Restricted elimination diet for children with Attention-deficit/hyperactivity disorder (ADHD)

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Abstract

Objective

•The meta-analysis of Sonuga-Barke et al. (2013) includes several non-pharmacological interventions for ADHD. Nutritional interventions -including the restricted elimination diet- have been discussed critically. Works from the group of Buitelaar from the Netherlands stand out with effect sizes 3 to 5, while other dietetic RCTs only show effect sizes of about 0.5.

•In the present study we evaluate weather in children with ADHD under dietary nutrition ADHD symptoms can be reduced and if the dietetic intervention can be established in an ambulant setting according to the Dutch model.

Methods employed

•Of 40 interested patient´s families, 24 patients diagnosed ADHD according to ICD 10 participated in this study. Patients were between 7.3 and 14.10 years old, including 6 girls and 18 boys. The period of the restricted elimination diet was four weeks. Primary endpoint was the change in ADHD rating scale score between baseline and the end of the diet phase. Secondary endpoints were parents and teachers abbreviated Connor´s rating scale. The patients documented individual improvement by questioner to quality of life (MARSYS children´s ILK).

•Group differences were calculated with ANOVA and subsequent student t-test.

Results

•The compliance to the diet was good, 22 of the 24 patients completed the 4 weeks diet phase. The total ADHD rating scale scores improved to about 50% of the initial value from 30.54 ± 9.68 to 16.64 ± 8.19 (n=22, MW ± SD). Significance was p<0.001, for inattention p<0.001, for hyperactive/impulsivity p<0.001, respect-ively. abbreviated Parent´s Conner´s and a questionnaire to quality of life (ILK) confirmed data from the ADHD rating scale.

Conclusions

•The data indicate that restricted elimination diet followed by an individual food recommendation could be a valid treatment option for children with ADHD.

Study-Design

Inclusion-Criteria

- Informed Consent (patient and parents)
- Diagnosed ADHD according to DSM IV and ICD-10
- Age 7 to 18 years
- Normal IQ / patient can read and write

Exclusion-Criteria

- Neurological or organic comorbidity not allowing dietetic intervention
- Missing teachers compliance
- ADHD medication
- Patients under a special diet

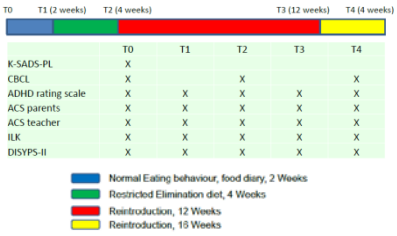
Study-Procedure

After the initial examination follows 1 week to fill in the questionnaires. This starting point T0 is considered baseline. From time T0 - T1 a nutrition diary is added recording every nutrient. The period from T1 - T2 describes the 4 weeks of oligoantigenic diet, from T2 - T3 reintroduction occurs, and T4 is the first follow-up. The duration of the study is approximately 16 weeks. Our primary outcome measure is the ADHD rating scale between T1 and T2, before and after diet.

Study-Population

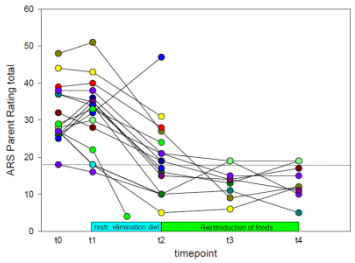
No. Included	24
Age (means ± SD (range))	10.1±2.17 (7-14)
Gender m/f	18/6
No. completed diet	22
dropout	2
Responder/Nonresponder	14/8
Comorbidities	Dyslexia
	Dyskalkulia
	ODD
	Autism
	Enuresis

Timetable measures



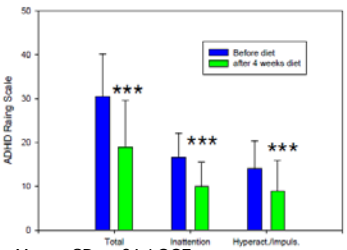
Results

ADHD rating scale (ARS)



Individual data; n=24

ARS statistics, pre-post diet

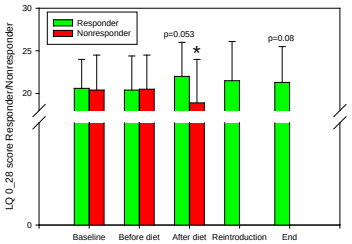


Means±SD; n=24; LOCF
ANOVA / subsequent student t-test

Respose and Improvement

Patient	Responder ARS gesamt	Inattention	Hyperact./Impuls.
1	Dropout		
2	Responder	Responder	Nonresponder
3	Responder	Responder	Responder
4	Nonresponder	Nonresponder	Responder
5	Responder	Nonresponder	Responder
6	Dropout		
7	Nonresponder	Nonresponder	Responder
8	Responder	Responder	Responder
9	Responder	Responder	Nonresponder
10	Responder	Nonresponder	Responder
11	Responder	Responder	Responder
12	Responder	Responder	Nonresponder
13	Nonresponder	Nonresponder	Nonresponder
14	Nonresponder	Nonresponder	Responder
15	Responder	Responder	Responder
16	Nonresponder	Nonresponder	Nonresponder
17	Nonresponder	Responder	Nonresponder
18	Responder	Responder	Nonresponder
19	Responder	Nonresponder	Responder
20	Nonresponder	Nonresponder	Responder
21	Nonresponder	Nonresponder	Nonresponder
22	Responder	Responder	Responder
23	Responder	Responder	Responder
24	Responder	Responder	Nonresponder

ILK-children



Means±SD; n=10 responder; n=6 nonresponder
ANOVA / subsequent student t-test, as compared to pre-diet.

Observed food intolerances

cow-milk	broccoli
goat-milk	paprika
bovine-meat	tomato
chicken-egg	mango
pistachio	citrus fruits
wheat	food additives
corn	sweetener
cinnamon	….
cauliflower	

Most patients showed more then one intolerance, up to 7.

Response

14 of 22 patients (64%) were responders according to total ADHD rating scale measurement with a response >40%.
Only 2 patients (9 %) did not show any effect in all sub-categories of ADHD rating scale.
According to the questionnaire to quality of life (ILK) the responding children recognized individual improvement.

Summary

- In this study we wanted to verify whether the oligoantigenic diet represents an alternative in ADHD therapy.
- The oligoantigenic diet is designed to monitor a possible individual relationship between diet and ADHD.
- 14 out of 22 patients (64%) were responders according to total ADHD rating scale measure with a response >40%.
- 19 out of 22 patients (86%) %) were responders according at least one subcategory of ADHD rating scale with a response >40%.
- Pellser et al. (2011) reported 78% responders in their group of 50 children (age 4 to 8 years) with 22% drop outs
- All children who performed the oligoantigenic diet phase got better on ADHD rating scale.
- For children with ADHD, in which one or more food components influence the expression of the disease, a viable individual diet recommendation is created.
- As a development-dependent change in the food compatibility is expected. To control food compatibility at a distance of 0.5-1 year is recommended.
- Limitations: Not blind, not Placebo controlled

Dietary interventions could be an effective form of treatment for ADHD in children.
More RCT studies are needed to ensure the effectiveness.

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References

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