OF APPLYING A SERIES OF PHYSICAL FACTORS IN CHILDREN WITH TONSILLAR HYPERTROPHY ASSOCIATED WITH SOME OF THE SYMPTOMS OF SLEEP DISORDERED BREATHING

Zhenya Ruseva Petrova

Department of General Medicine, Medical University Varna, Bulgaria, <u>drruseva@abv.bg</u> **Mariyana Mihaylova Krasteva** Department of physiotherapy, rehabilitation, thalassotherapy and occupational diseases, Medical

University Varna, Bulgaria, m.mihailova96@abv.bg

Mario Petrov Milkov

Department of Prosthetic Dental Medicine, Medical University Varna, Bulgaria

Nikolay Rumenov Sapundzhiev

Department of Neurosurgery and ENT, Medical University Varna, Bulgaria

Abstract: Hypertrophy of the palatine tonsils is one of the most common pathologies in children. . It is the number one reason that children go to their GPs and later to otorhinolaryngologist.. The condition is often linked to Upper respiratory tract infection (URTIs) and later development of sleep disordered breathing /SDB/, that lead to disturbances in the quality of life of the patients. More and more parents refuse surgery and turn to alternative methods of treatment That is why the medical community is interested in solving these problems and developing the best therapies. We sought out to study the effectiveness of a complex of physical factors in treating tonsillar hyperplasia in children and the resulting breathing difficulties.Subject of our study were 22 children 3-10 years old diagnosed with tonsillar hypertrophy level 3+,4+ and one or several symptoms of SDB with or without behavioral issues, that have gone through the physiotherapy ward with Medical center "St. Marina" Varna. Therapy with ultrasound and polarized, polychromatic, incoherent low energy light has been carried out. A questioner developed by the research has been used (Appendix 1), in combination with the standard scale of tonsillar enlargement. The parents have also filled out a consent form for minors.At the end of treatment 82 % of the participating children exhibited a notable decrease in the size of the tonsils, that correlates with a reduction of the symptoms of SDB (p<0.001)The results are encouraging and that gives us reason to continue our research.

Keywords: tonsillar hypertrophy (TH), difficulties breathing during sleep, physical factors, ultrasound, polarized polychromatic incoherent low energy light (PP).

INTRODUCTION

Hypertrophy of the tonsils is one of the most common pathologies in children. It is the number one reason that children go to their GPs and later to otorhinolaryngologist. The condition is often linked to Upper respiratory tract infection (URTIs) and later development of sleep disordered breathing /SDB/, that lead to disturbances in the quality of life of the patients. That is why the medical community is interested in solving these problems and developing the best therapies. The size of the palatine tonsils is evaluated based on the anatomical proportions in the aero digestive tract. Levels 3+ and 4+ are considered Hypertrophy [2]

Tonsilar hypertrophy itself doest require treatment unless it is accompanied by other symptoms ,but palatine tonsils hyperplasia is the main factor for recurring tonsillar pharyngitis , sleep disordered breathing, otitis and sinusitis.[7]

SDB – this condition is characterized by abnormal respiratory patterns or insufficient ventilation during sleep, including snoring, breathing trough the mouth and pauses in breathing. It includes a series of obstructive disturbances with obstructive sleep apnea /OSA/ being the most serious one. OSA in children is connected with the following night symptoms: snoring, pauses in breathing, restless sleep, night terrors, enuresis nocturne. Day symptoms include: breathing trough the mouth, sleepiness, attention problems, hyperactivity, difficulties with learning, weight problems [6].

According to some authors, patients with primary snoring are at a higher risk of developing OSA [5]. Children with sleep disordered breathing are more likely to have poor academic success, a fact which improves after adenotonsillectomy [3]. The main method of treatment of TH is surgery – tonsillectomy and tonsilotomy. Tonsillectomy is defined as complete removal of the tonsil including the capsule, using dissection of the parieto-insular space between the capsule and the muscles. In the USA this is one of the most common surgical procedures –

530 000 surgeries among children below 15 years old [8]. Tonsilotomy consists of resicizing of the medial part of the palatine tonsils [1]. This method is becoming more preferred by otorhinolaryngologists and patients alike for treatment of tonsillar hypertrophy with possible SDB.

GOAL

To study the effectiveness of a complex of physical factors in treating tonsillar hyperplasia in children and the resulting breathing difficulties.

MATERIALS AND METHODS

22 children 3-10 years old diagnosed with tonsillar hypertrophy level 3+,4+ and one or several symptoms of SDB with or without behavioral issues, that have gone through the physiotherapy ward with Medical center "St. Marina" Varna. Therapy with ultrasound and polarized, polychromatic, incoherent low energy light has been carried out. A questioner developed by the research has been used (Application 1), in combination with the standard scale of tonsillar enlargement. The parents have also filled out a consent form for minors.

RESULTS

The results that we got are very encouraging regarding the efficiency of the applied methodology.



Fig.1 Distribution of the kids based of snoring before PT treatment Legend: Snoring : never /level 0/; sometimes /level 1/; often /level 2/; always /level 3/.

