

Original Article

Multiplex Laser for treating Non Involuting Congenital Haemangiomas (NICH) in children

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Abstract

Background Non-involuting congenital haemangioma (NICH) is a form of congenital haemangioma that does not involute or regress. Previous treatment has involved excision of troublesome lesions.

Methods We present the use of CYNERGY (multiplex) laser in the management of NICH in the paediatric population. Seven children underwent CYNERGY therapy, at 595nm PDL and 1064nm Nd:YAG as a combined laser. Three children had general anaesthetic (GA), while four were treated using local anaesthetic gel. We used photographic analysis for pre and post treatment assessment using a colour coded chart.

Results In all cases there was marked improvement in redness as well as reduction in the bulk. Average improvement was achieved by 75% following total of 3-8 treatments. Three patients received over 90% resolution. All three had procedure under GA.

Conclusion We have shown that vascular lasers, specifically Multiplex, has a further role to play in this condition. We noted that clinicians are more willing to treat under GA as an increase in total number of pulses was seen to achieve greater clinical improvement. None of the patients treated with multiplex required debulking surgery.

Key words

Congenital Haemangioma, laser treatment, non-involuting congenital haemangioma, children, birth mark.

Introduction

Non-involuting congenital haemangiomas (NICH) are distinguished from other types of haemangiomas by lack of postnatal growth or involution.¹⁻³ There are now 4 distinct categories of congenital haemangioma. NICHs as described, rapidly involuting congenital

haemangiomas (RICH), which usually involute within the first year of life, and partially involuting congenital haemangiomas (PICH).^{4,5} PICHs present clinically very similar to RICH but undergo only partial involution.² RICHs are the most common of the four while NICHs have been shown in a number of studies to be rather sporadic.^{1,6} Unlike Infantile Haemangiomas (IH) they are fully formed at birth and do not display a response to propranolol.⁷ NICHs have generally been treated with excision for those that are medically or aesthetically troubling, while some have tried pulse-dye laser (PDL).^{6,8} Currently there is lack of published data on the use of laser therapy in congenital

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haemangioma.¹ TICH, Tardive involuting congenital haemangioma has recently been described which erupts during puberty.¹¹

Objectives

The aim of this study was to assess the efficacy of the multiplex (CYNERGY) laser in the treatment of NICH in the paediatric population.

Patients and Method

Seven children aged between 5 and 15 years, 2 male 5 female, with NICH, were identified as having been treated with combined CYNERGY (multiplex laser) at Great Ormond Street Hospital (GOSH) between December 2013-2016. The multiplex laser is a combination laser which delivers 585-nm Pulsed Dye Laser [PDL] and a 1064-nm Nd:YAG laser. The probe used was 10mm in 5 cases and 7mm in 2 cases. Laser parameters were; group 3 with a pulse duration of 6ms using PDL and 15ms using Nd:YAG). Fluences varied between 7.5-11.5 (J/cm²) with PDL and 60 Joules Nd:YAG except in 2 cases of 40 Joules (**Table 1**).

Four of the patients previously had PDL prior to their multiplex using 585 nm wavelength; at repeat treatment all had combined multiplex laser therapy. Cooling was provided by Dynamic Cooling Device TM (DCDTM) using the PDL laser and ice cool water while with multiplex, cool USS gel was applied at the time of procedure and the cryo4 air flow cool system was utilised. Photos were taken before and after each treatment. Results were assessed by examining the patient photographs before and at the end of treatment, a percentage change was calculated using both a colour coded chart and by clinical assessment. Three of the patients had general anaesthesia [GA] while four were treated under local anaesthesia [LA].

Table 1 Patients and treatment variables on Cynergy Multiplex PDL/ Nd:YAG

Variables	Numbers
Age	5-15 years
Patient Number	7
Male : Female	2 : 5
Laser Probe used	7-10 mm
Laser parameter	Group 3
Pulse duration	6 ms-PDL / 15 ms- Nd:YAG
Fluence	7.5-11.5 J/cm ² -PDL / 40-60 J/cm ² -Nd:YAG

Patients treated under GA were more than 3 years of age.

