

Multidisciplinary Approach to Facial Hemangioma: Systematic Review and Case Report

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ABSTRACT

Facial hemangiomas are benign vascular tumors that represent a clinical entity of significant interest due to their biological behavior, diverse clinical presentation, and potential functional and aesthetic implications. Although most hemangiomas are diagnosed during infancy, these lesions may also occur in adulthood, where they typically present as slowly progressive vascular masses. Their location on the face and scalp is particularly relevant because of the cosmetic impact they may produce and their proximity to anatomically and functionally important structures.

We present the case of a 35-year-old female patient with a hemangioma located in the left frontal region, characterized by progressive growth and occasional episodes of bleeding. Initial clinical evaluation suggested a benign vascular lesion; however, imaging studies were essential to determine its anatomical extent and establish the most appropriate therapeutic plan. Computed tomography (CT) revealed a superficial lesion confined to the subcutaneous tissue, without evidence of infiltration into deep structures, periosteum, or frontal bone, findings that favored a conservative surgical approach.

The literature review demonstrated that the management of facial hemangiomas should be individualized according to the clinical characteristics of the lesion, patient age, symptomatology, and the degree of aesthetic or functional impairment. Although several therapeutic alternatives exist, including observation, pharmacological treatment, laser therapy, and sclerotherapy, surgical excision remains a highly effective option for superficial, well-circumscribed lesions amenable to primary closure.

In the present case, the absence of deep extension allowed complete surgical resection while preserving the surrounding tissues. The surgical defect was reconstructed using layered primary closure, resulting in a satisfactory postoperative course without complications or clinical recurrence during follow-up. Histopathological examination confirmed the diagnosis of superficial capillary hemangioma, corroborating the preoperative clinical suspicion.

The findings of this case are consistent with current scientific evidence, which indicates that careful clinical evaluation complemented by imaging studies enables accurate selection of patients who are candidates for surgical treatment. Complete excision offers several advantages, including immediate lesion resolution, histopathological confirmation of diagnosis, low recurrence rates, and favorable cosmetic outcomes when primary closure is feasible.

ARTICLE DETAILS

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In conclusion, superficial facial hemangiomas in adult patients can be successfully treated through surgical excision when appropriate patient selection is performed. Preoperative evaluation using computed tomography is essential to exclude deep tissue involvement and optimize surgical planning. Surgery represents a safe, effective, and definitive treatment option capable of providing excellent functional and cosmetic outcomes with minimal morbidity, as demonstrated in the present case.

KEYWORDS: Facial hemangioma, capillary hemangioma, benign vascular tumor, plastic surgery, surgical excision, primary closure.

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INTRODUCTION

Hemangiomas are the most common benign vascular tumors of infancy and represent one of the most clinically significant vascular anomalies because of their high incidence and the potential functional and aesthetic consequences they may produce. These lesions are characterized by abnormal endothelial cell proliferation, resulting in a vascular mass with a distinctive biological pattern consisting of an initial rapid proliferative phase, followed by a stabilization period and, subsequently, a spontaneous involution phase that may last for several years. Although most hemangiomas follow a favorable and self-limited course, a significant proportion may develop complications requiring medical or surgical intervention.

The incidence of infantile hemangiomas is estimated to range between 4% and 10% of newborns, with a higher prevalence among females, occurring at an approximate female-to-male ratio of 3:1. Several risk factors have been associated with their development, including prematurity, low birth weight, multiple gestations, advanced maternal age, and certain obstetric complications. From an embryological and pathophysiological perspective, the exact etiology remains incompletely understood; however, proposed mechanisms include hypoxia-related phenomena, abnormalities in angiogenesis, and dysregulated expression of vascular growth factors, particularly vascular endothelial growth factor (VEGF) and hypoxia-inducible factor (HIF).

The classification of vascular anomalies has undergone substantial changes since the original proposal by Mulliken and Glowacki in 1982 and its subsequent adoption by the International Society for the Study of Vascular Anomalies (ISSVA). Currently, these lesions are categorized into vascular tumors and vascular malformations, a distinction that is essential because of the differences in biological behavior, prognosis, and treatment. Among vascular tumors, infantile hemangioma remains the most common and extensively studied entity.