In the beginning of the PT treatment, the child distribution based on snoring is as follows: 73% (14) of them are always or often snoring, while 18%(7) snore sometimes.



Fig.2 Distribution of the kids based on snoring after PT treatment

After conducting a PT treatment, usually or always snoring children are only 9%(2). Before the PT only 9%(1) aren't snoring at all, and after that those numbers rise to 41% (9) (P<0,001) (Fig.2).



Fig. 3 Distribution of the kids based on the size of their palatine tonsils before PT

Legend of the clinical levels in evaluation of the size of the palatine tonsils:

-level 1+ - fill below 25% of the transverse space between the posterior palatine arches;

- level 2+ - 25% to 49% fill below 50% of the transverse space between the posterior palatine arches;

- level 3+ - 50% to 74% fill below 75% of the transverse space between the posterior palatine arches;

- level 4+- fill 75% or more of the transverse space between the posterior palatine arches.

When tracking the size of the palatine tonsils before treatment a hypertrophy of the tonsils was found in 91% (20) of the kids. Two of the kids with size of the tonsils level 2+ were included in the research because of symptoms of SDB symptom.



Fig. 4 Trend in the changes of the palatine tonsils' size after PT treatment

After PT treatment the change in size of the palatine tonsils is as follows: in 9% is observed a normalization in tonsils' size – level 1+(2), in 73%(16) the size is reduced to level 2+, which is a variation of the norm. The children with tonsillar hypertrophy are reduced to 18%(4), (P<0,001)(Fig. 4).

DISCUSSION

In our research we found significant reduction of the palatine tonsils' size in 82% () of the children, when treated with PT. This result correlates with a reduction of the SBD symptom. The positive trend that is observed in the tracked parameters gave us ground to conclude that physical therapy treatment is suitable as an alternative therapy in children with tonsillar hypertrophy. It's necessary the medical studies of the subject to continue in order to be established with better accuracy the statistical significance of the method. In our opinion the developed PT methodology can be used as a prophylaxis measure in frequently ailing children, who are risky regarding development of tonsillar hypertrophy, in order to prevent SDB symptom. Object of our future researches would be the establishment of the duration of the effect of this therapy and in what is the optimal frequency.

REFERENCES

[1] Сапунджиев Н., Генова П, Тонзилотомия минало в бъдеще време, Med info, 2014

[2] Baugh RF1, Archer SM, Mitchell RB, et al . Clinical practice guideline: tonsillectomy in children. Otolaryngol Head Neck Surg. 2011 Jan;144(1 Suppl):S1-30

[3] Gozal D. Sleep-disordered br eathing and school performance in children. Pediatrics. 1998 Sep;102(3 Pt 1):616-20.

[4] Helling K, Abrams J, Bertram WK, Hohner S, Scherer H. Die Lasertonsillotomie bei der Tonsillenhyperplasie des 15. Kleinkindes. HNO. 2002; 50(5):470-8.

[5] Lumeng, J. C., & Chervin, R. D. (2008). Epidemiology of pediatric obstructive sleep apnea. Proceedings of the American Thoracic Society, 5(2), 242-252

[6] Pirsig W, Diagnostic for OSA in Children. 42 Braziliancongress of othorinolarymgology and cervico facial surgery, 2012

[7] Reinhardt A. Klinische Ergebnisse nach ambulant durchgeführter Diodenlaser- Tonsillotomie bei symptomatischer 4. Tonsillenhyperplasie des Kindes. 2012; Doctoral thesis; Medizinischen Fakultät Charité-Universitätsmedizin Berlin.

[8] Reginald F. Baugh, Sanford M. Archer, Ron B. Mitchell, et al. Clinical Practice Guideline: Tonsillectomy in Children. Otolaryngology -- Head and Neck Surgery 2011

Appendix 1

I section:		1.Name of the child
Biographic anthropometric part	and	2. Sex
		3. Birth date/age
		4. Height and weight
		5. Parent's name
		6. Phone number
II section:		1. Snoring: never /level 0/; sometimes /level 1/;
Nocturnal symptoms		often /level 2/; always /level 3/
		2.Troubled sleep: never /level 0/; sometimes /level 1/; often /level 2/; always /level 3/
		3. Apneic pauses/pauses in breathing/: never/level 0/; sometimes/level 1/; often /level 2/; always/level 3/
		4 Night enuresis/ bed wetting/ : never/level 0/; sometimes/level 1/; often /level 2/;always/level 3/
		Legend: never /not even once/; sometimes /1-2 times a week/; often /3-5 times a week/; -always /every night/
III section:		1.Drowsiness: never /level 0/; sometimes /level 1/;
Daily symptoms		often /level 2/; always /level 3/
		2.Reduced concentration: never /level 0/; sometimes /level 1/;
		often /level 2/; always /level 3/;
		3. Hyperactivity: never /level 0/; sometimes /level 1/; often /level 2/ ; always /level 3/