



COMPARISON BETWEEN SURGICAL VS LASER TREATMENT OF HEMANGIOMAS-A RETROSPECTIVE CLINICAL STUDY OF 25 CASES

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ABSTRACT

INTRODUCTION: Hemangiomas are one of the most common congenital abnormality that produces tumor-like swelling. Hemangiomas, usually undergo spontaneous involution, it does not require any intervention but some patients have a functional impairment or cosmetic disfigurement which requires active management. For the last three decades, the laser has proved its efficacy in the treatment of hemangiomas in different studies and it is widely used nowadays. So In this study, we have compared the results of the use of Nd-YAG laser and surgery in the management of patients with hemangiomas. **MATERIALS AND METHODS:** 25 cases of hemangiomas have been admitted to our care between March 1991 till April 2022 and studied in the present study. Detailed history and clinical examination, with regards to age, sex, site, size mode of presentation, complications, etc. were noted. Surgery was tried in 13 patients with hemangioma and 12 patients received laser treatment. Various comparison in the form of complete or partial regression/excision, Scarring, Post op. bleeding, Post op. infection, and recurrence has been done in our study. **RESULTS:** In our study, around 90% of patients are below 30 years of age and 56% are female. Silent lesions were 36%, and Lesions with complications were 64%. Incidence of capillary hemangioma was more compare to cavernous & port-wine stain hemangioma. Out of 25 patients, 12 patients suffering from various types of hemangioma were treated with Nd-YAG laser. Complete resolution of the lesion was achieved in all 12 patients with postoperative scarring in 4(33.3%) patients and Postoperative bleeding in 1(08.3%) patient. 13 patients were treated with surgical excision and ligation of feeders. Most of the hemangioma (84%) can be completely treated by surgery and 8% of them were not excisable. These lesions were invading deeper and vital structures like big veins and nerves. These lesions were planned for laser application later on. Postoperative wound infection was in 38% which was controlled by antibiotics. In 7.6% recurrence was noted after a few days of surgery. **CONCLUSION:** A hemangioma can be treated successfully by both surgical and laser application but laser therapy is superior to surgery. Any type and any size of hemangioma at any site of the body can be treated by laser therapy. Surgery is always associated with post-operative scarring. Postoperative infection is also one of the most common complications in surgery. During surgery blood loss may be profuse and requires a blood transfusion. The only disadvantage with laser is that it is available in the selected institutes and an expert is required for handling & application of laser.

KEYWORDS

INTRODUCTION

Hemangiomas are one of the most common congenital abnormalities that produce tumor-like swelling. Hemangiomas usually appear at birth and are more common in females, according to the caliber of the vessels, they are classified as 1) capillary 2) cavernous 3) capillary-cavernous type[1][2]. Almost all hemangiomas, usually undergo spontaneous involution[1], it does not require any active management but some patients have a functional impairment or cosmetic disfigurement, Ulceration, bleeding pain, and functional handicap due to involvement of the oropharynx, tongue, lip, and eyelid which require active management.

In past, hemangiomas have been treated by Steroid Injection therapy, tattooing, dermabrasion, injection of sclerosing agents, ionizing radiation, cryosurgery, embolization, electrocautery, and surgery[3][4][5][6][7][8].

In recent years, high-dose intralesional or systemic steroid therapy has repeatedly been reported to arrest growth and/or precipitate involution of rapidly enlarging hemangiomas and has become the treatment of choice for lesions, threatening respiration, feeding, or vision[3][9].

For the last three decades, the laser has proved its efficacy in the treatment of hemangiomas during various studies and it is widely used nowadays for the management of hemangiomas. Laser light has the property of coherence, monochromaticity, and high-intensity beam which act only on chromophore (target tissue) and destroy it. Various laser-like CO₂, Argon, Pulse dye, Nd YAG has been tried in the treatment of the various type of hemangiomas. They have shown encouraging results of laser in form of complete destruction of vascular tissue with minimum complication[10][11][12][13][14].

In this study we have compared results of the use of Nd-YAG laser and surgery in the management of patients of hemangiomas.

MATERIALS & METHODS

25 cases of hemangiomas, who have attended our center between March 2010 till April 2022, have been studied in the present study. Detail history and clinical examination, as regards to age, sex, site, size mode of presentation complication etc. were noted. Routine investigations like Hemogram, Urine R/M, Blood sugar, ECG, Preoperative medical assessment in all elderly patients and patients with chronic disease have been done. Parenteral ampicillin was given to all the patients ½ hour before the procedure of treatment. Though, various methods of treatment of hemangiomas are known, we have studied following methods in details:

- Surgery
- Laser application.

