Original Research Paper

Volume - 12 | Issue - 10 | October - 2022 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Paediatric Surgery

ANALYSIS OF VARIOUS INTERVENTIONS IN THE MANAGEMENT OF INFANTILE HEMANGIOMAS

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ABSTRACT **Introduction:** Infantile hemangiomas are the most common benign vascular tumors of infancy. The prevalence is around 3-10%. The various risk factors include female gender, prematurity, low birth weight, multiple pregnancies, advanced maternal age and in vitro fertilization. IH most commonly affect the head and neck region. This study aims to give an insight and highlight the evidence-based approach in the management of IH. **Aim:** To assess the occurrence, plan of management and the interventions in the management of hemangiomas occurring in children. **Method:** This study used a retrospective observational method to assess and evaluate the various interventions employed in the management of infantile hemangiomas between July 2021 and February 2022. **Result:** A total of 50 patients were included in the study, 30 were females and 20 males. 15 lesions were surgically treated, 5 underwent laser ablation and remaining 30 were treated with beta blockers and corticosteroids. The primary outcome measures were clearance, a subjective measure of improvement, and adverse events. Secondary outcomes were other measures of resolution; aesthetic appearance; and requirement for surgical correction. **Outcome:** The treatment of IH depends on the following factors: Type of hemangioma, stage of the lesion, location and extent, number and distribution of the lesion, associated systemic involvement, presence or absence of ulceration and psychosocial distress of the parents or child. In general, any function threatening (ocular, ear, nasal tip, lip, large disfiguring facial lesion and genitalia involvement) or life-threatening hemangioma, need intervention. The remaining cases need only active non-intervention, like education about the natural course, treatment options and anticipatory guidance. Systemic corticosteroids are used for complicated hemangiomas, followed by non-selective beta-blockers, such as oral propranolol and topical timolol can be used for uncomplicated localized lesions.

KEYWORDS : Infantile hemangioma, Propanolol, corticosteroids, surgical excision, laser ablation

INTRODUCTION

Infantile hemangiomas are the most common soft-tissue tumors of childhood, occurring in 3 to 10% of infants. These lesions usually do not develop at birth and are generally diagnosed during the first 4 to 6 weeks of life, with maximum growth during the first 5 months. The characteristic evolution of nearly all infantile hemangiomas is proliferation, stabilization, and slow, spontaneous involution. Five major factors are emphasized: the age of the child, the location of the hemangioma(s), the total number of hemangiomas present, the hemangioma subtype, and the presence and nature of dermal involvement. Most of the lesions follow an uncomplicated clinical course, however 10% result in complications that may require specialist intervention. Some infantile hemangiomas leave permanent sequelae, with potential psychological effects in the children and their parents. Historically, systemic glucocorticoids were used for the treatment for complicated infantile hemangiomas, and interferon alfa and vincristine were used for lesions refractory to glucocorticoid therapy.

Flash lamp-pumped pulsed dye laser (FPDL) has a wavelength of 585 nm-595 nm and destroys the blood vessels selectively. It is the only laser that delivers photocoagulation of the targeted vessels while keeping the overlying skin intact. It is thus used to promote regression and inhibit endothelial cell proliferation of superficial hemangiomas and can also accelerate the regression of involuting hemangiomas.

The efficacy of these treatments was variable and they may also have associated safety concerns. Here we report a study conducted to compare different interventions to treat infantile hemangiomas involving patients treated for up to 24 weeks. The study protocol was approved by the local ethics committee. Parents or guardians gave written informed consent according to national regulations. The first, penultimate, and last authors vouch for the integrity and completeness of the data and analyses and for the fidelity of this report to the protocol.

Method

This study used a retrospective observational method to assess and evaluate the various interventions employed in the management of infantile hemangiomas between July 2021 and February 2022.

Inclusion and exclusion criteria

Eligible patients were 21 days to 370 days of age, with a proliferating infantile hemangioma requiring therapeutic intervention. *All cases diagnosed with Congenital hemangiomas (RICH, NICH) were excluded. Patients with coagulation disorders and associated congenital anomalies (PHACES, LUMBAR anomalies) were excluded. Infantile hemangiomas where no active intervention was required; only reassurance and counselling were advised were excluded.* The study was performed in accordance with Good Clinical Practice guidelines. The study protocol was approved by the local ethics committee at each participating center. Parents or guardians gave written informed consent.

Investigations

Initial review by pediatric surgeon Cardiovascular examination (blood pressure, heart rate, echocardiogram, electrocardiogram) Blood count; Prothrombin time, and partial thromboplastin time Blood urea nitrogen, creatinine; Liver function tests; Electrolytes If segmental/craniofacial: MRI to rule out intracranial anomalies. Based on the above, patients were given treatment, namely oral Propranolol, prednisone, surgery or pulse dye laser therapy

Indication for medical management included: -

Non-resolution of IH Failure of other treatments IH location inaccessible to surgery and/or parents unwilling for surgery Obstruction of airway, visual axis, or other vital structures Severe cosmetic disfigurement Severe ulceration, existence of deep component, or otherwise locally complicated Intolerance to other therapies, i.e. deranged liver function tests

Follow Up

Repeat measurement and/or serial photography of hemangioma to assess response Assessment of change in size and color, decrease in ulceration and inflammation Maximal follow up interval 2 weeks in initial period of treatment for dose adjustment, monitoring and education Intervals can be extended up to 1 month towards the end of therapy Repeat imaging Discontinue when IH has been static for 2 weeks or when regressed/resolved for 2 weeks. Taper by serial halving to discontinue Pediatric surgical consultation for counseling, reassurance and surgical intervention The primary outcome measures

were degree of clearance, recurrence, and adverse events/ complications. Secondary outcomes were subjective measure of improvement/satisfaction of the parents with respect to the intervention employed, post intervention aesthetic value and experience.