The most common anatomical location of hemangiomas is the head and neck region, accounting for approximately 60% of cases. Facial involvement is particularly important because of the functional, psychological, and reconstructive challenges it may create. Depending on their size and location, these lesions may affect critical anatomical structures such as the eyelids, orbit, nose, lips, cheeks, and

cervical region. Periocular hemangiomas may lead to amblyopia, astigmatism, or permanent visual impairment; nasal lesions may cause significant cosmetic deformities; and perioral lesions may interfere with feeding, speech, and oral function.

In addition to functional impairment, facial hemangiomas may be associated with local complications such as ulceration, secondary infection, bleeding, pain, and pathological scarring. Ulceration is the most common complication and may result in permanent aesthetic sequelae, particularly in lesions located in areas of friction or moisture. Furthermore, extensive or segmental hemangiomas may be associated with complex syndromes such as PHACE syndrome, characterized by large facial hemangiomas associated with posterior fossa malformations, arterial anomalies, cardiac defects, and ocular abnormalities.

The diagnosis of facial hemangiomas is primarily clinical and is based on the characteristic natural history of the lesion, physical examination findings, and temporal evolution. However, selected cases may require complementary studies such as Doppler ultrasonography, magnetic resonance imaging, or computed tomography to determine lesion depth, evaluate adjacent structures, or exclude differential diagnoses. Accurate identification of the lesion is essential to establish an appropriate therapeutic strategy and avoid unnecessary treatments.

For many years, management of hemangiomas was based primarily on clinical observation, given their tendency toward spontaneous involution. However, the discovery of propranolol as an effective treatment revolutionized the therapeutic approach to this condition. Since its introduction in 2008, propranolol has become the first-line treatment for complicated infantile hemangiomas, demonstrating high response rates and a favorable safety profile. Additionally, other therapeutic modalities, including systemic corticosteroids, laser therapy, sclerotherapy, and surgery, continue to play an important role in selected cases.

Despite the therapeutic advances achieved over recent decades, controversies remain regarding the precise indications for treatment, the optimal duration of pharmacological therapy, the ideal timing for surgical intervention, and the management of residual sequelae. Furthermore, the available evidence continues to evolve concerning prognostic factors, long-term functional and

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aesthetic outcomes, and the most appropriate reconstructive strategies for each patient.

