Basrah Journal Of Surgery

Original Article

Bas J Surg, December, 22, 2016

INJECTION OF BOILING HYPERTONIC SALINE IN THE TREATMENT OF CUTANEOUS HAEMANGIOMA

Zuhair F Fathallah

MB,ChB, MSc, Assist. Prof. of Plastic Surgery, Department of Surgery, College of Medicine, University of Basrah, IRAQ.

Abstract

This study deals with a new way for the treatment of cutaneous haemangiomas in children and adults by using a boiling hypertonic saline, the material used is safe and nontoxic even if absorbed.

A total of 309 patients with 354 haemangiomas were studied. The sample consisted of 233 females and 76 males ranging in age from 2 months to 50 years. Patients were divided into three groups; Group I: observation, Group II: excision and reconstruction, Group III: injection & excision. Each patient in group III received 2-4 shots of boiling saline intra-lesional at an interval of 3-4 weeks, to allow time for the post injection swelling to subside and fibrous tissue to mature.

The female to male ratio was 3.1:1. The lesion appears within the first weeks after birth in 189 children (61.3%). Among the 309 patients, 288 (81.4%) haemangiomas were located on the head and neck, 39 (11%) on the trunk, 25 (7%) on the extremities, and 2 (0.6) in the perineal area. The three groups are as follows: group I: observation; 161 patients (52%). group II: excision and reconstruction. 42 patients (13.7); group III: injection & excision, 106 patients (34.3%). The presenting symptoms at consultation were parents worry 200 patients (64%), obstruction of orifices 38 (12.3%), ulceration 32 (10.6 percent), bleeding 26 (8.2%), infection 10(3.2%), and pain 3 (0.8percent).

The complications after treatment of the 106 patients were; bleeding 3 patients (2.3%), infection 7 (6.8%), skin necrosis 20 (19.3%); the remaining patients 76 (71.6%) tolerate the injection easily and show no effect.

The evaluation of patients treated with boiling saline sclerotherapy is based on improvement of volume, color, and texture as follow, poor 10 (9.1%); good 54 (51.1%); and excellent 42 (39.8%).

In conclusion, treatment of cutaneous Haemangioma is indicated when there is no sign of involution. Injection sclerotherapy with boiling saline proved to be safe, nontoxic, cheap and effective.

Introduction

Haemangiomas are the most common benign vascular tumors of infancy, that affect roughly as many as 10% of infants[1]. They are most commonly presented shortly after birth, it has a period of rapid growth during early infancy followed by gradual involution[2,3]. The majority of these tumors are medically insignificant, but it may intrude on vital structures, ulcerate, bleed, infected or cause significant structural abnormalities. On rare occasion a cutaneous Haemangiomas may associated with underlying congenital anomalies[2,4]. Haemangiomas may develop complications, including infection or ulceration[4].

Haemangiomas are more frequent in females than in males and are relatively more common among white infants and rare in dark skin individuals[5]. Premature infants are at high risk and it's directly related to birth weight.

Most superficial haemangiomas range in size from a few millimeters to several centimeters in diameter, presented as a white or pink macule, a port wine stain like lesion of the skin[6], or it may show itself as erythematous patch, blanched spot or localized telangiectasia within

clinically normal skin. Deep haemangiomas generally appears as raised, flesh-colored nodule, often has a bluish hue. Haemangiomas are commonly occurring in the head and neck location6, they may occur anywhere in the skin, mucous membranes, or underlying viscera.

Mulliken and Glowacki in 1982 defined the features of various cutaneous vascular anomalies by correlating the clinical, histological and autoradiographical data from patients with vascular markers[7]. The International Society for the Study of Vascular Anomalies (ISSVA), classified vascular lesions into haemangiomas as proliferating endothelial tumours and congenital vascular malformations. Malformations are subdivided according to the type of vascular channels and hemodynamic characteristics, into low flow (venous, lymphatic and capillary) lesions and high-flow malformations[8].

The natural history of haemangioma is that it's presented shortly after birth[9]. It may show as a white or pink flat lesion or a port wine stain lesion more visible with agitation[6]. Increase in size and elevation during first year of life, it may continue into the second year of life, followed by a stable period of 6- 8 months. Then a slow involution begins by the appearance of a gray region within the lesion. Involution usually is completed by the time the patient is 5- 10 years of age[10].

Traditionally the management of haemangiomas has been based on the "Watch and Wait" of the past[5], which is not always accepted by the parents but they have to wait since this tumours will involutes spontaneously. The close observation is effective in cases of small haemangioma away from areas of functional damage and of slow rate of growth[11]. Treatment should be applied to those haemangiomas that obstruct the visual axis, the airway, the auditory channel; to those of rapid growth produce or might produce tissue destruction or lesions, significant disfiguration, ulcerated and lesions with a great cutaneous extension or visceral affection[11].

