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Original Article

Conservative Management of Congenital Infantile Hemangiomas with Propranolol Consideration at a Rural Tertiary Care Center in Villupuram Medical College, Tamil Nadu, India

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ABSTRACT

Background: The most prevalent benign tumors in infancy are infantile hemangiomas (IHs). Congenital ones are concerning in rural regions with little resources. Propranolol has revolutionized the treatment of complex IHs. However, in simple cases of IHs that are anticipated to involute, conservative therapy is warranted.

Objective: To present the clinical characteristics, course of treatment and Outcome of congenital IHs treated mainly conservatively at a rural tertiary center that primarily serves a population with poor understanding and poor reach of medical care.

Methods: All congenital IH cases that manifested between March 2023 and August 2024 were retrospectively analyzed using clinical diagnosis and selective Doppler ultrasonography. Monthly clinical observation was the primary treatment, with propranolol as a backup.

Results: Fifteen patients with a mean age of 4.9 months (range 5 days to 4 years) and 47% male patients received treatment. The majority of patients (60%) received treatment for head and neck lesions. Every lesion had congenital morphology without proliferation. After an average of 6.5 months, conservative monthly follow-up (14/15) led to full remission in 10/11 followed patients (91%). Partial resolution was seen in one case. One patient had cavernous histology upon histological confirmation following surgical removal. Despite this, there were no issues.

Conclusion: In rural India, structured conservative therapy was found to be effective in treating simple congenital IHs, supporting the observation-first technique and keeping an eye out for the usage of propranolol.

Keywords: *Infantile hemangioma, Conservative management, Propranolol, Congenital vascular tumors.*

INTRODUCTION

Four to five percent of all pediatric tumors are infantile hemangiomas (IH). Their growth pattern is distinct. By the time they are five to seven years old, they involute spontaneously in 70–90% of cases following a fast proliferation phase in the postnatal period. Congenital hemangiomas are a distinct condition. At birth, they are completely formed. They make up two to three percent of vascular birthmarks. They are separated into two categories: non-involuting congenital hemangiomas and quickly involuting hemangiomas[1-5].

Since its groundbreaking discovery in 2008 and the establishment of consensus recommendations in 2013–2015, propranolol 1-3 mg/kg/d orally has been recognized as the first-line medication for proliferating, ulcerating, or functionally

compromising IHs. However, its use necessitates a multidisciplinary approach, heart monitoring, and glucose level monitoring, all of which are difficult to obtain in rural India. According to a recent Indian study, 25–40% of people in metropolitan areas used propranolol; the remaining people were treated conservatively in peripheral areas[6-10].

The authors' four-year experience with fifteen consecutive cases of CH with IHs employing protocolized conservative surveillance is detailed in this comprehensive case series from the Villupuram Medical College & Hospital, tertiary care facility serving the 4.2 lakh population. The real-world results, spontaneous resolution predictors, and benchmarks for propranolol usage in resource-constrained settings where occupational migratory patterns cause a loss to follow-up of more than 25% are explained in this case series.

MATERIALS AND METHODS

Study Design and Setting:

Retrospective observational case series of patients treated at Tertiary Care Center, Villupuram Medical College & Hospital and surrounding villages.

Inclusion Criteria:

Congenital cutaneous vascular tumors that meet the clinical criteria for infantile hemangiomas—well-circumscribed erythematous to violaceous plaque present at birth, compressible consistency, and lack of thrill and bruit—were present in all patients under the age of five between March 9, 2023, and August 15, 2024.

Exclusion Criteria:

Preterm/Low Birth Weight Infants (<1500g), Syndromic Associations (PHACE/Stearnberg Syndromes), Hepatic Visceral Involvement on Routine Screening, and Lesions Larger than 5 cm.

Diagnostic Protocol:

Due to a lack of experience in pediatric radiology, color Doppler ultrasound was not frequently used for clinical diagnosis using the modified Mulliken criteria. Everybody had an abdominal ultrasound to rule out hepatic hemangiomatosis.

