Infantile hemangiomas (IH) are the most common tumor of infancy and have been estimated to occur in 4% of infants. While IH are typically absent at birth, they become noticeable within the first few weeks of life. Approximately one third of IH present shortly after birth, another third present in the first month and the remainder develop within the first six months of life.

KEYWORDS: infantile hemangiomas, tumor, lesions, vascular patches.
During typical development, IH undergo a period of rapid proliferation during the first three months and then slowly involute once the maximum size has been reached, usually after one year (Figure 1). Involution will take many years with 50% of IH being completely involuted by 5 years of age. IH are quite distinct from true neoplasms as they tend to grow in volume rather than diameter. While some IH regress completely, the IH that resolve after 6 years are more likely to leave residual cutaneous changes such as telangectasias, atrophic wrinkling, and scarring among other side-effects. The pathogenesis behind IH is not well documented, however recent studies have indicated genetic mutations in pro-angiogenic growth factors and hypoxia as possible causes, and endothelial progenitor cells as the original cells. It is important to note that other vascular lesions can be mistaken for IH, and these include congenital hemangiomas (Figure 2), port-wine stains (Figure 3), kaposiform
Infantile Hemangiomas

hemangioendotheliomas, tufted angiomas (Figure 4) and pyogenic granulomas (Figure 5).³

Generally, IH tend to occur more in females, Caucasians, low birth weight babies, premature infants and multiple gestation pregnancies.¹ In the early 1990’s, the International Society for the Study of Vascular Anomalies (ISSVA) developed a classification system that distinguished vascular tumours from vascular malformations, hence resolving erroneous communication.⁵ While vascular tumours usually regress or may persist, vascular malformations never regress and tend to persist throughout life.⁵ Differentiating between these two anomalies is essential to not only distinguish their clinical, radiological and pathological features, but their approach toward management is quite different as well.⁵

What infantile hemangiomas to worry about

While most IH resolve without complications, some have alarming features that need to be addressed and followed.¹ Approximately 24% of IH have complications that require interventions, with ulceration being most common.¹² Other important features to note are that some may result in permanent disfigurement or functional impairment. For

Figure 2: Congenital hemangioma
Figure 3: Port-wine stain
Figure 4: Tufted angioma
Figure 5: Pyogenic granuloma
Figure 6: Periorbital hemangioma
Figure 7: “Beard distribution” hemangioma
instance, periorbital lesions (Figure 6) may lead to visual compromise through astigmatism, amblyopia and optic atrophy. Laryngeal and tongue lesions can lead to airway obstruction and cause swallowing impairment, and clues to airway involvement are associated hemangiomas in a “beard distribution” (Figure 7). Nasal-tip lesions can result in cosmetic disfigurement (Figure 8). A lumbosacral location is associated with underlying spinal cord tethering and myelopathy, as well as other structural abnormalities (Figure 9). Also, multiple (>5) IH are a marker of hepatic hemangiomas and hemangiomatosis (Figure 10).

The timing of therapy is critical in severe IH as they are best treated early in the proliferative phase to prevent inferior outcomes.

How to treat infantile hemangiomas

Although most patients with IH do not require intervention, the decision to treat is made on an individual basis. Usual therapy for IH involves active observation, but systemic treatment can be required to avoid scarring, permanent disfigurement or life threatening complications. Until 2008, the first-line therapy for IH was corticosteroids (systemic, topical or intralesional), however they were associated with high-incidence side effects, including secondary hypertension (40%), cushingoid features (40%) and growth suppression (67%). Over the last few years, the non-selective beta-blocker propranolol has become the first-line therapeutic choice. Its superior safety and efficacy has been documented in a number of studies. Its mechanism of action is not fully elucidated. However, it is believed to induce early colour change through vasoconstriction, to inhibit the growth phase through blocking endothelial growth factors.

Figure 8: Nasal tip hemangioma
Figure 9: Lumbosacral hemangioma
Figure 10: Neonatal hemangiomatosis
like VEGF and BFGF, and to hasten resolution through induction of apoptosis.\textsuperscript{16,17} Infants started on propranolol are closely monitored for side effects, with the most common being hypoglycemia, hypotension, bradycardia and bronchial hyperreactivity.\textsuperscript{3} Another non-selective beta-blocker, nadolol has shown similar benefits to propranolol, while exhibiting less side effects.\textsuperscript{3}

The timing of therapy is critical in severe IH as they are best treated early in the proliferative phase to prevent inferior outcomes.\textsuperscript{3} Patients who are started on a beta-blocker should extend their treatment up to one year of age to prevent relapse of IH.\textsuperscript{3} Second-line treatments include systemic corticosteroids, alpha-interferon and vincristine.\textsuperscript{7} Topical treatments such as the use of timolol have been reported to be effective in the treatment of small superficial IH.\textsuperscript{2,3} Very few IH require surgical intervention but cases are considered on a case-by-case basis.\textsuperscript{3}

### Vascular Anomaly Classification

<table>
<thead>
<tr>
<th>Vascular Tumour</th>
<th>Vascular Malformation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Usually regress or may persist</td>
<td>• Never regress and tend to persist throughout life</td>
</tr>
<tr>
<td><strong>Single vessel type:</strong></td>
<td>• Hemangioma</td>
</tr>
<tr>
<td>• Capillary</td>
<td>• Hemangioma of infancy</td>
</tr>
<tr>
<td>• Venous</td>
<td>• Congenital hemangioma</td>
</tr>
<tr>
<td>• Lymphatic</td>
<td>• Rapidly involuting congenital hemangioma</td>
</tr>
<tr>
<td>• Arteriovenous</td>
<td>• Noninvoluting congenital hemangioma</td>
</tr>
<tr>
<td><strong>Combined/complex malformations:</strong></td>
<td>• Vascular neoplasm</td>
</tr>
<tr>
<td>• Lymphaticovenous</td>
<td>• Kaposiform hemangioendothelioma</td>
</tr>
<tr>
<td>• Capillary-venous</td>
<td>• Angiosarcoma</td>
</tr>
<tr>
<td>• Capillary-lymphaticovenous</td>
<td>• Hemangiopericytoma</td>
</tr>
<tr>
<td>• Capillary-arteriovenous</td>
<td>• Miscellaneous</td>
</tr>
<tr>
<td></td>
<td>• Tufted angioma</td>
</tr>
<tr>
<td></td>
<td>• Pyogenic granuloma</td>
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</tbody>
</table>
**SUMMARY OF KEY POINTS**

Hemangiomas usually appear within the first month of life and undergo a rapid proliferation phase followed by an involution phase.

Risk factors for hemangiomas include female gender, prematurity, low birth-weight, Caucasian ethnicity and multiple gestation pregnancies.

Most hemangiomas can be managed by observation, education and reassurance.

In select hemangiomas, complications can ensue and these include visual obstruction, airway compromise, cosmetic disfigurement and extracutaneous involvement.

In concerning hemangiomas, an emerging and effective treatment option is oral beta-blocker therapy.

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**The authors have no conflict of interest to disclose.**

**This paper has not been previously published or presented.**

*All photos courtesy of Dr. Lam.*

**References**


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**CLINICAL PEARLS**

Beware of periorbital hemangiomas — even small ones can cause amblyopia, astigmatism, optic atrophy.

Patients with greater than 5 hemangiomas are at risk for diffuse hemangiomatosis and hepatic hemangiomas.

Other vascular lesions that can mimic hemangiomas — these generally do not respond to beta-blocker therapy.

Since the majority of growth occurs in the first 12 weeks, early recognition and referral of problematic hemangiomas is essential.