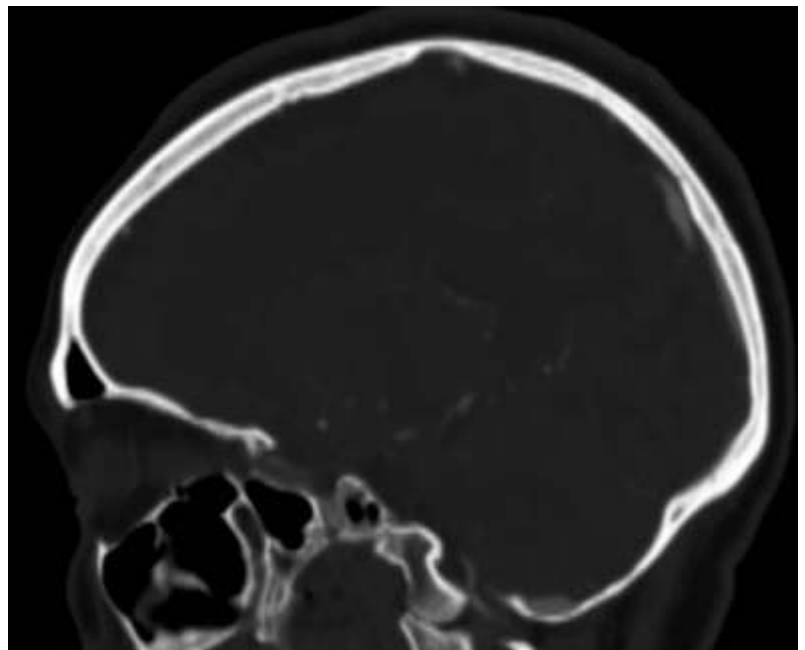
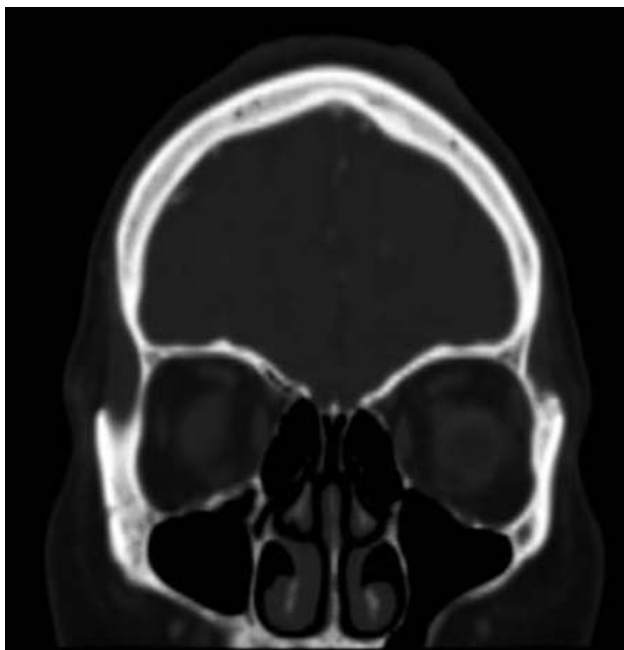
Moreover, case reports continue to be a valuable tool for documenting unusual clinical presentations, innovative therapeutic modalities, and complex reconstructive outcomes. The integration of scientific evidence obtained through a systematic review with clinical experience derived from a specific case provides a broader and more practical perspective on this pathology, facilitating evidence-based clinical decision-making.

Therefore, the aim of the present study is to perform a systematic review of the available literature on facial hemangiomas, analyzing their epidemiology, pathophysiology, classification, clinical manifestations, diagnostic methods, and current therapeutic options. Additionally, a clinical case of facial hemangioma treated at

our institution is presented, highlighting the diagnostic, therapeutic, and reconstructive considerations involved in its management, with the purpose of contributing to the knowledge and ongoing advancement of this important entity within plastic and reconstructive surgery.

CASE REPORT

A 35-year-old female patient with no significant past medical history presented to the Plastic Surgery Department with a vascular lesion located in the left frontal region along the hairline. The patient reported an approximately four-year history of slow and progressive growth. She denied pain, previous trauma, neurological changes, or associated systemic symptoms. Clinical manifestations included occasional episodes of mild bleeding following hair brushing or manipulation of the lesion, as well as aesthetic concerns due to its gradual enlargement.



Figures 1 and 2. Coronal and axial computed tomography scans demonstrating a well-circumscribed superficial vascular lesion located in the left frontal region, confined to the subcutaneous tissue, with no evidence of invasion into deep tissue planes, galea aponeurotica, periosteum, or underlying bone structures. No intracranial extension or involvement of adjacent neurovascular structures was identified.

Physical examination revealed an exophytic vascular lesion with a reddish-violet coloration, multilobulated appearance, well-defined borders, and slight elevation above the skin surface. The lesion was located in the left frontotemporal region near the hair implantation line. It consisted of a main vascular plaque measuring approximately 2.5×1.5 cm, accompanied by a superior satellite nodule measuring approximately 0.8 cm in diameter. On palpation, the lesion was soft, compressible, non-tender, without local temperature increase, and without audible bruit or palpable thrill. The surrounding skin was intact and showed no signs of infection. To determine the extent of the lesion and rule out infiltration of deeper structures, a cranial computed tomography (CT)

scan with soft tissue windows was obtained. The study demonstrated a superficial vascular lesion confined to the subcutaneous tissue of the left frontal region, well circumscribed, with no evidence of invasion of the galea aponeurotica, periosteum, or underlying bone structures. No intracranial extension or involvement of adjacent neurovascular structures was identified.

