Propranolol Treatment of Infantile Hemangioma; A Systematic Review and Meta-Analysis

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Abstract

Purpose: Infantile hemangiomas are benign vascular neoplasms that can cause numerous functional or cosmetic problems. The purpose of the present study is to review the pathogenesis of hemangioma and to compare the efficacy and complications related to therapy of infantile hemangiomas with propranolol versus corticosteroids.

Method: A comprehensive review of literature was conducted from from 1965 to March 2012 using MEDLINE, PubMed, Ovid, Cochrane Review database, and Google Scholar. All articles were reviewed for reports of clinical cases, reported side effects, doses, duration of treatment, number of patients and response rate to treatment.

Results: 1,162 studies were identified. Of those only 56 articles met our inclusion criteria after review by two independent reviewers (AI and JK). For the purpose of meta-analysis, 16 studies comprising 2,629 patients, and 25 studies comprising 795 patients were included. Less than 90% of patients treated with corticosteroid responded to therapy compared to 99% of patients treated with propranolol after follow up for 12 months. Meta-analysis demonstrated the corticosteroid studies to have a pooled response rate of 69% versus propranolol response rate of 97% ($p<0.001$).

Conclusion: Propranolol is a relatively recent therapy of hemangiomas with fewer side effects, a different mechanism of action, and greater efficacy than current first-line corticosteroid therapy. We admit that many of these studies do not have the same patient population or duration/regimen of treatment for hemangiomas; however, based on available data in literature, it appears that propranolol could be an emerging and effective treatment for infantile hemangiomas. Further randomized control trials are recommended.

Study	Events	Total		Proportion	95%-CI	W(random)
haemangiomas						
Blei and Chianese	8	30		0.27	[0.12; 0.46]	2.5%
Sadan and Wolach [5]	56	60		0.93	[0.84; 0.98]	2.7%
Pandey et al	1003	1127		0.89	[0.87; 0.91]	2.9%
Kelly et al[28]	8	16		0.50	[0.25; 0.75]	2.3%
Zhou et al[29]	20	23		0.87	[0.66; 0.97]	2.4%
Rossler et al[30]	33	38		0.87	[0.72; 0.96]	2.6%
Pope et al [31]	8	20		0.40	[0.19; 0.64]	2.4%
Greene et al[32]	56	67		0.84	[0.73; 0.92]	2.7%
Al-Sebeih et al[33]	13	14		0.93	[0.66; 1.00]	2.2%
Narcy et al[34]	7	21		0.33	[0.15; 0.57]	2.4%
Random effects model		1416		0.71	[0.56; 0.84]	25.1%
propranolol						
Price (25)	59	59		1.00	[0.94; 1.00]	2.7%
Schupp (26)	54	55		0.98	[0.90; 1.00]	2.7%
Bagazgoitia (27)	71	71		1.00	[0.95; 1.00]	2.7%
Jin(28)	77	78		0.99	[0.93; 1.00]	2.7%
Ming-Ming (29)	37	37		1.00	[0.91; 1.00]	2.6%
Fuchsman (30)	37	39		0.95	[0.83; 0.99]	2.6%
Zaher (31)	29	30		0.97	[0.83; 1.00]	2.5%
De Graaf (32)	28	28		1.00	[0.88; 1.00]	2.5%
Schiestl (33)	25	25		1.00	[0.86; 1.00]	2.5%
Missoi (34)	17	17		1.00	[0.80; 1.00]	2.3%
Al Dhaybi (35)	17	18		0.94	[0.73; 1.00]	2.3%
Hogeling (36)	16	20		0.80	[0.56; 0.94]	2.4%
Holmes (37)	31	31		1.00	[0.89; 1.00]	2.5%
Zvulunov (38)	42	42		1.00	[0.92; 1.00]	2.6%
Chai (39)	27	27		1.00	[0.87; 1.00]	2.5%
Bertrand (40)	12	12		1.00	[0.74; 1.00]	2.1%
Tan (41)	15	15		1.00	[0.78; 1.00]	2.2%
Leaute-Labreze (2)	11	11		1.00	[0.72; 1.00]	2.1%
Buckmiller(12)	16	32		0.50	[0.32; 0.68]	2.5%
Bonifazi	11	11		1.00	[0.72; 1.00]	2.1%
Mahadevan(45)	10	10		1.00	[0.69; 1.00]	2.0%
Leboulanger(18)	14	14		1.00	[0.77; 1.00]	2.2%
Cushung(47)	49	49		1.00	[0.93; 1.00]	2.7%
Sans(44)	32	32		1.00	[0.89; 1.00]	2.5%
Random effects model		763		0.97	[0.95; 0.99]	58.6%
z-other						
Chantharatanapiboon[9]	144	160		0.90	[0.84; 0.94]	2.8%
Chen et al[25]	93	155		0.60	[0.52; 0.68]	2.8%
Chowdri et al[26]	32	74		0.43	[0.32; 0.55]	2.7%
Jalil et al[10]	19	50		0.38	[0.25; 0.53]	2.7%
Kushner[7]	21	25		0.84	[0.64; 0.95]	2.5%
Prasetyono et al[8]	532	749		0.71	[0.68; 0.74]	2.9%
Random effects model		1213		0.66	[0.51; 0.79]	16.4%
Random effects model		3392		0.89	[0.83; 0.93]	100%