Statistical Analysis The
sample size was in accordance to incidence of infantile hemangiomas requiring treatment.

Hemangiomas with sizes <2cms were treated conservatively with half of them being given 2 mg/kg of propranolol given to patients for 3 months and the other half were given 2 mg/kg of oral prednisone daily, tapering it to 1mg/kg/day for 3 months. 15 patients with hemangioma size >3cms were treated with surgical excision. 5 underwent laser ablation.

Tables
Table 1 ***[Baseline characteristics of study patients and hemangiomas]***

Characteristics	Prednisone (15)	Propranolol (15)	Surgical excision(15)	Laser ablation(5)
Sex: Male(20) Female(30)	5 10	7 8	10 5	2 3
Age <90days >90days	12 3	10 5	2 13	2 3
Hemangiomas Facial(5) Non-facial(45) Morphology Segmental Localised Indeterminate Superficial Flat Elevated	 1 14 6 1 5 3 1 0	 2 13 8 2 2 2 1 0	 2 13 0 0 2 9 0 4	 1 4 0 0 1 1 3 0

RESULT
A total of 50 patients with congenital hemangiomas were assessed for baseline characteristics and treatment they received were compared for efficacy. Treatment inefficacy and patient incompliance was the most frequent reason for discontinuation. Due to the non-invasive nature of the propranolol treatment and high rates of complete/ near complete resolution, it was the most preferred form of treatment especially in segmental and indeterminate hemangiomas with sizes <2 cm.Corticosteroids have been used to treat uncomplicated hemangiomas since decades, our results both propranolol and prednisone were comparable but prednisone was surpassed by propranolol in terms of cosmetic outcomes with propranolol leaving minimal residual erythema and telangiectasia. Surgical excision was carried out in about 15 cases, where the hemangiomas were >2 cm in size, superficially located and elevated. Resolution was good, nearly 80-90 percent excision could be done safely without compromising the blood supply and functionality of the organ. Pulse dye lasers were used to treat 5 patients, these hemangiomas were > 2cms, characteristically flat as well elevated, mostly superficially and essentially could not be excised due to their location or size limitations. Flash lamp-pumped pulsed dye laser was used in 5 cases and had 100% resolution with zero to minimal residua.

Treatment	Complete/near complete resolution	Adverse events	Duration of treatment	Overrun	Discontinuation of Therapy
Prednisone	80%	4	3 months	2	1
Propranolol	90%	5	3-6 months	1	0
Pulse dye laser	100%	0	1 day	0	0
Surgical excision	80%	2	<1 week	0	2

"Overrun" indicates patients who were assigned to another regimen due inefficacy or † Nearly complete resolution was defined as a minimal degree of telangiectasis, erythema, skin thickening, soft-tissue swelling and minimal alteration of anatomical landmarks at 24 weeks.

Adverse events- Associated with propranolol therapy include hypotension, bronchospasm, bardycardia and hypoglycemia.

CONCLUSION
Hemangiomas are Benign vascular neoplasms that usually appear during the first weeks of life. Infantile hemangiomas (IHs) occur in as many as 5% of infants, making them the most common benign tumor in infants. Their life can be divided into phases.

Proliferative Phase begins when it usually appears by 4 weeks of life, grows in the first 2 to 3 months of life, and by 6 months maximum growth is achieved, this is followed by Involuting phase (>1year).

Most regression is accomplished before 4 years of age, leaving behind residua. IH residua may include fibrofatty tissue, telangiectasias, scarring, pigment change, or atrophic skin.

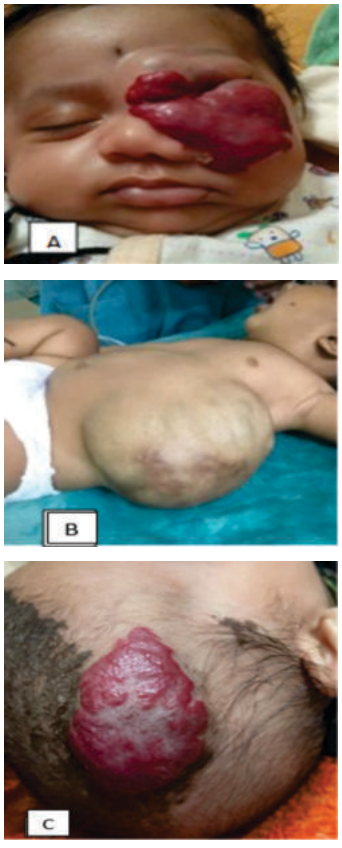
Risk factors include female child, Low birth weight babies, placental anomalies, most notably, preeclampsia and placenta previa, placental disruption as with chorionic villus sampling, multiple gestation pregnancy, and advanced maternal age.

Depending on the age of the patient, the location, how fast the hemangioma is growing, and whether it might cause problems, therapeutic intervention can be planned

There are 3 main reasons for treatment:
1. Medical problems caused by the hemangioma (Functional impairment in periorbital IH, hepatic or airway IH)
2. Breakdown of the hemangioma skin that may cause skin damage or scarring (facial IH)
3. Concern about permanent skin changes(scarring)

Those IHs that are potentially higher risk and should prompt concern, and emphasizes increased vigilance, consideration of active treatment.

Infantile hemangiomas A) Facial hemangioma, B) Abdominal hemangioma (deep component) , C) Hemangioma over scalp



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