

The effects of daily pulmonary rehabilitation program at home on childhood asthma

G. Bingöl Karakoç*, M. Yılmaz*, S. Sur, D. Ufuk Altıntaş*, T. Sarpel****
and **S. Güneşer Kendirli***

*Çukurova University. Faculty of Medicine. Division of Pediatric Allergy-Immunology. **Department of Physical Medicine and Rehabilitation. Adana. Turkey.

SUMMARY

Objective: the aim of this study is to investigate the efficacy of pulmonary rehabilitation program in children with asthma.

Patients and method: twenty eight children with mild persistent or moderate asthma were included into a double blind, randomised study. Sixteen children (9 girls, 7 boys) with the mean age of 10.8 ± 2.3 were assigned to receive pulmonary rehabilitation program with their parents for 30 days (group I). Control group included 12 children (6 girls, 6 boys) with the mean age of 10.2 ± 2.4 (group II). Symptom and medication scores quality of life index and pulmonary function tests were evaluated in rehabilitation and control group in the beginning of the study and after the one month period.

Results: the groups did not differ on all parameters before the study ($p > 0.05$). Statistically significant decrease were found in symptom and medication scores in rehabilitation group ($p < 0.05$) and quality of life index was increased significantly in the same group ($p < 0.05$). Pulmonary function measures also significantly improved including vital capacity, forced vital capacity, FEV₁, PEF and FEF₂₅₋₇₅ in the rehabilitation group ($p < 0.05$). The best improvement were seen in FEF₂₅₋₇₅ (10.09% increase) and PEF (7.81% increase) values. In control group no statistically significant differences were found in all parameters.

Conclusion: in this study it was shown that daily pulmonary rehabilitation at home could improve quality of life and pulmonary functions. So pulmonary

rehabilitation should be placed as a component of management in childhood asthma.

Key words: Pulmonary rehabilitation. Childhood, asthma.

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INTRODUCTION

A number of patients with chronic obstructive pulmonary diseases and asthma is on the rise over all the world. Education, environmental control and drug therapy are the corner stones in the management of asthma. Nowadays pulmonary rehabilitation is a recognised discipline for stabilisation and improvement of asthma and chronic obstructive pulmonary diseases. Pulmonary rehabilitation program (PRP) could improve the quality of life, pulmonary functions, exercise tolerance, reduce the symptoms and anxiety of patients and decrease frequency and duration of hospitalisation (1-6).

The aim of this study is to investigate the efficacy of pulmonary rehabilitation program in children with asthma.

PATIENTS AND METHOD

Twenty eight children with mild persistent or moderate asthma were included into a double blind, randomised study. Sixteen children (9 girls, 7 boys) with the mean age of 10.8 ± 2.3 were assigned to receive pulmonary rehabilitation program with their

parents for 30 days (group I). Control group included 12 children (6 girls, 6 boys) with the mean age of 10.2 ± 2.4 (group II). Children in both groups were comparable according to the stage of asthma and they had been using same drugs at least for six months.

Pulmonary rehabilitation program consisted of relaxation exercises, endurance exercises, breathing exercises and rhythmic mobilisation exercises. Patients and their parents had visited Physical Medicine and Rehabilitation Department at the first visit and they were thought to perform this program at home for 30 days. Symptom scores, medication scores (7), quality of life index (8) and pulmonary function tests were evaluated in rehabilitation and control group in the beginning of the study and after the one month period.

STATISTIC

The results in both group were given as mean scores and standard deviation. The findings indicated that non parametric methods were appropriate so Wilcoxon matched pairs test was used for difference between results at baseline and after the study. Mann-Whitney U test was used for comparing the groups. A p value of < 0.05 was regarded as statistically significant.

RESULTS

Symptom and medication scores and quality of life index of group I and group II were listed in table I. The groups did not differ on all parameters before the

Table I

Symptom and medication score and quality of life index of group I (rehabilitation group) and control group

	First visit	Second visit	p
Rehabilitation group (Group I)			
Symptom score	0.63 ± 0.71 (median: 0.5)	0.19 ± 0.40 (median: 0)	0.01
Medication score	4.40 ± 1.70	3.50 ± 0.80	0.007
Quality of life Index	6.02 ± 0.5	6.40 ± 0.40	0.009
Control Group			
Symptom score	0.67 ± 0.57	0.49 ± 1.40 (median: 0)	0.16
Medication score	4.09 ± 0.79	4.06 ± 0.93	0.32
Quality of life Index	6.15 ± 0.29	6.27 ± 0.49	0.16

Table II

Pulmonary functions (% predicted values for age and height) of group I and control group

