



Role of imaging in the diagnosis of parotid infantile hemangiomas



Fabiola C. Weber^{a, b}, Arin K. Greene^{a, c}, Denise M. Adams^{a, d}, Marilyn G. Liang^{a, e},
Mohammed H. Alomari^{a, c}, Stephan D. Voss^f, Gulraiz Chaudry^{a, b, *}

^a Vascular Anomalies Center, Boston Children's Hospital and Harvard Medical School, Boston, MA, USA

^b Division of Vascular and Interventional Radiology, Boston Children's Hospital and Harvard Medical School, Boston, MA, USA

^c Department of Plastic and Oral Surgery, Boston Children's Hospital and Harvard Medical School, Boston, MA, USA

^d Division of Hematology/Oncology, Boston Children's Hospital and Harvard Medical School, Boston, MA, USA

^e Department of Dermatology, Boston Children's Hospital and Harvard Medical School, Boston, MA, USA

^f Department of Radiology, Boston Children's Hospital and Harvard Medical School, Boston, MA, USA

ARTICLE INFO

Article history:

Received 4 July 2017

Received in revised form

29 August 2017

Accepted 31 August 2017

Available online 4 September 2017

Keywords:

Hemangioma

Imaging

Parotid

ABSTRACT

Objectives: To review the clinical presentation, imaging and follow-up of parotid infantile hemangiomas (IH).

Methods: Over a 15-year period, all patients with a clinical diagnosis of parotid IH were evaluated. Imaging was available in 35. The medical records, photographs, and radiology studies of these patients were reviewed.

Results: All patients presented at less than 4 months of age (M:F, 13:21). 19 (55)% of tumors were on the left and were bilateral in 2 patients. The majority (29 patients) presented due to localized swelling or palpable mass; the remainder had a cutaneous lesion, but no palpable mass at the time of presentation. The referring diagnosis was incomplete or incorrect in 9 patients (26%).

The imaging studies all demonstrated a well-defined homogeneous mass, with no abnormality of the surrounding subcutaneous fat. Sonography showed a uniformly vascular lesion with pulsatile fast-flow seen on Doppler. On MRI, the lesion was hyperintense on T2-weighted images, isointense on T1, with intense enhancement post-contrast.

Oral therapy (propranolol or corticosteroids) was prescribed in 15 (45%). Follow-up in 28 patients demonstrated stability of the lesion in 11, regression in size in 11 and complete involution in 6. After involution 2 patients underwent resection of residual tissue and/or excess skin.

Conclusions: Typical clinical presentation alone may be adequate to establish a diagnosis of parotid infantile hemangioma. However, in patients with no overlying cutaneous lesion, imaging can play a critical role in confirming the diagnosis. The sonographic findings are sufficiently characteristic to allow for a definitive diagnosis, obviating the need for further investigations. If diagnostic uncertainty remains or the full extent of the lesion cannot be appreciated, then MRI should be preferred over CT to avoid ionizing radiation.

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1. Introduction

Infantile hemangioma is a benign growth of endothelial cells and represents the most common tumor of infancy [1]. The rate of incidence is approximately 4% with risk factors including female gender, low-birth weight, and Caucasian race [2]. The majority of hemangiomas are cutaneous and are most commonly found in the

head and neck [1]. Most cases present with a typical appearance of a “strawberry” hemangioma with expansion after birth; the diagnosis is therefore rarely in doubt in these cases.

Infantile hemangiomas are the most common tumor of the parotid gland in children and ninety percent of all salivary hemangiomas occur in the parotid gland [3]. Parotid hemangiomas usually appear within a few weeks of birth and are mostly asymptomatic. Like all infantile hemangiomas they follow an active proliferative phase during the first 6–9 months of life, followed by an involution phase that is usually complete by 3–5 years of age [4–6].

* Corresponding author. Division of Vascular and Interventional Radiology, Boston Children's Hospital, 300 Longwood Avenue, Boston, MA 02115, USA.

E-mail address: gulraiz.chaudry@childrens.harvard.edu (G. Chaudry).

The majority of parotid hemangiomas are diagnosed based on clinical history and physical examination. However, in the absence of an overlying cutaneous hemangioma, these present as a palpable mass or a focal area of swelling, requiring imaging to establish a diagnosis.

The purpose of this study was to identify the clinical presentation, imaging characteristics, and the management of parotid hemangiomas.

2. Materials and methods

The study was compliant with the Health Insurance Portability and Accountability Act and was approved by the institutional review board. The database from the Vascular Anomalies Center was searched for patients from with the diagnosis of parotid hemangiomas. Over a 13 year period (2004–2017) the database search yielded a total of 35 patients that had imaging studies available for review. A retrospective review of the medical records, photographs, and radiology studies was performed. Demographic information, clinical presentation and physical examination findings were recorded. The imaging was reviewed independently by two pediatric radiologists (FW and GC). The findings documented were tumor size, site and type of imaging. The lesions were evaluated for echogenicity, calcification, fat content, morphology, vascularity, enhancement and involvement of local structures. On MRI, the signal intensity on T1-weighted and T2-weighted images was assessed relative to that of skeletal muscle. The same imaging criteria were evaluated for follow-up imaging.

Sonography had been performed in 21 patients. The ultrasound scans were performed on a variety of ultrasound machines with color flow images and spectral Doppler traces obtained in all. Three patients had a contrast enhanced CT scan completed, with sagittal and coronal reformatting. An MRI was obtained in 23 infants, with T1 and T2 weighted sequences performed in at least two planes, and intravenous contrast administered in all patients.

Initial imaging evaluation of the lesion was performed in our institution in 12 of the patients. Nine of these had an ultrasound scan performed as the primary investigation. An MRI was performed as the first imaging modality in the remainder, all of whom presented without an associated cutaneous lesion.

3. Results

3.1. Clinical presentation

All of the patients presented at 4 months of age or less, with 29% ($n = 10$) presenting by 6 weeks of age. The female-to-male ratio was approximately 2.2:1 (24 females and 11 males). Twenty (57%) of the tumors were on the left and bilateral hemangiomas were seen in 2. The majority (82%, $n = 29$) presented due to localized swelling or palpable mass (Fig. 1). Of these only 7 infants had an overlying cutaneous lesion (Fig. 2). The remainder had a cutaneous lesion of the cheek but no palpable mass at the time of presentation (Fig. 2). The cutaneous lesion extended to the lip in 4, neck in 3 and pinna in 2. There were no remote cutaneous lesions in any of the patients. There was no clinical or radiological evidence of PHACE syndrome.

Twenty-six patients were referred with a correct diagnosis of parotid hemangioma. In the remainder the referring diagnosis was lymphadenopathy (2), lymphatic/vascular malformation (4), cheek mass (2) and mumps (1). The findings are summarized in Table 1.

3.2. Imaging characteristics

The sonographic images all demonstrated a well-circumscribed mass replacing most of the visualized parotid gland (Fig. 3a). The



Fig. 1. 2 month old infant with right parotid swelling, but no cutaneous findings.



Fig. 2. 3 month old infant with a large cutaneous hemangioma overlying the parotid lesion.

Table 1
Demographics and results.

Parameter	Value
Mean age at diagnosis (range)	2.4 months (1 day–4 months)
Female to male ratio	2.2:1
Localized swelling	29 (82%)
Overlying cutaneous lesion	13 (36%)
Correct referring diagnosis	26 (74%)

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