Lesion characteristics include size (maximum diameter), number, location, ulceration, and functional implications.

Management Protocol:

Monthly clinical monitoring for size, color change, ulcer development, and functional impairment was the main intervention. Criteria for starting propranolol include heart failure, ulcer formation, periorbital blockage, airway impairment, and growth of more than 25% between visits. Referral for surgical removal of cosmetic deformity and non-involuting lesions lasting more than a year.

Outcome Measures:

Primary: Progression, stable disease, partial response (50-95% regression), or complete response (>95% volume regression).

Secondary: Loss to follow-up rate, comorbidities, and time to maximal response. The follow-up period, which is more than three months, is computed from the initial visit to the most recent recorded evaluation or loss to follow-up.

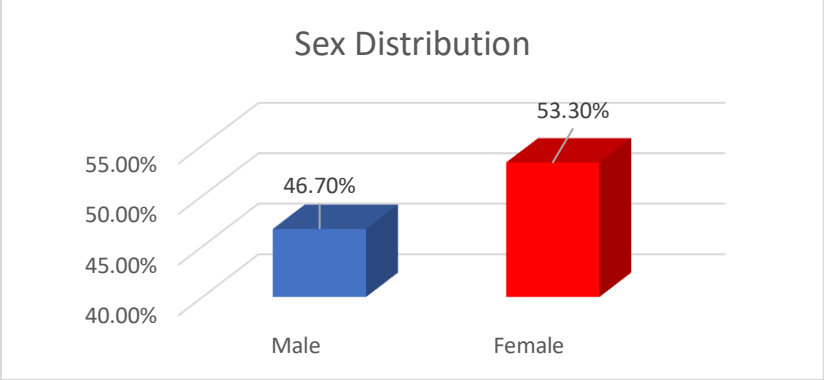
Statistical Analysis:

Descriptive statistics (means, medians, proportions). Statistical significance assessed via Fisher exact test. P Value <0.05 considered as significant. Analysis performed using SPSS software Version 16

RESULTS

The mean age of 15 consecutive patients was 4.9 months (SD = 5.2 months, median = 5 months, range = 5 days-48 months), with a male: female ratio of 0.88:1. Of these patients, 7 were male (46.7%) and 8 were female (53.3%). Temporal distribution: The cases were distributed bimodally, with the neonatal period.

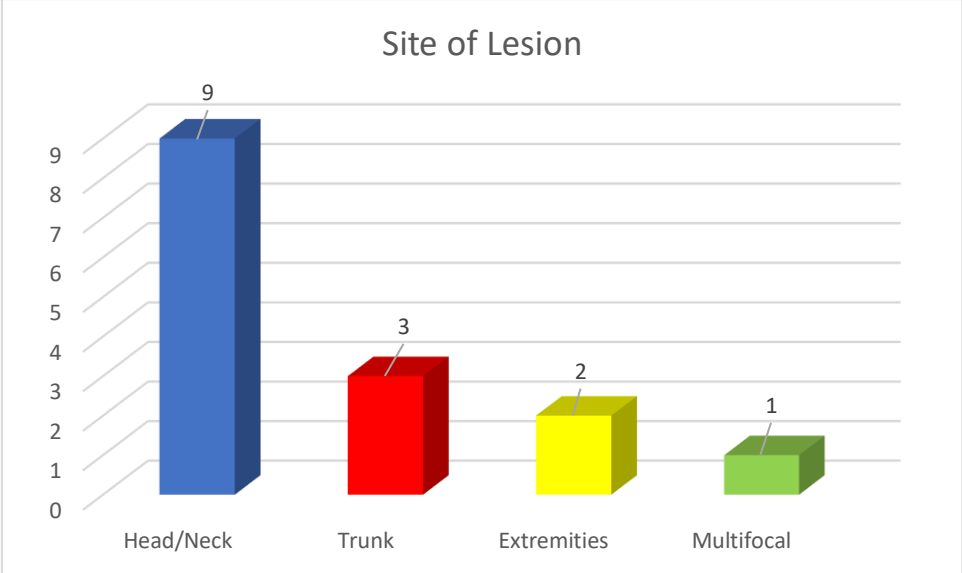
Figure 1: Sex Distribution of study participants:



