperative satisfaction for the patients either aesthetically or functionally.

Conclusion:

Management of venous vascular malformations of the lips by using multiple transfixing sutures for ligation is a, simple, safe, reliable, and cost effective surgical technique avoiding injury of the orbicularis oris muscle which may occur during surgical excision, and thus preserving functional and aesthetic lips.

REFERENCES

1- Richter G.T. and Friedman A.B.: Hemangiomas and vascular malformations: current theory and management. Int. J. Pediatr., 645-678, 2012. Epub 2012 May 7.

2- Mulliken J.B. and Glowacki J.: Hemangiomas and vascular malformations in infants and children: A classification based on endothelial characteristics. Plastic and Reconstructive Surgery, 69 (3): 412-422, 1982.

3- Boutros S., Longaker M.T. and Zide B.M.: Hemangiomas of the face: Approach to successful management. Perspect. Plast. Surg., 14: 45, 2000.

4- Zide B.M., Clat P.M., Stile F.L. and Longaker M.T.: Vascular lip enlargement: Part I. Hemangiomas-Tenetsof therapy. Plast. Reconstr. Surg., 100: 1664, 1997

5- Rothfleisch J.E., Kosann M.K., Levine V.J. and AschinoffR.: Laser treatment of congenital and acquired vascular lesions. Dermatol. Clin., 20: 1, 2002.

6- Low D.W.: Management of adult facial vascular anomalies. Facial Plast. Surg., 19: 113, 2003.

7- Wechselberger G., Gurunluoglu R., Bauer T., Piza-Katzer H. and Schoeller T.: Functional lower lip reconstruction with bilateral cheek advancement flaps: Revisitation of Webster method with a minor modification in the technique. Aesth. Plast. Surg., 26: 423, 2002.

8- Campus G., Standoli N. and Alfano C.: Reconstruction of the lower lip with a full thickness nasolabial island flap. Scand. J. Plast. Reconstr. Hand Surg., 28: 285, 1994.

9- Williams H.B.: Vascular neoplasms. Clin. Plast. Surg., 7: 597, 1980.

10- Mulliken J.B.: Vascular anomalies. In: Aston S.J., Beasley R.W., Thorne C.H.M. (eds). Grabb and Smith's Plastic Surgery, 5th ed. Philadelphia: Lippincott-Raven Publishers, 1997.

11- Barsky S.H., Rosen S., Geer D.E. and Noe J.M.: The nature and evolution of port-wine stains: A computer assisted study. J. Invest. Dermatol., 74: 154, 1980.

12- Bradley J.F., Zide B.M., Berenstein A. and Longaker M.T.: Large arteriovenous malformations of the face: Aesthetic results with recurrence control. Plast. Reconstr. Surg., 103: 351, 1999.

13- Jemec B. and Sanders R.: A facial low-flow venous malformation treated with fibrin glue. Br. J. Plast. Surg., 53: 73, 2000.

14- Vazquez-Doval F.J. and Vicente F.J.: Treatment of vascular anomalies of the oral cavity by transfixion technique. Dermatol. Surg., 24: 1087, 1998.

15- Jackson I.T., Keskin M., Yavuzer R. and Kelly C.P.: Compartmentalization of massive vascular malformations. Plast. Reconstr. Surg., 115: 10, 2005.

16- Mazzola R.F. and Lupo G.: Evolving concepts in lip reconstruction. Clin. Plast. Surg., 11: 583, 1984.

17- Luce E.A.: Reconstruction of the lower lip. Clin. Plast. Surg., 22: 109, 1995.