	First visit	Second visit	p
Group I			
VC	76.62 ± 8.64	83.12 ± 12.38	0.05
FVC	78.00 ± 8.83	84.75 ± 10.76	0.02
FEV ₁	74.23 ± 11.67	80.62 ± 12.27	0.009
PEF	65.62 ± 8.50	73.43 ± 7.32	0.001
FEF ₂₅₋₇₅	75.73 ± 11.12	85.31 ± 14.45	0.006
Group II			
VC	78.66 ± 10.39	80.25 ± 6.25	0.75
FVC	79.67 ± 8.64	81.41 ± 7.07	0.36
FEV ₁	73.75 ± 7.12	75.91 ± 5.43	0.15
PEF	6.33 ± 7.22	68.91 ± 9.16	0.21
FEF ₂₅₋₇₅	74.54 ± 11.96	76.66 ± 10.37	0.37

study ($p > 0.05$). Statistically significant decrease were found in symptom and medication scores in rehabilitation group ($p < 0.05$) and quality of life index was increased significantly in the same group ($p < 0.05$) (table I). Pulmonary function measures also significantly improved including vital capacity, forced vital capacity, forced expiratory volume in the first second of expiration, peak expiratory flow rate (PEF) and FEF₂₅₋₇₅ in the rehabilitation group ($p < 0.05$). the best improvement were seen in FEF₂₅₋₇₅ (10.09 % increase) and PEF (7.81 % increase) values (table II).

In control group no statistically significant differences were found in symptom and medication scores, in quality of life index, even in pulmonary function tests ($p > 0.05$).

DISCUSSION

Pulmonary rehabilitation program had both physiological and psychological beneficial effects on patients with chronic obstructive pulmonary diseases. Pulmonary rehabilitation relaxes the chest muscles, improves ventilation, decreases work of breathing and decreases the anxiety of patients and their parents.

In this study it was shown that pulmonary rehabilitation could improve the quality of life and pulmonary functions. Similar to our results Cambach et al had reported that quality of life and exercise capacity improved after the rehabilitation program (2). Field et al also had demonstrated that children with asthma had improved pulmonary function after the daily relaxation and massage therapy (4). They

found best improvement in FEF_{25-75} values like our finding which reflects the small airway obstruction. These results mean PRP could lead improvement in airway obstruction and control of asthma.

In another study that were carried out by Cox et al it was shown that pulmonary rehabilitation had beneficial effects on endurance, psychological variables, quality of life, skills, coordination, smoking habits, airway obstruction and dyspnea (6). However bronchial hyperresponsiveness, need of pulmonary drugs and complaint of cough did not change. They followed patients for two years and long term effects of PRP were evaluated. Our study is a preliminary study and long term effects of PRP is well not known.

The cost effectiveness of PRP is another point that could discuss. In our group PRP was performed at home by parents and it makes less cost. If we had enough data about the results of PRP performed by physiotherapists we could make a comparison for these both methods. Effects on psychological variables and compliance could not be evaluated in this study.

In conclusion because of the beneficial effects on quality of life and pulmonary functions pulmonary rehabilitation should be placed as a component of management in childhood asthma. Further studies are needed to investigate the long term effects and cost effectiveness of PRP.

($p > 0,05$). Después de un mes de rehabilitación, se encontró una disminución estadísticamente significativa en las puntuaciones por síntomas y consumo de fármacos ($p < 0,05$) y un índice de calidad de vida significativamente mayor ($p < 0,05$). Las mediciones de función pulmonar también mejoraron significativamente, incluyendo la capacidad vital, capacidad vital forzada, FEV_1 , PEF y FEF_{25-75} en el grupo de rehabilitación ($p < 0,05$). La máxima mejoría se constató en los valores del FEF_{25-75} (un incremento del 10,09%) y PEF (un incremento del 7,81%). No se observó ningún cambio estadísticamente significativo en los parámetros del grupo control.

Conclusión: este estudio ha demostrado que un programa de rehabilitación pulmonar diaria en el domicilio puede mejorar la calidad de vida y función pulmonar. Por lo tanto, la rehabilitación pulmonar debería incluirse en el tratamiento del asma infantil.

Palabras clave: Rehabilitación pulmonar. Infancia. Asma.

Correspondence:

Dr. Gülbin Bingöl Karakoç
Department of Pediatric Allergy and Immunology,
Çukurova University Faculty of Medicine
01330 Adana
Turkey
E-mail: gulbin2@yahoo.com

RESUMEN

Objetivos: el objetivo de este estudio fue investigar la eficacia de un programa de rehabilitación pulmonar para niños asmáticos.

Pacientes y método: veintiocho niños con asma leve persistente o moderada fueron incluidos en un estudio aleatorio doble ciego. Dieciséis niños (9 chicas y 7 chicos, edad media $10,8 \pm 2,3$ años) fueron incluidos en un programa de rehabilitación pulmonar de 30 días de duración que realizaron con sus padres (grupo I). El grupo control incluyó 12 niños (6 chicas y 6 chicos, edad media $10,2 \pm 2,4$ años) (grupo II). Se evaluaron las puntuaciones por síntomas y el consumo de fármacos, el índice de la calidad de vida y las pruebas de función pulmonar en los grupos de rehabilitación y control al principio del estudio y después de un intervalo de un mes.

Resultados: antes del estudio no se encontró ninguna diferencia entre grupos en los parámetros

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