Paediatric and Perinatal Pathology: Update on vascular anomalies in childhood

Benign vascular tumours

S Fraitag

Hôpital Necker-Enfants Malades, Paris
Benign vascular tumours

- Infantile hemangioma / Hemangioma of infancy
- Congenital hemangioma
  - Rapidly involuting (RICH)
  - Non-involuting (NICH)
  - Partially involuting (PICH)
- Tufted angioma
- Spindle-cell hemangioma
- Epithelioid hemangioma
- Pyogenic granuloma

Other
- Hobnail hemangioma
- Microvenular hemangioma
- Anastomosing hemangioma
- Glomeruloid hemangioma
- Papillary hemangioma
- Intravascular papillary endothelial hyperplasia
- Cutaneous epithelioid angiomatous nodule
- Acquired elastotic hemangioma
- Littoral cell hemangioma of the spleen

Related lesions
- Eccrine angiomatous hamartoma
- Reactive angioendotheliomatosis
- Bacillary angiomatosis
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Infantile hemangioma

- Also called « hemangioma of infancy »
- **The most common tumour in infants:**
  - 1 to 2 % of infants......10 %
- 4 G /1 B, >> premature
- Head and neck area
- **Stereotyped evolution:**
  - Arises 2-3 weeks after birth
  - Grows rapidly....
Natural history of IH:

1. Initial rapid proliferative phase
2. Slow involutive phase

Graph showing height over time:
- Birth to 3–8 months: Initial rapid proliferation phase
- 1 yo: Peak growth phase
- 7 yo: Slow involutive phase
The histological aspect varies with the age of the lesion

**Early stage:** proliferative phase

- Non lobulated lesion
- Poorly visible vascular cavities
Early stage: proliferative phase

- High cellularity
- Mitotic figures
Glut1: glucose transporter protein isoform 1

Glucose transporter normally restricted to endothelia with blood-tissue barrier function, as in brain and placenta

Is a marker of the endothelial cells of infantile hemangioma

- Not expressed
  - in vascular malformations
  - in other vascular tumors of children and adults
- Except for
  - verrucous veinous malformations
  - some epithelioid hemangioniomas (rare weak cytoplasmic expression)
  - a subset of angiosarcoma

North P et al. Arch Dermatol 2001; 137: 559 - 570
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Stable stage: more mature phase

- Plump endothelial cells
- Centered by a small lumina
- Less interstitial cells
- Lobular organization
• Most capillaries have disappeared
• Replaced by fibrous or fatty tissue
• Thickened and hyalinized wall
Glut1 stains the Infantile Hemangioma vessels whatever the stage!
Infantile hemangioma with minimal or arrested growth « Abortive Hemangioma »

- **Distinct clinical appearance:**
  - plaque with telangiectatic patches
  - lesions resembling bruises
- Unique predilection for the **lower body**
- May be confused with a **capillary malformation**

*Courtesy P Vabres*

Ki-Young Suh, Ilona Friden. *Arch Dermatol*; 2010; 146(9): 971-976
Dilated capillaries in the upper dermis
No lobulation
Why biopsy Infantile Hemangiomas?
In case of atypical clinical presentation:

- to confirm the diagnosis **before betablocker therapy**
By courtesy  MC Machet and A Maruani
Intra-uterine onset (UltraSound)

Present and fully developed at birth

Never grows after birth

G = B, 5 to 6 cm in diameter

Head and neck = extremities, rare on the trunk

Three subtypes:

- **Rapidly** Involuting Congenital Hemangioma
- **Non** Involuting Congenital Hemangioma
- **Partially** Involuting Congenital Hemangioma

• Well-defined, small and large lobules
• Large vessels
• Dense fibrous tissue
Well differentiated vessels. Most have a stellate lumen. No spindled cells.
Endothelial cells with a prominent, sometimes hobnailed nucleus may exhibit large eosinophilic cytoplasmic hyaline inclusions.
Endoluminal projections
Fibrotic background +/- hemosiderin deposits
Large looking abnormal vessels
Why biopsy them?
Rule out other disorders:

- Tumous associated with Kasabach-Merritt syndrome
- Infantile myofibromatosis
- Sarcomas
ETV6-NTRK3
Infantile/congenital fibrosarcoma
| Rapidly involuting congenital hemangioma | Transient mild/moderate thrombocytopenia, +/- consumptive coagulopathy and elevated D-dimer |
Tufted angioma

