Serial Excision of Facial Hemangiomas

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Objective: To present the technique of and indications for serial excision of facial hemangiomas.

Methods: Clinical review of patients cared for by the senior author (M.H.) in a private-practice specialty center.

Results: Forty-six patients underwent serial excision of facial infantile hemangiomas. The average number of excisions was 3 (range, 2-5), with a mean interoperative period of 4 months (range, 3-7 months). One patient sustained a traumatic dehiscence of the surgical wound, and 6 others had minor wound problems that had no impact on the final result. Two “final” scars underwent surgical revision. All results were ultimately deemed acceptable by the parents and surgeons.

Conclusion: Serial excision is a practical and reliable technique for treatment of facial hemangiomas which due to size and location are not feasibly excised and repaired in a single setting without the use of complex adjunctive reconstructive techniques.


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The diagnosis, nomenclature, and natural history of infantile hemangiomas are well documented and not controversial. Consensus on treatment, however, is still evolving. Misconceptions about problems encountered when operating on hemangiomas, such as clinically significant blood loss or the lack of surgical planes, are giving way as more surgeons know about the natural history and biological characteristics of these tumors and surgical experiences are documented and shared.

The overall goal of treatment is to obtain the best cosmetic and functional result by the time the affected child is 2½ to 3 years of age, when a sense of self-image begins to develop, and at the latest by age 5 years, which is when most children begin formal schooling. It has been the tenet of the senior author (M.H.) that early intervention is justifiable if it allows for a result that is at least as good as that expected by the anticipated natural involution of a specific tumor and if an acceptable result by involution would not be achieved by the time of the developmental milestones noted herein. Various modalities, including medical, laser, and surgery, are often needed to achieve that goal and have been amply described. The specific goal of surgery is to effect total removal of the lesion, to set the stage for further surgical or laser treatments, or to manage sequelae and complications. Most often, a single surgical procedure with primary closure achieves this.

There are situations, however, in which the size and/or location of the tumor precludes removal with primary closure. The use of flaps, except those of simple advancement or skin grafts, is best avoided on the faces of these very young children. Tissue expansion of adjacent tissue to allow closure of an expected large resection defect has been used successfully in the pediatric population. However, these are technically complex and labor-intensive procedures with well described and clinically significant sequelae and complication rates. The senior author has used forehead flaps, microvascular free tissue transfers, and tissue expansion in a very select and limited subset of the patients with infantile hemangiomas treated surgically.

Methods

If removal of a specific infantile hemangioma is not achievable in 1 stage without the use of adjunctive complex techniques, we present serial excision as a viable alternative. We believe primary linear closure of the defect, whether it be in 1 or several stages, is preferable to the use of the aforementioned tech-
techniques. Serial excision of other benign pediatric lesions, such as congenital melanocytic nevi, has been used successfully for decades and has served as the motivation for application of the technique to hemangiomas. What makes this technique possible in the treatment of hemangiomas are the known surgical planes, which either exist or can be created, and what is known of the qualities of the tumor during proliferation and involution. Dissection is possible between the superficial and deep components of the hemangioma, within the deep component, or between the deep component and normal tissues. Each of these planes can be approached as necessary with careful sharp and microunipsolar dissection. Dissection within the substance of the tumor is easily performed, and hemostasis is readily achieved with bipolar cautery. An avascular plane invariably exists between the deep component and the surrounding normal tissue (Figure 1). Most serial excisions are performed during the involutinal stage when the tumor is being replaced by fibrofatty tissue. However, judicious resection during late proliferation can be performed as well. The first stage of elliptical excision is performed completely intralesionally, sparing normal skin (Figure 2). The purpose of this and each subsequent excision is to reduce the size of the lesion leading to eventual primary closure. The elliptical excision is planned along the axis of the eventual final scar—along relaxed skin tension lines or at the junction of facial subunits. After this subtotal excision of the tumor, the edges are sutured under moderate tension to promote creep. Absorbable sutures are typically used in the intermediate stages, and meticulous wound closure techniques with tissue adhesives and nonabsorbable skin suture materials are used for the final stage. Enough time between stages is allowed to develop enough laxity of the surrounding tissues to enable reduction of the size of the residual lesion by subsequent advancement of the excision edges. The main objective is to eventually obtain a tension-free primary closure of the normal skin in the final stage. Absolute, complete removal of the tumor is not necessary or always desirable. Often, the deep component is sculpted or removed subtotally in order to not create a contour defect. Likewise, if complete removal of the superficial component in the final stage would require excision of enough skin to make closure difficult, it is left behind to continue involuting or treated with the pulsed-dye laser.

RESULTS

Forty-six patients underwent serial excision of facial hemangiomas from 2009 through 2010 out of a series
of 276 patients with hemangiomas operated on during the same period. An average of 3 serial excisions was necessary (range, 2-5). The average time between stages was approximately 4 months (range, 3-8 months). Thirty-one patients achieved a final result by about 3 years of age, 8 by around age 5 years, and 2 were not finished with surgical treatment when this article was submitted. Complications included 1 near-complete wound dehiscence owing to postoperative trauma requiring resuturing and 6 minor wound infec-

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ions or dehiscences during the intermediate stages, which were treated with local care and had no bearing on the final outcome. Two “final” scars were surgically revised with concomitant primary carbon dioxide laser abrasion for improved camouflage. The pulsed-dye laser was used in 13 patients to treat residual superficial components of the tumors. Ultimately, all final results were deemed acceptable by the parents and surgeons. Clinical examples are seen in Figures 3, 4, and 5.

Figure 3. Treatment of a complicated hemangioma of the cheek. A, Ulcerated proliferating superficial hemangioma in infancy treated with the pulsed-dye laser to heal the ulcer. B, The same thick superficial hemangioma in early involution and just prior to the first serial excision. The relative surface area occupied by the lesion precludes total excision and is unlikely to involute acceptably. C, After 2 serial excisions parallel to the nasolabial crease. D, After 1 pulsed-dye laser treatment and involution of the residual superficial component.

Figure 4. Treatment of a large complicated hemangioma of the midforehead. A, Proliferating, ulcerated compound hemangioma during treatment with propranolol and pulsed-dye laser. B, Late proliferating/early involuting stage of the same hemangioma at the time of the first of 5 serial excisions and 6 pulsed-dye laser treatments (patient was 1 year old). C, Intralesional defect created at the time of the first excision. D, Primary closure obtained at time of first excision. E, One week after fifth excision and sixth pulsed-dye laser treatment (surgical adhesive was still in place; the patient was 3 years old).

Figure 5. Treatment of a complicated upper lip hemangioma. A, Ulcerated compound hemangioma of the upper lip at the time of presentation. B, Healed ulceration after treatment with pulsed-dye laser and oral steroids and before first surgery. C, After 2 serial excisions and debulking of the hemangioma. D, After third serial excision and advancement and before further pulsed-dye laser treatments.
Serial excision is a reliable and reproducible option for the surgical treatment of infantile hemangiomas that cannot be resected and reconstructed by simple primary closure or advancement. The advantage of obviating the use of complex reconstructive techniques while obtaining acceptable cosmetic results in concert with developmental milestones outweighs the relative disadvantage of frequent outpatient procedures and anesthetics. Just as the technique is well accepted for the treatment of other pediatric cutaneous lesions, we believe serial excision has a similar place for these benign vascular tumors.

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