CASE REPORT

Treating enuresis in a patient with ADHD: application of a novel behavioural modification therapy

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SUMMARY

We report the case of a 6-year-old patient diagnosed with attention-deficit hyperactivity disorder (ADHD) and comorbid enuresis disorder, who was treated with methylphenidate for the past 3 months and a novel behavioural modification therapy by using an application called 'Enuresis Trainer'. This therapeutic application is basically an interactive 'Bedwetting Calendar', based on traditional cognitive behavioural modification therapies and positive reinforcement systems. Enuresis is defined as the failure of voluntary control of the urethral sphincter. The prevalence of enuresis is 15–20% in the child population; however, children with ADHD had a 2.7 times higher incidence of nocturnal enuresis. Bedwetting is a common cause of isolation in children as well as loss of self-esteem and other psychological distress for the child and the family.

BACKGROUND

The purpose of reviewing this case is to highlight that a regular behavioural modification therapy can improve enuresis symptoms, without using specific medication.

Enuresis is defined as the failure of voluntary control of the urethral sphincter. If a child has never been able to reach an adequate sphincter control in the past we refer to it as primary enuresis.¹ The prevalence of enuresis is 15–20% in the child population; however, children with ADHD had a 2.7 times higher incidence of enuresis and a 4.5 times higher incidence of daytime enuresis. In the USA, enuresis affects 5–7 million children.^{2–8}

Some researchers support the hypothesis that primary nocturnal enuresis is a heterogeneous process, and that genetic heterogeneity may be reflected in some of the comorbid clinical conditions such as attention-deficit and hyperactivity disorder.^{5,7}

Bedwetting or enuresis is a common cause of isolation in children. They may avoid certain social situations, like overnight camps and slumber parties. Bedwetting can cause real problems such as loss of self-esteem and other psychological distress for the child and the family. The most important reason for treating enuresis is to minimise the embarrassment and anxiety of the child and the frustration experienced by the parents.^{7,9}

Preliminary management focusing on behavioural modification and positive reinforcement is often helpful. The only therapies that have been shown to be effective in randomised trials are alarm therapy¹⁰ and treatment with desmopressin acetate or imipramine.^{11,12} Most children with enuresis

feel very alone with their problem, like they cannot talk to other people about it. Family members with a history of enuresis should be encouraged to share their experiences and offer moral support to the child. The knowledge that another family member has had enuresis and has outgrown the problem can be therapeutic.⁷

CASE PRESENTATION

This case study involves a 6-year-old child born in Barcelona (Spain) who received follow-up treatment in a childhood psychiatry unit for the past 1 year due to behavioural disorders, and ADHD. The patient also suffered from primary enuresis wetting his bed approximately 2 nights/week. He was being treated with methylphenidate 10 mg/day. To treat his enuresis disorder, positive reinforcement therapy with a bedwetting calendar had also been recommended during the past 3 months. At that time the patient was using a traditional bedwetting calendar, marking with a 'star' or a 'smiley face' the days he did not wet the bed (figure 1). During those 3 months the patient had not gone more than 2 consecutive days without wetting the bed. He experienced more anxiety and sadness due to that problem.

The patient did not present any relevant medical history. Pregnancy and birth went without complications. He was the only child of his parents, both aged 32 years at that time. His father, who worked as a waiter, had no medical history of interest. His mother, unemployed, had a family history of alcohol abuse (her father and brother) and major depression (her mother). The parents were smokers (20 cigarettes/day) and had a history of alcohol and cannabis abuse.

INVESTIGATIONS

Clinical assessment was performed with special attention to psychiatric symptoms as well as specific enuresis features (frequency, time of the day, possible triggers, child and parent's reaction).

Complete physical examination and standard urine and blood tests were also performed (all normal).

DIFFERENTIAL DIAGNOSIS

Differential diagnosis of the disorder was made, which include organic disorders such as diabetes mellitus, urinary infection and renal disorders.

TREATMENT

Initially, we encouraged his parents to start treatment with desmopressin, but as he was being

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Figure 1 Traditional bedwetting calendar.

treated for ADHD, they preferred not to be prescribed more medication. Thus we decided to start a novel treatment with behaviour modification therapy by using an interactive bedwetting calendar, which is an application for smartphones and tablets based on traditional cognitive behaviour modification therapies, that can be used every day by the child with the possibility of receiving an animated reward (figure 2) if they do not urinate in bed during the night. By using the 'reward mode' the parents can select the number of days without wetting the bed the child has to complete to receive a prize. The reward is usually in the form of a fun activity, like going to the park or to the cinema.

The objective was to play with the application at least 5 min/day.

OUTCOME AND FOLLOW-UP

We observed that during the first 4 weeks of daily using this application, the boy did not urinate in bed and controlled his sphincter during the night.

DISCUSSION

Motivational therapy can be a useful treatment for bedwetting but children should be active and eager participants in the process. It involves a careful system of record keeping and rewards. However, motivational therapy is not right for every child. If the child does not take responsibility or have a role in the process, they are less likely to be motivated to stop bedwetting. Research conducted in ADHD has observed that children with ADHD do not respond to rewards in the same way as

children without ADHD. Besides poor completion rates of these cognitive behavioural therapies have been observed in children with ADHD. We hypothesise that during the first period of the therapy the child did not experience enough motivation to control his sphincters, because the therapy and the reward were not attractive enough for him. New technologies and computer-based methods applied to traditional behavioural modification therapies might be a solution for this lack of motivation. Video game play is an exciting and fast growing segment of new entertainment media. Recently, neuroimaging studies addressed the effects of virtual reality and video games on brain systems. Activation of nucleus accumbens during a non-violent video game as compared with a control task with similar stimulus material has been reported in another research.¹³ Other studies support the role of the nucleus accumbens for reward processing¹⁴ as part of the mesolimbic dopaminergic pathway,¹⁵ revealing an influence of video games on the brain reward system. Taking this information into account we suggest that new technologies (video games) applied to traditional therapies might increase the motivation to fulfil them and get better outcomes, especially in patients with ADHD.

Learning points

- ▶ Patients with attention-deficit/hyperactivity disorder (ADHD) are especially vulnerable to comorbid disorders.
- ▶ Patients with ADHD have higher incidence of enuresis.
- ▶ Poor completion rates of traditional bedwetting calendars in children with ADHD have been observed.
- ▶ A daily computerised interactive behavioural modification therapy can help in treating enuresis in children with ADHD and comorbid enuresis disorder.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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Figure 2 Capture from 'Enuresis Trainer'. An interactive application to treat enuresis in children.

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