The treatment is aiming to counter the proliferative growth, reduce the volume of hemangioma, and initialize the process of regression[6]. When there is complication as bleeding, ulceration, infection or obstruction of orifices then treatment is indicated; Musumeci et al[10], divided treatment line into; First-line approaches include topical, intralesional, and systemic corticosteroids. Second-line options include interferon alfa-2a and -2b, laser therapy, and surgical therapy. Third-line approaches include cytotoxins, embolization, and angiogenesis inhibitors. Other therapies and procedural approaches including intermittent pneumatic and continuous compression; cryosurgery; radiotherapy; implantation of copper needles; sclerotherapy; electrocautery; electroacupuncture; imiquimod cream 5%; and prospective agents, such as OXi4503. Steroid therapy has been used for palliation, Panmdy et al[12] used topical steroid with excellent response in 50% of cases. Vincrestin replaced interferon as the agent of choice for complicated haemangiomas which are not responding to steroid[12].

Sclerotherapy is employed largely because of its efficiency and ability to conserve the surrounding tissue[13]; it also has several advantages such as no external scarring and few complications as compared to surgery. There are varieties of agents used for sclerotherapy such as sodium tetradecylsulfate[6], Sharma & Khandpur, used it for the treatment of 13 patients. Ethanolamine oleate[14] and hypertonic saline are used as well. Cytotoxic drugs are another treatment group: intralesional bleomycin, vincristine, cyclophosphamide and pingiangmycin[11]. The disadvantage of sclerotherapy is that it required general anesthesia for injection because it's painful[15].

This paper deal with alternative way for the treatment of haemangiomas in

children and adults by using a boiling hypertonic saline, which destruct the vessels and the endothelial lining of the haemangiomas followed by fibrosis and enhancement of process of involution of the haemangioma. The material used is safe and cause no toxicity even if it is absorbed.

Materials and Methods

This paper represents the work of a single team during a period of ten years in the plastic surgery unit in Basrah Teaching Hospital/Basrah Medical College. The study was conducted during the period January 2000 till December 2009 with the approval of the scientific committee of the Dept. of Surgery/Basrah Medial College.

It is a retrospective study of 309 patients with cutaneous haemangiomas referred to the out patients department (OPD) of Plastic Surgery unit of Basrah Teaching Hospital. They were 233 females and 76 males, with their age range from2months to 50 years. The patients were from different social, educational and economic background. From the patients chart, the following information was extracted: age, sex, onset of haemangiomas, anatomic location, and complications noted at time of presentation, complications noted while under treatment, and final outcome. When patients attended OPD at the first time, they were assigned to one of the following treatment modalities: group I, observation; group II, excision and reconstruction III, sclerotherapy then excision.

Treatment suggested depends on size, location, and symptom the patient was experiencing. Parents were offered several options. Observation only was always offered first. Small lesions usually were observed or rarely excised. Ulcerated lesions were treated conservatively. Patients with large lesions obstructing orifices usually were treated with sclerotherapy then excision.

The patients were followed up in OPD to assess the final outcome depending on improvement e.g. size (volume), color, texture etc.

Procedure

Boiling hypertonic saline is the Sclerosing agent used. It acts by causing thermal damage then fibrosis to the vessels forming the haemangioma.

The policy of the treatment for the patients with haemangioma who are categorized as a candidate for injection therapy; is to give them 2-4 shots of boiling saline intra lesional at an interval of 3-4 weeks, to allow time for the post injection swelling to subside and fibrous tissue to mature.

Patients after full assessment were taken to theater for a short anesthesia, GA required because most of the patients are children and the injection is painful. The lesion is injected with boiling hypertonic saline, which was prepared on the spot. The haemangioma was first squeezed to evacuate the blood, then a long needle introduced through normal skin and the tip felt in the lesion. Depending on the size of the lesion, 0.5- 2 ml of boiling liquid injected in the area. Pressure maintained over the area by bandage or plaster for 24 hours to prolong the contact period between the Sclerosing agent and the endothelial lining resulting in disruption of the endothelium, intense inflammatory reaction and blood coagulation, which later results in fibrosis with obliteration of blood vessels.

Patients were discharged in the same evening to be reviewed in the intervals between injections to assess the colour, size and emptying sign of the lesion and mark the spots for the next injection.

