PedsCases Podcast Scripts

This is a text version of a podcast from Pedscases.com on "**Infantile Hemangioma.**" These podcasts are designed to give medical students an overview of key topics in pediatrics. The audio versions are accessible on iTunes or at www.pedcases.com/podcasts.

Infantile Hemangioma

Developed by Lauren Z and Dr. Don McConnell for PedsCases.com.
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Introduction:

Hey everyone, my name is Lauren and I am a third year medical student at the University of Alberta. This PedsCases podcast is designed to give an organized approach to infantile hemangioma (IH), the most common benign tumor of infancy. This podcast was created with Dr. Don McConnell, a pediatrician specializing in pediatric dermatology in Edmonton, Alberta, Canada.

Clinical Case

Let's start with a clinical case: you are a third year medical student working on your pediatrics rotation. One day in clinic, you encounter a healthy 3 week-old term infant who presents with her mother for a routine check-up. Her mother inquires about a small red lesion on her baby's forehead that appeared about a week ago. On exam, you observe a well female infant with a 0.8 cm well-circumscribed erythematous papule to the right temple. Further inspection of her skin reveals no other lesions, and the remainder of physical exam is unremarkable. Her mother is wondering what the lesion is, and whether you believe it is concerning.

Learning Objectives

1. Describe the growth characteristics, clinical features and possible complications of infantile hemangiomas
2. Outline the current treatments for infantile hemangiomas
3. Determine the clinical circumstances that would instigate a referral to a pediatric dermatologist for further evaluation and management

What is an Infantile Hemangioma?

Infantile hemangiomas (IH's) are a type of vascular neoplasm formed by proliferation of blood vessel or other vascular tissue[2]. Unlike vascular malformations, IH's have a rapid

post-natal proliferative phase. Most IH's are small, benign and self-resolving. However, because of their size or location, a minority of IH's may pose a risk for significant complications that require medical management.

Risk Factors/Causes of IH

There are several known risk factors for the development of IH, including low birthweight, preterm birth, female gender, twin gestation and fair skin[1,2].

Currently, the pathogenesis of IH is not fully understood. It is hypothesized that in utero, endothelial progenitor cells may migrate to locations which favor vascular growth[1], including those affected by poor tissue oxygenation and perfusion.

Clinical Features of IH

At birth, a premonitory mark may be present such as a discoloration, blanching, or telangiectasia[1,2]. Typically, IH proliferate during the first 1- 4 months of life, with rapid growth of superficial IH observed between 5-7 weeks of age[1,2]. In most cases, the growth phase is completed by 5 months of age, followed by a period of gradual involution[1]. Larger, deeper IH tend to grow for a longer period of time and involute more slowly[2].

Hemangiomas are classified according to soft-tissue depth as well as distribution. Those classified by depth may be organized into three categories: superficial, deep, or mixed lesions. Superficial IH are bright red with minimal elevation, while deep hemangiomas tend to have subcutaneous involvement and are often "bluish" in color[1,2]. Mixed hemangiomas have both components.

Lesions classified by distribution are organized into four categories. Localized IH's are well-defined focal lesions, while segmental IH's are large (>5 cm in diameter) and plaque-like[1]. Indeterminate IH's do not clearly fall into either of the aforementioned categories. Lastly, multi-focal IH's are comprised of multiple discrete IH's at several sites across the skin surface.

Typically, IH is diagnosed clinically. Therefore, imaging of IH's with ultrasound is not indicated for diagnostic purposes unless the lesion has an atypical appearance or growth pattern[1].

Complications of IH

While most hemangiomas are self-resolving and do not require treatment, there are a minority of IH's that may be problematic, which are discussed in this section.

(1) Rarely, hemangiomas may present life threatening complications. These include IH's with airway or hepatic involvement. Hemangiomas in the "beard" distribution;

that is, those around the nose, mouth, chin, and neck area have potential for extension resulting in an obstructive airway hemangioma[1,2]. As the IH enlarges, most children affected develop biphasic stridor and a barky cough[1]. Symptoms can often be mistaken for more common infectious or inflammatory etiologies such as croup, rendering the mean age of diagnosis 4 months[1]. In approximately half of infants in whom an airway IH is diagnosed also will have a cutaneous IH[1]. As such, these cases require urgent evaluation by ENT. Having 5 or more cutaneous IH's also increase's ones risk for liver hemangioma, which are associated with congestive heart failure and severe hypothyroidism[1,2]. Such cases should be evaluated with screening by abdominal ultrasound[1] and thyroid studies may also be indicated for the next several months.

(2) Some IHs have the potential for functional impairment, namely, IH's found in the periocular region. Growth and extension into the visual field may result in astigmatism, anisometropia, or amblyopia[1,2]. These patients should be referred to pediatric ophthalmology for assessment. Additionally, IH that involve the lip or oral cavity may cause feeding impairment[1].

