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ARE PARASOMNIAS ASSOCIATED WITH URINARY INCONTINENCE IN CHILDREN AND CAN BE RESOLVED BY SUCCESSFUL TREATMENT OF BLADDER SYMPTOMS?

Hypothesis / aims of study

Parasomnias summarize a group of sleep disorders involving abnormal and unnatural movements, behaviors, emotions, perceptions or dreams in children or adults of both genders of which confusional arousals, sleepwalking, sleep terror (*parvor nocturnus*), teeth grinding, motor activities – restless legs, sleep related eating disorders, and sleep paralysis occurs most frequently. This study aims to investigate the relationship between nocturnal enuresis and parasomnias in children using a power-calculated sample size population. Additionally, our study aims to clarify whether treatment of nocturnal enuresis or lower urinary tract symptoms (LUTS) according to the recommendations of guidelines can improve parasomnias.

Study design, materials and methods

Children with monosymptomatic enuresis (ME), with non-monosymptomatic enuresis (NME) and children, who never had lower urinary tract symptoms (LUTS) and nobody in their family had a history of LUTS in childhood representing a control group (C), were enrolled in the prospective study. These three groups of unselected children were asked whether they remembered to be woken up by their caregivers because of parasomnias or woke up spontaneously with or without toilet dreams. Evaluated parasomnia events were sleep walking, *pavor nocturnus*, increased limb movement, nightmares and speaking. Children were evaluated with general and urological history, bladder diary, ultrasound and uroflowmetry. Descriptive statistics and the Chi-square test were applied for the power calculated sample size of the first part of the study.

A subgroup of these patients than were further evaluated after guideline conform treatment with urotherapy, alone or in combination with alarm devices, antimuscarinics, desmopressin or a combination of these treatments according to their individual diagnosis and severity. All families were followed-up by phone calls after the end of treatment and asked about the outcome concerning parasomnias and LUTS/incontinence treatment. Additionally, parents were asked whether their children still woke up spontaneously, experienced nocturia, and how they judged sleep quality and other quality of life parameters e.g. daytime exhaustion and learning skills.

Results

Statistical evaluation prescribed 91 patients with ME and 101 patients with NME (age 5-17years). These children were compared with 83 asymptomatic children (controls) aged 5-17years.

Correlations of nocturnal enuresis and parasomnias; statistical calculation by Chi-square test (significant results in bold number):

Investigated Parameters	ME patients vs. controls	NME patients vs. controls	All patients vs. controls
Remember to be woken up	n.a.	n.a.	n.a.
Waking up spontaneously	**0.04**	n.s. (0.46)	n.s. (0.14)
Toilet dreams	**0.041**	**0.005**	**0.006**
Sleep walking	**0.014**	**0.012**	**0.006**
Pavor nocturnus	n.s. (0.117)	n.s. (0.11)	n.s. (0.85)
Increased limb movement	**0.009**	**0.0001**	**0.0001**
nightmares	n.s.	**0.004**	**0.017**
Speaking/talking during sleep	n.s. (0.544)	n.s. (0.291)	n.s. (0.378)

Than data of 48 incontinent children (ME=7, NME=41) were analyzed, of the study participants with NME, 19/41 suffered from daytime incontinence and overactive bladder (OAB) symptoms. No statistical evaluation was performed due to small patient numbers.

Outcomes of parasomnia, quality of life (QoL) parameters and urinary incontinence:

	ME	NME total	NME with OAB
Waking up			
- no	2/3	8/10	2/2
- improved	1/3	2/10	
Sleep walking			
- no	2/3	8/10	2/2
- improved	1/3	2/10	
Pavor nocturnus			
-No	4/4	11/13	6/6
-improved		1/13	
-unchanged		1/13	
Limb Movements			
- no	1/1	6/18	3/9
- improved		10/18	5/9

- unchanged		2/18	1/9
Nightmares			
- no	2/2	23/33	9/13
- improved		8/33	4/13
- unchanged		2/33	
Sleep quality			
- improved	3/7	27/41	13/19
- unchanged	4/7	14/41	6/19
Nocturia			
- yes	3/7	21/41	7/19
- no	4/7	20/41	12/19
Day Exhaustion			
- improved	3/7	30/41	16/19
- unchanged	4/7	11/41	3/19
Learning skills			
- improved	1/7	17/41	8/19
- unchanged	6/7	24/41	11/19
Treatment response			
- complete response	7/7	31/41	15/19
- partial response		5/41	3/19
- non- responders		5/41	1/19

Interpretation of results

Overall, toilet dreams and parasomnias were found to be related to enuresis. ME patients are more likely to wake up spontaneously compared to NME patients who had more nightmares. Increased limb movements had the strongest correlation to enuresis. Parasomnias and QoL are improved when urinary incontinence is successfully treated independent of the treatment modality. Although ME-children are likely to shift to nocturia, parasomnias and QoL are improved. OAB patients are more likely to sleep the entire night, resolving parasomnias and improving QoL. In a substantial number of patients with NME or storage symptoms learning skills could be improved.

Concluding message

Our results show that parasomnias are related to urinary incontinence in children. This study also highlights the association of successful treatment and parasomnias but larger patient numbers are needed to confirm our findings. Further research how the bladder might impair the brain is mandatory**.** Similar impairments might also be found in adult patients.

Disclosures

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