Aim of the Study

The aim is to examine the effect of a new material to treat cutaneous haemangioma by the use of intralesional injection of boiling hypertonic saline, which are two Sclerosing agents i.e. heat and hypertonic saline, both are cheap and readily available.

Results

Review of the results of this study revealed that in a 10 years period, 309 patients were seen with 354 haemangiomas. The sex distribution was 233 females and 76 males (approximately 3.1:1). There are a lot of variations in the number of the referred cases per years and in F: M ratio (Table I) .

Table I: Number of patients/year.

Year	Male	Female
2000	3	18
2001	7	13
2002	2	26
2003	5	11
2004	10	30
2005	10	26
2006	7	15
2007	8	30
2008	7	28
2009	17	36
Total	76	233
F: M = 3.1:1		

Age of the patients was ranging from 2 months to 50 years. About 189 (61.3%) children were seen within the first few weeks after birth. Among the 309 patients, 34(11%) had more than one lesion, while 275(89%) had a single lesion. The total number of lesions is 354 lesions. The majority of haemangiomas 288 were found on the head and neck (81.4 %), with 39 lesions (11%) on the trunk, 25 lesions (7%) on the extremities, and only two lesions (0.6) has been seen on the perineum (Table II) .

Table II: Sites of lesions

Site	No.	%
Head & Neck	288	81.4
Torso	39	11
Extremities	25	7
Perineum	2	0.6
Total Lesions	354	100

The main presenting symptoms were parents worry in 200 cases (64.7%), obstruction of orifices i.e. eye, mouth, ear and nose in 38 cases (12.3%), Ulceration in 32 cases (10.4%), history of bleeding in 26 cases (8.4 %), infection in 10 cases (3.2%) and pain due to infection or ulceration in 3 cases (1.0%) (Table III) .

Table III: Presenting Symptoms

	Number	Percentage
Parents wary	200	64.7%
Blocking orifices	38	12.3%
Ulceration	32	10.4%
Bleeding	26	8.4%
Infection	10	3.2%
Pain	3	1.0%

Lines of management of the haemangiomas were observation in 161 cases (52%), Excision and reconstruction in 42 cases (13.7%), Injection of sclerosing agent with or without excision in 106 cases (34.3%) (Table IV).

Table IV: Line of treatment

	Number	Percentage
Group I : Observation	161	52
Group II : Excision & Reconstruction	42	13.7
Group III : Injection then Excision	106	34.3

The complications in those patients who had the injection (106 cases) were bleeding which required treatment in 3 cases (2.8%), infection which required local and systemic antibiotic in 7 cases (6.6%) and skin necrosis in 20 cases (18.9%) treated by local antibiotic and dressing while in the rest of the 76 cases (71.7%) there were no complications (Table V).

Table V: Complication of treatment

n = 106	No.	%
Bleeding	3	2.8
Infection	7	6.6
Skin necrosis	20	18.9
Nil	76	71.7

The final outcome of injection treatment are excellent in 42 cases (39.6%) were the lesion completely disappeared with no remnant left. In 54 cases (51.0%) the result is good were a redundant skin left which need trimming. The rest of the cases (10 cases, 9.4%) the result was poor where there is no response or there is re-appearance of the lesion (Table VI).

Table VI: Final outcome

Result	Comment		
Excellent	Lesion completely disappear	42	39.6
Good	Redundant skin needs trimming	54	51.0
Poor	No response or recurrence (mixed)	10	9.4

From the 106 cases of haemangiomas, 96 cases had benefited from the injection between excellent and good result. The 10 cases with no response or re appearance of the lesion may be due to mix element of the Haemangioma (superficial & deep).

Discussion

As far as the author knows, there are no published papers dealing with the use of boiling hypertonic saline as a Sclerosing agent in the treatment of haemangioma.

The treatment of haemangiomas has been a conservative procedure for years[10,11]. One of the treatment modalities for haemangiomas was intralesional injection of various denaturing agents as an alternative to surgical excision[13]. No ideal material or line of treatment proves to be satisfactory for the patient and surgeon.

This series is dealing with a new material for injection of cutaneous haemangioma, which may or may not followed by surgical reconstruction of the affected area. After treating haemangiomas for ten years, it's time to asses and reviews this line of treatment.

During the study period, the majority of cases showed clearly female predominance with F: M ratio is 3.1: 1, but this ratio is variable each year, but generally its similar to the ratio reported

in literatures, it is 3- 5 times in Higuera series[16].

The age of presentation of the patients, ranging from 2 months to 50 years, Chang et al found that the mean age of first visit is 5 months[17]. The late presentation is due to many reasons e.g. ignorance which is the main cause, living in rural area where no specialist to give advice or the lesion cause no harm, or symptoms. Still 189 cases were presented early in life that is 2/3 of the total number.