- congenital or acquired angiomatous infiltrative solitary plaque,
- slightly firm at palpation,
- violaceous or brown, warm,
- proximal areas of limbs
- complete involution or…
- …persistence of a sclerous lesion with inflammatory flare-ups
- risk of Kasabach-Merritt syndrome, severe potentially lethal syndrome

Profound and sustained thrombocytopenia
Low fibrinogene levels
Elevated D-dimer

Bocca O, Fraitag S, Lasne D et al.
Acta Derm Venereol. 2016 Jan;96(1):77-81
• Intra-dermal lesion
• Well defined “cannonball” lobules
• Some dilated vascular spaces
- Lobules in a fibrous background
- Bigger vessels
- Small packed capillaries
- Crescent-shaped vascular spaces
- Aggregates of endothelial cells
- Split-like luminae
- Spindle-shaped cells
Congenital hemangioma  ⇔  Tufted angioma
Congenital hemangioma

Tufted angioma
Spindle Cell Hemangioma

- rare
- blueish tumours on distal extremities
- children and young adults
- isolated or..

- associated with a **Maffucci syndrome**: caused by somatic mutations of IDH1 or IDH2
  - veinous malformations
  - multiples enchondromas of the long bones
  - chondrosarcomas and other sarcomas
- can be surgically removed with recurrences in 60% of the cases
- deep dermis and subcutis
- well-defined lobules
- combination of solid and richly vascularized foci
• thin walled dilated vessels +/- thrombi or phleboliths
Two types of cells:

1 densely packed *fascicles of spindle cells*

- CD31-, CD34-, D2-40-
- AML+
2 CD31+ round or cuboidal cells with vacuolization (pseudo-lipoblasts)
R132C *IDH1* mutations, rarely R172V *IDH2* mutations

Maffucci syndrome
Epithelioid hemangioma

- Benign neoplasm that mainly affects adults
- *Children are rarely affected*
- No gender predilection
- Mostly on **head and neck**
- Red to violaceous papules, plaques or nodules with an average size of 1 cm
- Numerous synonyms
  - **ALHE**: angiolymphoid hyperplasia with eosinophilia

- **Differential diagnosis**: other epithelioid vascular tumours (E HemangioEndothelioma, Pseudomyogenic HE, Epithelioid AngioSarcoma), Kimura disease
- **FOSB** nuclear positivity ++++}

*Ortins-Pina A et al. FOSB immunoreactivity in endothelia of epithelioid hemangioma (ALHE). J Cutan Pathol. 2018; 45: 395-402*
• Ill-defined, lobular proliferation, dermis and/or subcutis
• Well-formed vascular channels lined by single layer of plump endothelial cells
- Epithelioid endothelial cells with ample eosinophilic cytoplasm
- Mixed inflammatory cell infiltrate with numerous eosinophils
- Small, solid aggregates of epithelioid cells
- Intracytoplasmic vacuoles
Pyogenic granuloma

- Also called “lobular capillary hemangioma”
- Very common lesion
- After a trauma or spontaneous
- Can develop on a preexisting vascular malformation (Port Wine Stains)
- Rapidly growing angiomatous polypoid lesion that bleeds easily
- Gums, lips, nasal mucosa, face, fingers and soles
- **BRAF** mutation in sporadic and particularly secondary PGs: act as a “second hit” on GNAQ mutation mediated
- Benign neoplasm > reactive hyperplasia

*Courtesy S Guero*

*Groesser L et al. Journal of Investigative Dermatology (2016) 136; 481-486*
• Polypoid lobular proliferation
• Dermis and/or subcutis (deep pyogenic granulomas)
• Eroded surface, epidermal hyperplasia (collarette)
- Well-differentiated round capillaries and small veins
- In an edematous/myxoid/collagenous stroma
- Lobules separated by fibrous stroma
Vascular lumina lined by a single layer of bland, plump, rarely focally epithelioid cells
Multiple neonatal pyogenic granulomas

Congenital and disseminated pyogenic granuloma-like vascular lesions S Mallet, C Rebelle, I Ligi, D Scavarda, C Bouvier P, S Fraitag, M Wassef. Acta Derm Venereol. 2015 Sep;95(7):860-1
Merci et au revoir!