Surgery:

Surgery was used as a treatment modality in 13 patients of hemangioma involving various sites. 7 patients with hemangiomas involving head and neck, 3 patients were of chest wall hemangiomas and 3 patients were of upper limb hemangiomas. The size varies between 2 cm² to 36 cm² in volume. General Anesthesia was given to all patients. Excision of hemangioma and ligation of Feeder was done as an operative procedure. Post-operative analgesic, anti-inflammatory and antibiotics were given to all patients. Hospital stay of patients were for 7 to 10 days.

Laser application:

Nd-YAG laser was used as modality of treatment in 12 patients. Out of which 8 patients were having lesion on head and neck, 2 patients were having lesion on upper limb, 1 patient was having lesion on thigh. Size of lesion varies between 1 cm² to 30 cm² in volume. General anesthesia was given. Period of laser application was 4 sec. for each step of application. Hand piece was held perpendicular to lesion. Total

number of steps varies between lesions. Laser application was done until shrinking or blanching of lesion occurs.

RESULTS

In this Clinical study, 25 patients suffering from hemangiomas were treated with surgery and laser, the following are observations of this study. The majority of patients attending the clinic were between 10-40 years of age (Table 1). Out of which 56% of patients were female (Table 2). The majority of the patients attending the clinic were adults (Table 3). Lesions of the head and neck were common about 68%. Upper limb & lower limb involvement can be seen in 20% of cases. Involvement of the chest in 12% of cases can be seen. In 2 patients the lesion were involving multiple sites. One of the patients has lesions over tongue, oropharynx and the neck and another one has lesions over the tongue and axilla (Table 4).

Table 1: Age of the patient

Sr. no.	Patient's age	Number of patient	% age
1.	0 - 1 Year	5	20%
2.	0 - 10 Year	5	20%
3.	10 - 20 Year	6	24%
4.	20 - 30 Year	7	28%
5.	30 - 40 Year	1	4%
6.	40 - 50 Year	1	4%

Table 2: Sex of patient

Sr. no.	Sex of patient	Number of patient	% Age
1.	Male	11	44%
2.	Female	14	56%

Table 3: Anatomical location of the hemangiomas

Sr. No.	Site	No. of patient
1.	Fore head	1
2.	Parotid gland	1
3.	Nose	1
4.	Post auricular region	1
5.	Cheek	1
6.	Oral cavity	2
7.	Tongue	5
8.	Intranasal	1
9.	Neck	4
10.	Chest	3
11.	Upper limb	4
12.	Lower limb	1

Table 4: Age at first appearance of lesion in patient

Sr. No.	Age of patient	Number of patient	% age
1.	Since birth	14	56%
2.	0 - 1 yr.	3	12%
3.	1 - 10 yr.	6	24%
4.	10 - 50 yr.	2	8%

64% of the lesions had one or more complications while 36% of the swellings/lesions were silent (Table 5). Incidence of capillary hemangioma was more compare to cavernous & port-wine stain hemangioma (Table 6). 12 patients suffering from various types of hemangiomas were treated with Nd YAG laser (Table 7). Laser therapy have been applied to lesion for 4 sec. for each step. Number of steps were various according to size of lesion. Laser therapy was given until the lesion gets shrunken or blenching appears in lesion. Power supply was between 18 to 45 watt.

Table 5: Complains of patient

Sr. No.	Patient's complain	No. of patient	% age
1.	Bleeding from lesion	9	36%
2.	Pain full lesion	2	8%
3.	Ulceration	2	8%
4.	Functional handicapped due to lesion	1	4%
5.	Sudden increase in size of lesion	2	8%
6.	Complaint of swelling only	9	36%

Table 6: Type of Hemangiomas

Sr. No.	Type of Hemangioma	No. of patient	% age
1.	Capillary Hemangioma	19	76%
2.	Cavernous Hemangioma	5	26%
3.	Port-wine stain	1	4%

Table 7: Type of Treatment

Sr. No.	Method	No. of patient
1.	Surgery	13
2.	Laser Therapy	12

Various results of laser associated with size and site of lesion are as below (Table 8). Good result suggest complete destruction of the lesion. Laser therapy can be tried in all type & all size of hemangiomas. With Nd-YAG laser 100% complete resolution of hemangioma was possible. Scarring was the only marked complication. In cutaneous lesion scarring was more marked. In large size lesion, where energy requirement to destruct the lesion was comparatively high, scarring was more marked. Post-operative bleeding was observed in 8.3%. (Type 9). There was no evidence of post-operative infection and recurrence.