This series show that 275(89%) patients had single lesion, but 34 patients (11%) had more than one lesion, which is presented in different part of the body. Higuera found 20% of infants have 2 or more lesions[16]. The low percentage of multiple lesions in this series is due to the negligence of the parents who are worried about facial lesion only.

The main part of the body affected is the head and neck (81.4%), next is the torso (11%) while the rest are in the extremities 7% and perineum 0.6%. Zheng et al[6], found 60 – 70 % of cases in the head and neck. Again the negligence of the parents about other body lesion, which are not obvious, is the cause of high head and neck percentage.

Two hundred cases (64.7%) were presented because of parents or grandparents worried about this red spot on the skin of their babies and asked for surgery because this spot is increasing in size and they were being blamed for not seeking medical advice. The rest of the cases presented for one or another of the complications such as ulceration, bleeding or blocking orifices, Bauland et al[1], found 74% of cases presented with ulceration and bleeding and required treatment with wound dressing and antibiotic. While in this study ulceration, bleeding and skin infection are the presenting features in 22% of the cases. Usually bleeding occurs after trauma from brothers. Pain in 3 cases (1.0%) is doubtful because child can't feel the pain in the haemangioma only when it is squeezed.

When the patients attends the OPD for the first time, they were categorized as either group I for observation only (161 patients, 52%) with reassurance of the parents and nothing to be done, they were advised to avoid unnecessary surgery because in the vast majority of cases the lesion will disappear. Parents were asked to bring the child every 6 months for revision in OPD. Poor cosmetic result may be expected in a small number of cases in this group because of redundant skin or scars that may occur following involution.

Group II are those seen for the first time, with no sign of regression and the parents insist on having something done, or in those who have the haemangioma involute but redundant skin was left behind. They have better skin texture probably due to the small average size of the lesion, which help in excision and simple reconstruction. This category forms about 42 patients (13.7%), and they will be scheduled for surgery for excision and reconstruction of the area.

The remaining 106 patients (34.3%) forming group III, who show no sign of involution or presented with complications as blocking orifices or necrosis etc. those were assigned for injection sclerotherapy under light general anesthesia, and have the full three sessions, left for over three months to have the fibrous tissue mature, then excision done with reconstruction.

Complications after the injection sclerotherapy are minimal. Skin necrosis in 20 patients (18.9%) which is mostly caused by the injection too superficial and usually it resolve with dressing and local antibiotic. Bleeding occurs in 3 patients (2.8%) due to excess manipulation of the sharp tip of the needle or puncturing of the affected skin and no pressure applied after the injection, therefore, the needle should introduce through healthy skin. The resulting swelling will resolve in few days. Infection is usually one of the sequels of the skin necrosis found in 7 patients (6.6%), resolve by local and

systemic antibiotics. Complications were seen more in the early part of this series.

The final outcome of injection sclerotherapy based on morphological changes as colour, texture, softness and surface smoothness. It is excellent in 42 patients (39.6%), were the lesions regressed after 3-4 injections with a little or no redundant skin left and there is no need for surgery. Hoque and Das[14] used ethanolamine oleate for sclerotherapy and had complete resolution in 79 out of 85 patients (93%).Crawford et al[20], in his series of 19 patients (6 males & 13 females), each of them received maximum 3 injectins, found that 12 out of 19 patients had the lesion shrunk (63%). But their main purpose is for relief of pain. Khandpur & Sharma[18] used 3% sodium tetradecyl sulphate and had the lesion regress by 90-100% in 11 cases after four injections. Good results in 54 patients (51.0%) where redundant skin left behind which need trimming and reconstruction. Hoque and Das[14] got 6 patients out of 85 (7%). Poor response results in 10 patients (9.4%) who show no response or recurrence after injection. Usually this is the case in large haemangioma or in mixed type. These cases may need another sessions or changing the line of treatment.

Clinical follow up of the patients was carried out for years.

Conclusion

Since haemangiomas are a cutaneous feature, its appearance in the newborn is a source of headache and worry for the parents and the family. More attention should be paid to the functional and psychological impacts of the deformities resulting from haemangiomas. Wait and see policy is not always successful because of the insistence of the parents. Early treatment is carried out when there is complications and occasionally to satisfy the parents, and because of that, it's better to start this treatment once there is no sign of involution. Injection sclerotherapy with boiling saline for the treatment of cutaneous haemangioma prove to be safe, simple, nontoxic, cheap and effective.