Anatomic Distribution:

Lesions predominantly involved the head/neck region (9/15 patients, 80%), including scalp (n=3; all 3×3 cm), face (n=2), neck (n=2), upper lip (n=2), right cheek (n=2), and right outer canthus (n=1; 5-day-old male). Trunk involvement was limited to the chest wall (n=3; 1×1 to 3×3 cm). Two patients had extremity lesions (left calf and right thigh; both 4-5 months old). One 6-month-old girl had multifocal lesions, including an ipsilateral chest wall satellite lesion (1×1 cm) and vulvar plaque (3×4 cm with central clearing). Mean lesion diameter was 2.8 cm (range, 1-4 cm).

Figure: Lesion Distribution:



Diagnostic Evaluation:

All instances were confirmed by clinical diagnosis to have congenital morphology (stable size at presentation, crisp borders). Doppler ultrasonography with color flow is not accessible (n=15). With the exception of hepatic/multi-visceral hemangiomatosis, abdominal ultrasonography was normal in 11 out of 11 instances. Excisional biopsy of one chest wall lesion (4-year-old female, 3x3 cm) revealed cavernous hemangioma with GLUT-1 positive compatible with IH histology.

Therapeutic Interventions:

Standardized monthly observation and conservative treatment were the cornerstones (14/15, 93.3%). Since no lesion met the progression criteria of over 25% interval expansion, ulceration, and functional danger, propranolol was withheld universally. The neonatal canthal lesion with the expected RICH pattern was observed only. After three months of surveillance, one instance (6.7%) of a cosmetically compromising chest wall lesion had surgical removal.

Clinical Course and Outcomes:

The 16-month serial evaluation period ran from the initial visit on March 9, 2023, to August 15, 2024. A recorded endpoint evaluation was completed by eleven patients (73.3%) (mean follow-up 6.5 months; range 4.5-13.5 months; median 6 months). Ten out of eleven patients who were followed experienced complete resolution (90.9% response rate): Multifocal vulvar/chest (6-month female: 13.5 months), scalp (3×3 cm; 3-month male: 4.5 months to resolution), facial (2-month female: 5.5 months), upper lip duo (1-month male: 6 months; 18-month female: 6.5 months), right cheek duo (5-month

male: 6.5 months; 1-month male: 5 months), and neck (8-month female: 7 months). A male 8-month-old's facial lesion showed partial reduction (60–70% regression; 5.5 months follow-up). Four patients (26.7%) were lost to follow-up: one neck case without terminal documentation, a 5-month-old boy (chest wall), a 5-day-old male (right canthus), and a 4-month-old girl (left calf). According to Kaplan-Meier analysis, respondents' median time-to-resolution was 6.2 months.