Table 8: Results & Complications of Laser Treatment

Sr. No.	Site of lesion	Volume length x width of lesion	Results	Complication
1.	Tongue – Lesion 1	9 cm2	Good	-
	Lesion 2	16 cm2	Good	-
	Lesion 3	20 cm2	Good	-
2.	Oral Cavity Lesion 1	1 cm2	Good	-
	Lesion 2	12 cm2	Good	-
3.	Cheek	6 cm2	Good	-
4.	Nose	3 cm2	Good	-
5.	Nostril (intranasal)	Polypoid growth observed	Good	-
6.	Parotid gland	30 cm2	Good	Scarring
7.	Rt. Shoulder	15 cm2	Good	Scarring
8.	Axilla and Tongue 1) Tongue	30 cm2	Good	Post-operative bleeding from tongue.
	2) Axilla	16 cm2	Good	Scarring
9.	Thigh	150 cm2 total area, 2*2 Cms sized multiple lesions.	Good	Scarring

Table 9: Types & proportions of Post Laser Treatment Complications

Sr. No.	Result of Laser	No. of patient	Percentage
1.	Complete destruction of lesion	12	100%
2.	Post-operative scarring	4	33.3%
3.	Post-operative bleeding	1	8.3%
4.	Recurrence	-	-
5.	Post-operative	-	-
6.	Partially destructed lesion	-	-

13 patients were treated with surgical excision and ligation of feeders. According to size, site & complications of surgery the results obtain are below. P suggest possible and poor result suggest incomplete or non-excisable results (Table 10). Most of the hemangiomas (84%) can be cured completely by surgery. 8% of were not excisable. These lesion were invading deeper and vital structures like big veins and nerves. This lesions were planned for laser application later on. Postoperative wound infection was in 38% which was control by antibiotics. Recurrence rate was 7.6% after few days of surgery (Table 11) Surgical excision always results in a scar, 13% in our study (Table 12). In this study scar was acceptable, there was no hypertrophic, hypo pigmented scar. Laser treatment has several advantages over surgery e.g. less post-operative stay, less pain, less blood loss, decrease duration of anesthesia required (Table 13).

Table 10: Types of Surgical treatment & results

Sr. No.	Site	Size(Cm s)	Complete Excision	Partial Excision	Not Excisable	Complication	Result
1.	Post auricular	2x2	P	-	-	-	Good
2.	Forehead	2x2	P	-	-	-	Good
3.	Tongue	2x1	P	-	-	-	Good

4.	Neck Lesion 1	4x5	P	-	-	-	Good
	Lesion 2	6x5	-	-	P	-	Poor
	Lesion 3	5x5	P	-	-	-	Good
5.	Neck Tongue	Big lesion involving complete anterior lateral compartment of Neck, tongue and oropharynx	-	P	-	Infection	Poor
6.	Chest	3x3	P	-	-	Infection + recurrence followed by Good surgery	Good
7.	Upper limb	4x3	P	-	-	Infection	Good
		3x3	P	-	-	-	Good
		6x3	P	-	-	Infection	Good

Table 11: Types & Proportions of Post-surgery complications

Sr. No.	Results	No. of Patients	% age
1.	Complete excision	11	84%
2.	Partial excision	1	8%
3.	Not excisable	1	8%
4.	Post-operative bleeding	-	-
5.	Post-operative infection	5	38%
6.	Recurrence	1	7.6%

Table 12: Comparison of results of surgery & laser treatment

Sr. No.	Results	Surgery	Laser
1.	No. of patients	13	12
2.	Complete regression/excision	11	12
3.	Partial regression/excision	1	-
4.	Not excisable	1	-
5.	Scarring	13	4
6.	Post op. bleeding	-	1
7.	Post op. infection	5	-
8.	Recurrence	1	-

Table 13: Comparison of advantages by Laser treatment over surgical treatment

Sr. No.	Factors	Laser	Surgery
1.	Hospital stay	3 to 5 days	7 to 10 days
2.	Blood loss during the procedure	Nil	50 to 100ml
3.	Anesthesia req.	15 to 30 min	30 to 60 min or more
4.	Post-operative pain & discomfort	Less	May be intense
5.	Post-operative requirement of analgesics and anti-inflammatory	Very less	Remarkably high

DISCUSSION

The present clinical study was undertaken to study the various clinical manifestation of hemangioma and their treatment with help of surgery and laser application. Lee Bivings and Lister notice the incidence of age and sex is as such: 76% of hemangioma exist in newborn. 15% in early childhood and 15% in adult life. In the present series, the incidence of hemangioma in newborns was 56%, in childhood it was 36%, and in adults 8%. The incidence in females was 56% and in males, it was 44%.

In the present series, the incidence of capillary hemangiomas was 76%, cavernous hemangioma was 20%, and port wine stain was 4%.