References

1. Bauland CG, Smit JM, Ketelaars R, Rieu PN, Spauwen PH. Management of haemangiomas of infancy: a retrospective analysis and a treatment protocol. Scand J Plast Reconstr Surg Hand Surg. 2008;42(2):86-91.
2. Chang CS, Wong A, Rohde CH, Ascherman JA, Wu JK. Management of lip hemangiomas: Minimizing peri-oral scars. J Plast Reconstr Aesthet Surg. 2012 Feb;65(2):163-8. Epub 2011 Sep 19.
3. Lauren C, Garzon MC. Treatment of infantile hemangiomas. Pediatr Ann. 2012 Aug 1;41(8):1-7. doi: 10.3928/00904481-20120727-10.
4. Smolinski KN, Yan AC. Hemangiomas of infancy: clinical and biological characteristics. Clin Pediatr (Phila). 2005 Nov-Dec;44(9):747-66
5. Hiraoka K, Mota De Queiroz A, Aparecida Marinho S, Costa Pereira AA, Costa Hanemann JA. Sclerotherapy with monoethanolamine oleate in benign oral vascular lesions. Minerva Stomatol. 2012 Jan-Feb;61(1-2):31-6
6. Zheng JW, Wang YA, Zhou GY, Zhu HG, Ye WM, Zhang ZY. Head and neck hemangiomas: how and when to treat. Shanghai Kou Qiang Yi Xue. 2007 Aug;16(4):337-42.
7. Beck DO, Gosain AK. The presentation and management of hemangiomas. Plast Reconstr Surg. 2009 Jun;123(6):181e-91e
8. Ernemann U, Kramer U, Miller S, Bisdas S, Rebmann H, Breuninger H, Zwick C, Hoffmann J. Current concepts in the classification, diagnosis and treatment of vascular anomalies. Eur J Radiol. 2010 Jul;75(1):2-11. Epub 2010 May 13
9. Maguiness SM, Frieden IJ. Management of difficult infantile haemangiomas. Arch Dis Child. 2012 Mar;97(3):266-71.
10. Musumeci ML, Schlecht K, Perrotta R, Schwartz RA, Micali G. Management of cutaneous hemangiomas in pediatric patients. Cutis 2008 Apr;81(4):315-22
11. Lloret P. Medical treatment of haemangiomas An Sist Sanit Navar. 2004;27 Suppl 1:81-92.
12. Panmdy A, Gangopadhay AN, Sharma SP, Kumar V, Gupta DK, Gopal SC. Evaluation of topical steroids in treatment of superficial haemangioma. Skinmed.2010 Jan-Feb; 8(1): 9- 11.
13. Mariano FV, Vargas PA, Della Coletta R, Lopes MA. Sclerotherapy followed by surgery for the treatment of oral hemangioma: a report of two cases. Gen Dent. 2011 May-Jun;59(3):e121-5.
14. Hoque S, Das BK. Treatment of venous malformations with ethanolamine oleate: a descriptive study of 83 cases. Pediatr Surg Int. 2011 May;27(5):527-31.
15. In Ho L, Keon HK, Pyoung J, Honk SB, Hyung-Jim K, Sung TK, Young WK, Dong-Ik K, Joon Y. Ethanol Sclerotherapy for the management of Craniofacial Venous Malformation : the Interim Result. Korean J Radiol. 10 (3), June 2009, 269-276.
16. Higuera, Stephen, Gordley, Kyl;e, Metry, Denise W, Stal, Samuel. Management of Haemangiomas and Pediatric Vascular Malformations. J Craniofac Surg, 17(4). July 2006. 783- 789 .
17. Chang LC, Haggstrom AN, Drolet BA, Baselga E, Chamlin SL, Garzon MC, Horii KA, Lucky AW, Mancini AJ, Metry DW, Nopper AJ, Frieden IJ; Hemangioma Investigator Group. Growth characteristics of infantile hemangiomas: implications for management. Pediatrics. 2008 Aug;122(2):360-7.
18. Khandpur S, Sharma VK. Utility of intralesional sclerotherapy with 3% sodium tetradecyl sulphate in cutaneous vascular malformations. Dermatol Surg. 2010 Mar;36(3):340-6. Epub 2010 Jan 19.
19. Crawford EA, Slotcavage RL, King JJ, Lackman RD, Ogilvie CM. Ethanol Sclerotherapy Reduces Pain in Symptomatic Musculoskeletal Hemangiomas. Clin Orthop Relat Res. 2009 November; 467(11): 2955–2961.
20. Jalil S, Akhtar J, Ahmed S. Corticosteroids therapy in the management of infantile cutaneous hemangiomas. J Coll Physicians Surg Pak. 2006 Oct;16(10):662-5.