Infantile hemangioma

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Infantile Hemangioma (IH)

Risk factors	Pathogenesis	Clinical	Pathology	Complications	Management
1. Caucasian 2. Female 3. Higher maternal age 4. Prematurity 5. Low birth weight 6. Multiple gestation 7. Placental insufficiency 8. Chorionic villus sampling	Not fully elucidated. Theories include: - Vasculogenesis & angiogenesis - ↑ VEGF signalling → endothelial cell proliferation - Expression of placenta-associated vascular antigens (GLUT-1) - Hypoxia → ↑ GLUT1 & VEGF → mobilization of endothelial progenitor cells - Genetic associations: VEGFR2, ANTXR1, loss of heterozygosity of 5q	Clinical types 1. **Superficial** (50-60%, most common) - Superficial dermis - Strawberry plaque with finely lobulated surface 2. **Deep** (15%) - Deep dermis / subcutis - Warm, ill-defied light blue-purple mass with minimal or no overlying skin changes → high flow by doppler during proliferative phase 3. **Mixed** (25-35%) - Well-delineated red vascular plaque overlying larger, poorly circumscribed violaceous or light blue nodule Patterns of involvement - **Focal** - **Multifocal:** if ≥5 lesions are present → must rule out extracutaneous hemangiomas (liver most common site for visceral involvement) - **Segmental:** plaque-like hemangioma covering a developmental unit → must rule out extracutaneous anomalies - **Indeterminate** Natural history - Subtle IH precursor lesions may be present at birth, but well-formed lesions usually not noted until a few weeks of life - **Early proliferative** phase: rapid increase in size, most rapid from 5-8 weeks, 80% reach final size by 3 months - **Late proliferative** phase: continued slower growth - **Plateau** phase - **Involution** phase: gray-purple color change, surface flattening, may begin as early as 1st year of life, median age of complete involution is 36 months, may not fully involute, may leave behind atrophic fibrofatty plaque or telangiectasias	Proliferative phase Lobular endothelial proliferation Involution phase Fibrous & fatty tissue Positive markers - GLUT1 - Lewis Y antigen - Merosin - FcgRII - WT1	Ulceration - Most common complication, up to 10% - IH at risk: on lips, anogenital, skin folds, large, mixed, or segmental IH - Increased risk of infection & scarring Disfigurement, functional impairment - Periocular, nasal tip, columella, lip, pinna, breast, anogenital IH Extracutaneous involvement - Large facial IH → **PHACES** syndrome - Lower facial IH → **airway hemangioma** - Midline lumbosacral IH → **spinal dysraphism** - Large lower body IH → **LUMBAR** syndrome - Multifocal IH with extracutaneous hemangiomas → **hepatic involvement** can lead to **high-output CHF** Hypothyroidism ↑ type 3 iodothyronine deiodinase in proliferating hemangiomas → deactivated thyroid hormone	Topical - Timolol 0.5% (max 0.25mg/kg/day) - Superpotent corticosteroids Intralesional - Triamcinolone 5-40mg/ml (max 3-5mg/kg) Systemic - Indications for systemic therapy: lesions threatening vision/airway, liver involvement (or high output CHF), risk for disfigurement, ulceration - Propranolol (1st line) ▪ Give with feeding ▪ Titrate to 2-3 mg/kg/day ▪ MOA: Vasoconstriction + Disrupt VEGF signaling + Endothelial cell apoptosis ▪ Adverse effects: hypotension, bradycardia, hypoglycemia, bronchospasm, sleep disturbance, cold extremities, diarrhea, somnolence ▪ PHACES: order MRI/MRA of head and neck and echocardiogram to rule out anomalies before starting - Systemic corticosteroids - Vincristine - Rapamycin (Sirolimus) Physical - PDL or Nd: YAG laser - Surgical excision - Arterial embolization

Syndromes associated with segmental hemangiomas

P	**P**osterior fossa & other brain malformations: Dandy-Walker, cerebellar hypoplasia
H	**H**emangiomas: segmental (face & neck)
A	**A**rterial abnormalities: cervical & cerebral artery aplasia, dysplasia, aneurysms (*cerebrovascular anomalies = most common)
C	**C**ardiac defects: aortic arch abnormalities, VSD, ASD
E	**E**ye abnormalities: retinal vascular anomalies, optic nerve hypoplasia
S	**S**ternal defects & supraumbilical raphe
L	**L**umbosacral/**L**ower body hemangioma & **L**ipomas or other cutaneous anomalies ("skin tags")
U	**U**rogenital anomalies
M	**M**yelopathy (spina bifida)
B	**B**ony deformities (hip dysplasia, leg length/width discrepancy, scoliosis)
A	**A**norectal (fistula, imperforate anus) & **A**rterial anomalies (lower limb stenosis, dysplasia)
R	**R**enal anomalies (hypoplastic, single, pelvic kidney)

Congenital hemangiomas and hallmark features that differentiate them from infantile hemangiomas

- Fully formed at birth
- Pathophysiology: Most have mutation in GNAQ or GNA11
- Doppler: dense vascularity, fast-flow
- Rapidly involuting congenital hemangiomas (RICH): rapidly involute in first year of life
- Non-involuting congenital hemangiomas (NICH): do not involute, grow proportionately with child, may be painful
- Partially involuting congenital hemangiomas (PICH): intermediate form, undergoes partial involution
- Pathology: Negative GLUT1 and Lewis Y antigen

Abbreviations: ASD: atrial septal defect, CHF: congestive heart failure, IL: intralesional, MOA: mechanism of action, NICH: Non-involuting congenital hemangiomas, PICH: Partially involuting congenital hemangiomas, PDL: pulse dye laser, RICH: Rapidly involuting congenital hemangiomas, VEGF: vascular endothelial growth factor, VSD: ventricular septal defect

References:

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