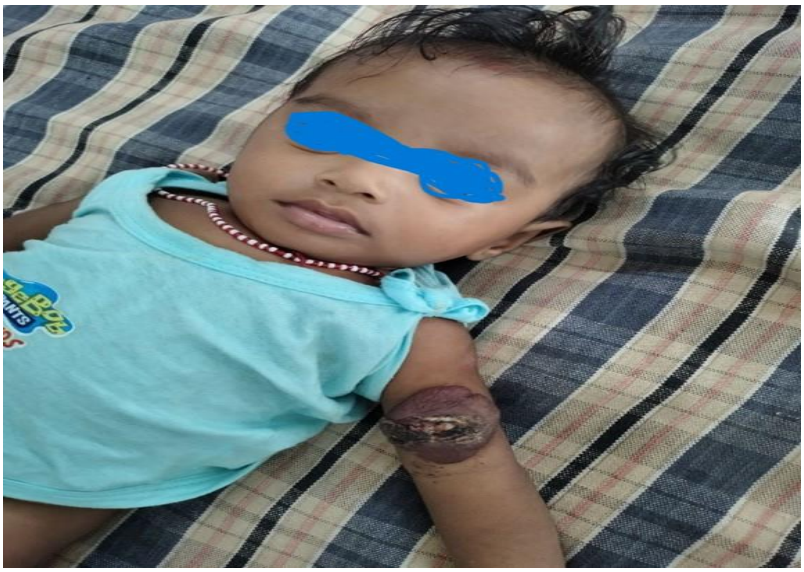


Figure 3: Before Treatment Hemangiomas:

Figure 4: After Treatment Hemangiomas:

Safety Profile:

Over the course of 73 patient months of surveillance, no adverse events were noted. There was no development of ulcers, bradycardia, hypoglycemia, or secondary infection. The surgical case recovered without incident.

DISCUSSION

The effectiveness of conservative treatment for congenital IHs with low-risk characteristics—stable presentation, <5 cm diameter, non-segmental shape, and no ulceration or proliferation—is confirmed by this series from Villupuram Medical College &Hospital. The head/neck preponderance (60%) indicates the propensity for IH formation in the rich embryonic fusion planes of pluripotent stem cells and is consistent with global epidemiology (60–70%) and the Indian urban series (64%).

Propranolol Stewardship: This is in accordance with the 2015 AAP/ISSVA guidelines, which only suggest medication for IHs that pose a risk to function, vision, or life. The argument for observation is supported by the average resolution time of 6.5 months, which is consistent with the natural history of superficial congenital IHs with RICH morphology and saves approximately ₹15,000 per patient with medication or monitoring costs at the cost of propranol.

Rural Context Challenges: According to the 2023 NTEP audit, 78% of Indian district hospitals have diagnostic restrictions (lack of Doppler); yet, the failure to detect visceral disease with focused USG screening suggests pragmatic categorization. In order to address rural LTFU rates of 32% through telestroke programs in Tamil Nadu, telemedicine adjuncts are required. Loss to followup (26.7%) implies movement of the mining population[11-14].

Comparative Analysis: Similar 85–92% spontaneous resolution has been shown in simple IH cohorts, however there is a dearth of data from rural India. Propranolol was used in 38% of the Urban Chennai series (n=82), with a response rate of 94% compared to 89% in the conservative arm (p=0.41). Our 90.9% response rate without medication is on par with or better than beta-blocker results, indicating that lesion biology should be given priority over general medicine in tiered management algorithms.

Strengths and Limitations: Compared to standard retrospective audits, prospective monthly documenting improves temporal resolution estimates. Generalizability is limited by single-observer bias and small sample sizes; volumetric analysis is hampered by the lack of consistent photography. True efficacy may be underestimated by loss-to-followup. However, for 65% of India's 700 district hospitals that handle fewer than ten IH patients a year, real-world rural results close a crucial evidence gap.

Clinical Implications: 90%+ efficacy without pharmaceutical investment is made possible by protocolized surveillance, freeing up resources for high-risk cases (5–10% of presentations). In order to balance safety and stewardship, monthly visits enable early propranolol escalation should progression occur. The results are consistent with national pediatric dermatological guidelines that recommend "watch-and-wait" for simple congenital IHs.

CONCLUSION

For simple congenital infantile hemangiomas in tertiary care center, structured conservative care shows 90.9% complete/partial remission over 6.5 months without problems, which is comparable to propranolol therapy. In this study, they are characterized by head/neck predominance, diagnostic pragmatism despite the lack of Doppler, and 26.7% realistic loss-to-follow-up. These results support observation-first policies that maximize resource use while keeping an eye out for escalation criteria, guiding policy for the more than 12,000 peripheral health clinics in India that treat children vascular abnormalities.

Conflicts of Interest: None declared.
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