Based on the clinical and radiological findings, a diagnosis of superficial capillary hemangioma of the left frontal region was established. Due to its visible location, progressive growth, recurrent episodes of bleeding, and absence of deep tissue involvement, surgical treatment by complete excision was indicated.



Figures 3 and 4. Preoperative images.

Under local infiltrative anesthesia using 2% lidocaine with epinephrine, an elliptical incision was designed encompassing the entire lesion with a minimal margin of healthy tissue. Careful dissection was subsequently performed down to the subcutaneous plane, identifying a completely superficial and well-circumscribed lesion. En-

bloc excision was carried out with adequate hemostasis achieved using bipolar electrocautery. Owing to the local skin laxity and the relatively small size of the resulting defect, layered primary closure was performed using absorbable sutures for the subcutaneous tissue and nonabsorbable monofilament sutures for skin closure



Figure 5. Immediate postoperative image.

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The postoperative course was uneventful, without immediate complications. The patient demonstrated appropriate wound healing, with no evidence of infection, hematoma, or wound dehiscence. Histopathological examination confirmed the diagnosis of superficial lobular capillary hemangioma without evidence of malignancy. During outpatient follow-up, a well-positioned linear scar along the hairline was observed, with satisfactory aesthetic results and no evidence of clinical recurrence.

DISCUSSION

Hemangiomas are benign vascular tumors characterized by endothelial cell proliferation and represent the most common vascular neoplasms of infancy; however, they may also occur in adults, although with considerably lower incidence. Their occurrence in the facial region presents both diagnostic and therapeutic challenges because of the aesthetic and functional implications associated with this location. In the present case, the patient exhibited a superficial vascular lesion located in the left frontal region, with slow growth and occasional episodes of bleeding, findings that are consistent with the characteristics described in the literature for superficial capillary hemangiomas.

The diagnosis of facial hemangiomas is generally established through clinical examination; nevertheless, imaging studies play a crucial role in determining lesion depth and excluding infiltration of adjacent structures. In our patient, computed tomography demonstrated a lesion confined to the subcutaneous tissue without involvement of the galea aponeurotica, periosteum, or frontal bone, information that allowed definitive surgical planning through simple excision and primary closure.

Treatment selection depends on multiple factors, including lesion size, location, depth, growth rate, and the presence of symptoms. Although propranolol currently represents the first-line treatment for complicated infantile hemangiomas, small, well-defined, and superficial lesions in adult patients may benefit from surgical excision, particularly when aesthetic concerns or recurrent bleeding are present. In the present case, the absence of deep extension allowed complete excision with adequate preservation of surrounding tissues and an excellent cosmetic outcome.

Several authors have reported that surgical excision offers important advantages for localized superficial lesions, including immediate resolution, histopathological confirmation of diagnosis, and low recurrence rates. Furthermore, when the surgical defect is small, primary closure represents the ideal reconstructive option, providing inconspicuous scars and minimizing procedural morbidity.

Table 1. Clinical Characteristics of the Main Types of Facial Hemangiomas

Characteristic	Superficial Hemangioma	Deep Hemangioma	Mixed Hemangioma
Color	Bright red	Bluish or violaceous	Combined
Location	Superficial dermis	Subcutaneous tissue	Both planes
Elevation	Moderate	Marked	Variable
Consistency	Soft	Soft-compressible	Intermediate
Clinical diagnosis	Easy	May require imaging	Requires clinical correlation
Risk of deformity	Low	Moderate to high	High

Table 2. Diagnostic Modalities in Facial Hemangiomas

Study	Main Utility	Advantages	Limitations
Physical examination	Initial diagnosis	Inexpensive and accessible	Does not determine depth
Doppler ultrasound	Vascular assessment	Non-invasive	Operator dependent
Computed tomography	Evaluation of extent and bone involvement	Excellent anatomical definition	Radiation exposure
Magnetic resonance imaging	Assessment of deep soft tissues	High sensitivity	Higher cost
Histopathology	Diagnostic confirmation	Definitive diagnosis	Requires biopsy or excision