(3) Another common indication for treatment is for IH at increased risk of ulceration. Ulceration can lead to significant pain, bleeding, secondary infection and commonly develop scarring. Ulceration occurs most frequently in infants less than 4 months[1], when the rate of IH proliferation is most rapid. Lesions at risk include segmental IH, or those involving the lips, nose, superior helix of ear, perineum, perianal skin, and intertriginous areas[1,2]. While most bleeding is minor and controllable with pressure, bleeding from deep ulceration can be substantial and even life threatening in rare circumstances[1].

(4) Infrequently, IH may present with associated underlying structural anomalies. Segmental IH of the face or scalp are associated with PHACE syndrome[1,2], which stands for Posterior Fossa, Hemangioma, Arterial lesions, Cardiac abnormalities, and Eye abnormalities, while segmental IH of the lumbosacral or perineal area is associated with LUMBAR syndrome, which stands for Lower body hemangioma, Urogenital anomalies, Myelopathy, Bone deformities, Anorectal malformations/Arterial anomalies, and Renal anomalies[1]. While exploring both syndromes in detail is beyond the scope of this podcast, it is important to note syndromes may involve further complications (e.g., intracranial and vascular abnormalities) necessitating further investigation (most commonly, MRI[1]) and referral to the appropriate specialist team.

(5) The most common indication to treat IH is to prevent permanent scarring or disfigurement. Specifically, segmental hemangiomas or hemangiomas >2 cm on the face/scalp, and IH on the tip of the nose or lip have a higher propensity for poor involution and sub-optimal cosmetic outcome, and as such should be evaluated for early initiation of treatment[1,2].

Treatment

First line treatment for IH is systemic propranolol, administered orally at a dose of 2-3 mg/kg per day in BID divided doses[1]. The mechanism of action of propranolol remains unclear, but it is hypothesized that vasoconstriction, angiogenesis inhibition and induction of apoptosis all play a role[1]. Typically, treatment lasts approximately 6 months, though is extended to at least 12 months of age in most cases.

Side effects of propranolol include sleep disturbances, cold extremities, GI symptoms, hypoglycemia, hypotension, bradycardia, and bronchial irritation or bronchospasm[1,2]. Propranolol should be administered with or after feeding and held at times of low oral intake to reduce the risk of hypoglycemia. When initiating treatment, in-office intermittent heart rate and blood pressure monitoring should be conducted for 2 hours after the first dose of propranolol[1]. Initiation monitoring for patients younger than 5 weeks or those with comorbidities may require brief hospitalization.

For those with contraindications to propranolol, systemic or intralesional corticosteroid may be used. However, more selective beta blockers such s Nadalol and atenolol are now being used much more commonly. Additionally, topical timolol may be used to treat thin and superficial IH's. Since the advent of B-blocker therapy, surgical and laser options are used less frequently. However, surgery may be considered in some cases, including in IH's which ulcerate, obstruct or deform vital structures (such as the airway or orbit), involve aesthetically poor-healing areas, lesions refractory to pharmacotherapy, or those that have left behind residual fibrofatty tissue following involution. In some cases, multiple treatments of pulse-dye laser may be used to remove residual erythema and superficial telangiectasias in involuted IH's.

Indications for Referral

In a primary care setting, most IH's are uncomplicated and require no active treatment. However, because many IH's leave behind permanent skin changes, there is a window of opportunity to treat lesions at high risk. Early intervention and/or referral (ideally by 1 month of age) is recommended for infants who have potential complications posed by IH as identified above[1]. While pediatric dermatologists are the most common specialist involved in IH management, referral to ENT, ophthalmology, or plastic and reconstructive surgery may also be considered.

Conclusion/Return to Case

Let's return to our clinical case. A review of systems was conducted with particular attention paid to respiratory or cardiac symptoms, with no complications as listed above identified. After careful discussion regarding benefits and risks of therapy, a watchful-waiting approach was decided upon as there were no indications to initiate treatment at the present time. Her mother was counseled regarding the course and progression of IH, and advised that even after involution, residual changes such as telangiectasias,

redundant skin, or a scar may be left behind. Her mother was encouraged to document the progression of growth with photographs and to schedule a visit to reassess the lesion if concerns about the appearance or development of ulceration, bleeding, or pain were to arise, all indicating that the lesion may no longer be low-risk.

Take Away Points

1. Infantile hemangiomas are the most common benign tumor of infancy, occurring in up to 5% of infants[1]. While the majority of IH are not problematic and require no active intervention, a small sub-set may pose significant complications.
2. Complications include IH's which may be life-threatening (for example, airway or hepatic IH's), IH's with the potential for functional impairment, those at risk of ulceration, lesions with associated structural abnormalities, and those which may cause permanent scarring or disfigurement
3. First line treatment is systemic propranolol, administered orally at a dose of 2-3 mg/kg per day in BID divided doses
4. Early intervention and/or referral (ideally by 1 month of age) is recommended for infants who have high-risk IH with potential complications in order to optimize outcomes.

References

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