Lee Bivings and Lister notice that capillary and cavernous types of hemangiomas usually undergo spontaneous regression [1][2]. Studies showing use of prednisone therapy in the management of large hemangiomas in infants and children have also been reported [3]. If such regression does not occur then, there may be some complication due to hemangioma, later on, such lesions require active management. In 1989 Bruce Achauer, reported series on treatment of hemangiomas by Nd-YAG and Argon laser. In a 6-year period, 55 patients received 57 Nd-YAG or argon laser treatments. Thirty patients received 31 argon treatments, and 25 patients received 26 Nd-YAG treatments; and 2 received first argon with subsequent Nd-YAG treatments. Although more dramatic successes were noted in the Nd-YAG laser, complications were more frequent and severe. Complications included delayed healing, postoperative bleeding, and some hypertrophic scarring. Complications were seen in 12 percent of all patients, 9 percent of these associated with the Nd-YAG laser [10].

Table 14: Results of Nd-Argon Laser Treatment in Bruce Achauer's study

Sr. No.	Result	Result in %
1.	Complete regression	72%
2.	Partial re Partial regression	28%
3.	Post-operative scarring	31%
4.	Post-operative bleeding	7.6%
5.	Delay healing	3.8%

These reports suggest that compare to the Bruce Achauer's series, complete regression was possible in 72%, while in our study it was 100% [10]. In Bruce Achauer's series the lesion were having size up to 103 cm² or more. In present series the size was maximum up to 30 cm² except in 1 patient, it was 150 cm². Bruce Archer has reported complete regression up to 50 cm² size lesion and in some patient with lesion more than 50 cm² [10]. This suggest that, size of lesion play important role in treatment of hemangioma. As the size increase the results were poor in form of partial regression. Energy requirement was also increased for bulky lesion.

Bruce Achauer reported scarring after laser application is 30% of patient. The similar results are seen in our series. This scarring was more marked in bulky lesions only [10]. In Bruce Achauer's study, post-operative bleeding was noticed in 8% of cases, in present series it is about 8%, of cases [10]. Delayed healing was present only in Bruce Achauer's series which was absent in our series. There was absence of post-operative infection or recurrence after laser therapy. The blood loss was absent in present series using ND YAG laser which suggest coagulation property of laser. Anesthesia requirement was for 15 to 30 min. during the laser application.

Bruce Achauer reported effect of argon laser on hemangioma, report suggested that argon laser was effective on small and flat lesion. There was no scarring or other post-operative complication in their patient. Thus, there is aesthetic value of Argon laser in small flat lesion.

Various study by Tian Tan [4], Apfelberg [11][12][13][14], Cosman [15], Noe JM [16], Hobby WL [17], Maser MR [18], Brigitte Dreno [19], suggest almost similar effect of laser on hemangioma which we can observe in our study. In recent years pulse dye laser has shown its efficacy in treatment of hemangioma due to well controlled and specific effects of pulse dye laser.

In present series results of surgery shows that in 84% patients had complete regression and in 8% patient partial regression was possible. In 8% patient surgical excision was not possible due to involvement of vital organs like blood vessels, nerves and deeper structures. Most lesion which were completely excisable were situated on chest, limb or face. The size of lesion was between 1 to 36 cm².

In surgery, post-operative wound infection was in 38% patient. Infection was mild and controlled by suitable antibiotic. Surgery always results in scar but was cosmetically acceptable to patient. None of patient shows hypertrophic, hypo or hyper pigmented scar. There was recurrence in one patient after one month, probably it was due to incomplete excision. Second operation bleeding was 50 to 100ml. There was no requirement of blood transfusion during and after surgery.

Comparative study of treatment of hemangioma between ND YAG laser and surgical excision indicates that:

Laser is definitely superior to surgery. Laser is less traumatic than surgery and it destroy only hemangioma with minimum damage to dermis. Surgical excision can damage nearby vital structure involving by hemangioma tissue. In laser therapy though anesthesia was required, it was short in duration compare to surgery. Bleeding was absent during ND YAG laser application while there was blood loss during surgery, which may be negligible in small lesion but may be profuse, in large lesion. Post-operative complication like infection and recurrence was marked in surgery which was absent in laser therapy. Surgery is always associated with scarring while in laser therapy it is present when required energy was more in bulky lesion. Hospital stay in 3 to 5 days in laser application surgery required 7 to 10 days hospitalization. Post-operative requirement of analgesic and anti-inflammatory, are more common in surgery, compare to laser application. Laser is less expensive and time consuming compare to surgery.

CONCLUSIONS

Most hemangiomas appear at birth but they require treatment when spontaneous involution is absent and presence of some complications or cosmetic disfigurement due to hemangiomas. Females are more commonly affected by hemangioma.

A hemangioma can be treated successfully by surgical and laser application but laser therapy is superior to surgery. Any type and any size of hemangioma at any site of the body can be treated by laser therapy. Postoperative complications and morbidity are less after laser treatment compared to surgical treatment. Complete excision is not always possible. Recurrence can be observed in a few patients.

The only disadvantage with laser is that it is available in the selected institute and an expert person is required for handling & applying the laser.

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