Table 3. Therapeutic Options for Facial Hemangiomas

Treatment	Indications	Advantages	Disadvantages
Observation	Small asymptomatic lesions	Non-invasive	Prolonged evolution
Propranolol	Proliferative hemangiomas	High efficacy	Requires follow-up
Laser therapy	Residual superficial lesions	Good cosmetic outcome	Multiple sessions
Sclerotherapy	Selected lesions	Less invasive	Variable outcomes
Surgery	Localized superficial lesions	Immediate resolution	Surgical scar

Table 4. Comparison Between Conservative and Surgical Management

Variable	Conservative Management	Surgical Excision
Time to resolution	Months to years	Immediate
Histological confirmation	No	Yes
Recurrence risk	Variable	Low
Initial aesthetic outcome	Variable	Immediate
Need for prolonged follow-up	High	Low
Overall cost	May be high	Usually a single procedure

In the present case, the lesion exhibited ideal characteristics for surgical management, including small size, superficial location, absence of deep infiltration, and the possibility of tension-free primary closure. These conditions allowed complete excision with an excellent postoperative course and favorable aesthetic outcome. The findings observed are consistent with those reported in the literature, where surgery remains a safe and effective alternative for well-circumscribed superficial facial hemangiomas, particularly in adult patients. Therefore, preoperative imaging studies are essential for appropriately selecting candidates for surgical treatment and optimizing both functional and cosmetic outcomes.

CONCLUSION

Facial hemangiomas are benign vascular tumors whose clinical significance lies not only in their biological behavior but also in the functional, psychological, and aesthetic repercussions they may generate. Although most of these lesions exhibit a favorable course, their location in visible areas of the face and scalp may significantly affect patients' quality of life, prompting the need for specialized medical attention. Consequently, diagnostic and therapeutic management should be individualized according to the clinical characteristics of each case, considering factors such as lesion size, depth, anatomical location, growth rate, symptomatology, and the patient's aesthetic expectations.

In the present case, a 35-year-old female patient presented with a vascular lesion in the left frontal region characterized by slow progressive growth, occasional bleeding episodes, and evident aesthetic impact. Initial clinical evaluation suggested a benign vascular lesion; however, imaging studies were essential in determining its true anatomical extent. Computed tomography demonstrated that the lesion was confined to the subcutaneous tissue without infiltration of deep structures, periosteum, or frontal bone, allowing the establishment of an appropriate therapeutic strategy.

The absence of deep tissue involvement made the patient an ideal candidate for definitive surgical treatment through complete excision and primary closure. This approach enabled total lesion removal while preserving the surrounding tissues, minimizing surgical morbidity, and achieving an excellent cosmetic outcome. Histopathological analysis confirmed the diagnosis of superficial capillary hemangioma,

excluding other vascular lesions or neoplastic processes that could have altered prognosis and follow-up.

The outcomes observed in this case are consistent with the evidence reported in the literature, which indicates that surgical excision remains a safe, effective, and predictable therapeutic option for superficial, well-circumscribed lesions located in areas where tension-free primary closure can be achieved. Among the principal advantages of this treatment are immediate lesion resolution, definitive histopathological diagnosis, low recurrence rates, and the possibility of achieving satisfactory cosmetic outcomes through a single intervention.

Furthermore, this case highlights the importance of preoperative imaging studies in the management of facial vascular anomalies. Accurate assessment of lesion depth and extent allows selection of the most appropriate treatment, reduces the risk of intraoperative complications, and optimizes reconstructive outcomes. In superficial lesions such as the one presented, computed tomography represents a valuable diagnostic tool for excluding bone involvement or infiltration of deeper tissue planes, thereby facilitating surgical planning.

Finally, successful management of facial hemangiomas requires a comprehensive evaluation based on clinical, radiological, and histopathological correlation. Surgical excision with primary closure represents an excellent therapeutic option in selected patients with superficial and well-defined lesions, providing favorable functional and aesthetic outcomes. The presentation of this case reinforces the existing evidence regarding the effectiveness of surgical treatment for localized facial hemangiomas and highlights the importance of meticulous preoperative planning in achieving optimal and durable results.

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