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A retrospective study to classify surgical indications for infantile hemangiomas[☆]



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Summary Infantile hemangiomas (IHs) spontaneously involute, but some leave contour deformities necessitating surgical correction. There is a paucity of data reviewing predictive risk factors associated with a need for surgery to guide clinicians when counseling parents. Patients undergoing IH resection by a single surgeon from August 2004 to August 2011 were reviewed to determine patient (age, gender, birth history) and IH characteristics (size, location) associated with surgical intervention. Data were compared to published data from the Hemangioma Investigator Group (HIG). Statistical analysis was performed using Student's *t*-test, odds ratio, and logistic regression analysis. Out of 196 referred patients, 112 underwent surgery. There was a female preponderance (3.5:1). Two-thirds of patients (64.9%) first presented to the surgeon at ≤ 2 years of age, but most underwent surgery between 2 and 3 years (52.7%; average lag time, 11 months). 18 patients underwent surgery at ≤ 1 year of age. IH patients with preterm birth history had increased risk for needing surgical intervention (odds ratio 2.124, CI 1.31–3.44; $p < 0.0012$). A majority (84.7%) of resected IHs were located on the head or neck, significantly higher than the distribution from the HIG data (62.2%; $p < 0.0001$). Resected head and neck IHs were smaller than those below the neck (average, 8.85 cm² vs. 22.35 cm², $p = 0.017$). Preterm birth is associated with higher risk for requiring surgical intervention. IHs on the head and neck are more likely to be removed when compared to those below the neck, and at a smaller size threshold.

[☆] At the time of submission, there were no FDA approved medications for infantile hemangiomas. However, the FDA has recently approved Hemanageol (propranolol HCL, Pierre Fabre) for treatment of infantile hemangioma (March 2014). However, it will not be available until June 2014 in the USA. Website: http://www.accessdata.fda.gov/scripts/opdlisting/oopd/OOPD_Results_2.cfm?Index_Number=266708 (Accessed 5/22/2014).

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Introduction

Infantile hemangiomas (IH) represent the most common tumor of infancy with an incidence estimated to affect 4–5% of infants.¹ IHs have a well described natural history, usually becoming apparent in the first few weeks of life and proliferating rapidly for the first several months of life, with 80% of superficial IHs reaching their maximal size at 5 months of age.² This rapid proliferation is followed by an involution of the tumor throughout childhood, and many IHs complete their involution without leaving obvious scarring.³ A more recent study by Couto et al., however, suggests that these “benign” courses are arrested in early childhood and improvements cease during early childhood, leaving contour deformities that will eventually require surgical resection.⁴ While most IHs follow this relatively benign course without requiring intervention during proliferation (62% in a multi-center dermatologic study did not receive any treatment),⁵ a subset of IHs cause complications or have severe morbidity ranging from pain, ulceration, blindness, severe scarring, psychosocial developmental issues, and can even become life threatening.⁶ Despite these potential complications, there are currently no FDA-approved medical treatments for IHs.

Recent studies identified that 24% of patients experienced complications related to the hemangiomas and 38% received some form of intervention.⁵ A prior report has linked characteristics such as segmental morphology, size, location, and subtype as predictive of complications that may require medical intervention.⁵ However, this study did not specifically study risk factors predicting a need for surgical intervention vs. complications treated conservatively. Intervention modalities described in this study included “active non-intervention,” to medical therapies, to surgical procedures. Few studies concentrate on evidence-based indications and outcomes for surgical intervention.^{7,8} In summary, hemangiomas are

heterogeneous with the growth characteristics of any individual IH difficult to systematically predict, instead relying on the clinical judgment of the treating clinician.^{9,10}

Some indications for surgical intervention during the proliferative phase have been defined: airway and visual obstruction, craniofacial deformation, recurrent bleeding, ulceration unresponsive to other therapy. Indications for the involuting and involuted phases are usually for restoring contour deformity or post-ulceration scar revision.⁶ However, risk factors that may predict an unacceptable contour deformity after involution, and thus the need for surgical intervention during and after involution, have not been systematically studied. Therefore, early identification and stratification of potential indicators that are predictive of surgical need may help guide treating physicians in initiating early medical therapy to try and limit proliferation vs. observation alone.

In order to answer this question, we underwent a retrospective review of patient and hemangioma characteristics referred for surgical treatment in a single surgeon’s practice to determine if any features of the patient or the IH could predict a need for surgery.

Materials and methods

Human subjects research approval was obtained from the Columbia University Institutional Review Board. A retrospective study was conducted reviewing the charts of all patients diagnosed with infantile hemangioma (IH; ICD code 228.0) seen by the senior author (JKW) between August 2004, and August 2011. Patient charts were accessed electronically. Incomplete history was determined from paper charts or by directly contacting referring physicians. The pathological diagnosis of IH from resected specimens was confirmed with the presence of glucose uptake transporter 1 (GLUT1).

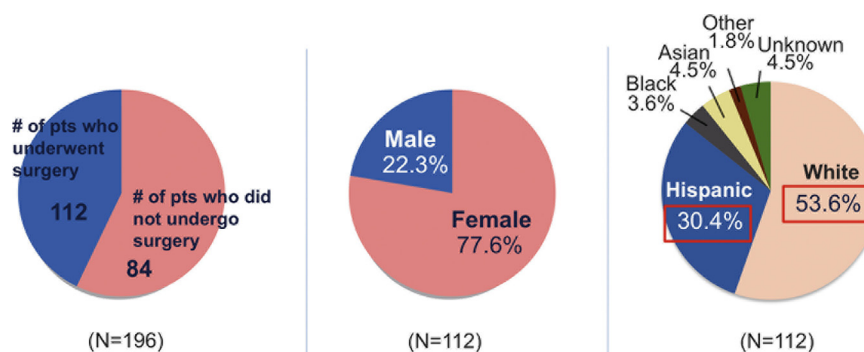


Figure 1 Demographic distribution of IH patients who underwent surgery. (Left) 112 out of 120 patients who were evaluated underwent surgical resection of an IH; (Center) There was a majority of female patients (78%); (Right) Most of the patients undergoing surgical resection were non-Hispanic Caucasians (54%).

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