Results

Out of all the patients included, NICH were confined as follows; 2 on the lower leg, 2 upper leg, 1 upper arm, 1 forearm and 1 patient had a lower lip NICH. The overall average percentage improvement was 75%, using between 3-8 treatments. Three patients achieved almost complete resolution with over 90% improvement, from presentation till end of treatment. Interestingly all three of these patients showing near complete resolution had their procedure with GA and had significantly greater number of pulses, average pulses under GA was 36 while the average pulses under LA was 15, indicating that clinicians can treat entire areas by using more pulses, while the patient is under GA.

In all cases there was a marked reduction in the redness and bulk of the lesion. As can be seen with one of the patients in **Figure 1a & 2a** before treatment and **Figure 1b & 2b** after multiplex laser therapy. All patients and their families were satisfied with the outcome, this data was recorded in the hospital records. In future studies patient satisfaction questionnaire could be used.



Figure 1a Pre treatment



Figure 1b Post treatment



Figure 2a Pre treatment



Figure 2b Post treatment

Conclusion

Overall we found that using multiplex laser following the initial PDL therapy showed good response.

Limitations

A small number of cases were included, patient satisfaction questionnaire was not used as part of our assessment as this was a retrospective study. Some patients had PDL sessions before they had the combination laser therapy thus already had partial improvement before having Multiplex laser treatment.

Discussion

NICH never involute as far as we are aware. The only therapeutic option described is of surgical excision and plastic reconstruction when there is cosmetic or medical impairment. Some clinicians have attempted PDL therapy however

this has shown limited benefit.^{9,10} We have seen that vascular lasers, specifically multiplex, have a further role to play in this condition. Since NICH do not involute we recommend early treatment. Our recommendation is maximum 6 to 8 treatments to get the best outcome before considering any surgical intervention. None of our seven patients required debulking surgery.

References

1. Lee PW, Frieden IJ, Streicher JL, McCalmont T, Haggstrom AN. Characteristics of noninvoluting congenital hemangioma: a retrospective review. *J Am Acad Dermatol* 2014; 70(5): 899-903.
2. Nasser E, Piram M, McCuaig CC, Kokta V, Dubois J, Powell J. Partially involuting congenital hemangiomas: a report of 8 cases and review of the literature. *J Am Acad Dermatol* 2014; 70(1): 75-9.
3. Enjolras O, Picard A, Soupre V. Congenital haemangiomas and other rare infantile vascular tumours. In *Annales de chirurgie*

- plastique et esthetique 2006; 51(4-5): 339-46.
4. Berenguer B, Mulliken JB, Enjolras O, Boon LM, Wassef M, Josset P, Burrows PE, Perez-Atayde AR, Kozakewich HP. Rapidly involuting congenital hemangioma: clinical and histopathologic features. *Pediatr Dev Pathol* 2003; 6(6): 495-510.
5. Keating LJ, Soares GM, Muratore CS. Rapidly involuting congenital Hemangioma. *Med Health R I* 2012; 95(5): 149-52.
6. Krol A, MacArthur CJ. Congenital hemangiomas: rapidly involuting and noninvoluting congenital hemangiomas. *Arch Facial Plast Surg* 200; 7(5): 307-11.
7. Tawfik AA, Alsharnoubi J. Topical timolol solution versus laser in treatment of infantile hemangioma: a comparative study. *Pediatr Dermatol* 2015; 32(3): 369-76.
8. Kessels JP, Hamers ET, Ostertag JU. Superficial hemangioma: pulsed dye laser versus wait-and-see. *Dermatol Surg* 2013; 39(3pt1): 414-21.
9. Richter GT, Friedman AB. Hemangiomas and vascular malformations: current theory and management. *Int J Pediatr* 2012; 2012: 645678.
10. Hochman M, Adams DM, Reeves TD. Current knowledge and management of vascular anomalies: I. Hemangiomas. *Arch Facial Plast Surg* 2011; 13(3): 145-51.
11. Hua C, Jin Y, Wang L, Chen H, Ma G, Qiu Y et al. Tardive Expansion Congenital Hemangioma: a variation of NICH or a new hemangiomatous entity? ISSVA [Internet]. Amsterdam: ISSVA; 2018 [cited 21 January 2019]. p. 48. Available from: <http://www.issva.org/UserFiles/file/ISSVA2018-Program-AbstractBook.pdf>.