

PedsCases Podcast Scripts

This is a text version of a podcast from PedsCases.com on the "Approach to Enuresis." These podcasts are designed to give medical students an overview of key topics in pediatrics. The audio versions are accessible on iTunes or at www.pedcases.com/podcasts.

Approach to Enuresis

Developed by Tasha Stoltz and Dr. Melanie Lewis for PedsCases.com.
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Introduction

Hello! My name is Tasha Stoltz and I am a second year medical student at McMaster University. Thanks to the guidance of Dr. Melanie Lewis, today we will be discussing an approach to enuresis.

Before we start, let's get the ball rolling with a clinical case. You are a medical student working in an outpatient clinic. You meet 8-year-old Mike Trucian for his annual visit. For the last few years, Mike has been able to stay dry during the day, but has accidents at night, at least four times a week. Last summer, he had to miss overnight camp because Mike was afraid his friends would find out about his nighttime problem. Otherwise, Mike has been a pretty healthy boy, he doesn't take any medications, and has met all of his developmental milestones. You panic, and think to yourself, what do I know about bed-wetting? Do I have an approach to this?

This podcast will hopefully give you an introduction to enuresis and an approach to dealing with this common issue. Included in this podcast are the following learning objectives:

1. We will review the physiology of micturition;
2. We will define primary and secondary enuresis;
3. We will discuss the different etiologies for primary and secondary enuresis;
4. We will review the investigations and some of the management options available for patients and their families.

Let's start by quickly reviewing the normal micturition cycle.

Normal Micturition Cycle (Graham & Levy, 2009)

Bladder filling stimulates stretch receptors in the bladder wall. There is an external urinary sphincter at the bladder outlet that is under voluntary control, and it remains contracted until a person decides to urinate. Once the volume in the bladder reaches a certain threshold -- which is a different volume for each individual -- this triggers the

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awareness of the need to void in the sensory cortex. Once a decision is made to urinate, a complex co-ordination of a number of things must happen in order for a person to void. The detrusor smooth muscle of the bladder must be contracted by parasympathetic cholinergic nerve fibers, and the internal sphincter, external sphincter, and pelvic floor muscles are relaxed. That is when we can get urine output.

Toilet-training can be a stressful time for children and families, and can cause significant psychological distress for both. Most children will achieve daytime urinary continence by age four, and nighttime continence by about age five.

Nocturnal Enuresis (Graham & Levy, 2009; Kiddoo, 2012)

Nocturnal enuresis can be investigated in children who have not achieved nighttime dryness by age five, or when the child or parents are concerned that their nighttime bedwetting is becoming a problem. Nocturnal enuresis can be split up into primary and secondary. Primary nocturnal enuresis is nocturnal wetting in a child who has never been dry on consecutive nights for longer than six months, and secondary enuresis is a new-onset nighttime wetting after the child has had a 6-month or greater period of dryness. Secondary enuresis is usually not related to an organic cause, and special attention should be given to underlying psychiatric or emotional problems, which we'll come back to a little later.

Nocturnal enuresis is a fairly common issue. One large British study found that the prevalence of bedwetting two or more times a week in children aged 9.5 years was 8%. In addition, there seems to be a strong genetic component. If one parent had enuresis as a child, their child has a 44% chance of experiencing enuresis. This number rises to 77% if both parents were affected. This issue tends to be more common in boys, and there is a higher prevalence in children with ADHD compared to children without ADHD. One study found that children who had enuresis had more fine and gross motor clumsiness, perceptual dysfunction, and speech deficits compared to controls. However, nocturnal enuresis self-resolves at about a rate of 15% a year even without treatment. This means that 99% of children will be dry by age 15.

There are three proposed mechanisms to explain nocturnal enuresis. The first mechanism is that there are some children who may have excessive nocturnal urine production. Some studies have shown an abnormal release of ADH in children with nocturnal enuresis. Another thought is that these children may have smaller-than-normal functional bladder capacities at night, and urodynamic studies have shown higher bladder instability at night compared with during the day. The third mechanism is that children may fail to awaken in response to bladder sensations. A lot of parents will claim that their children are deep sleepers and are more difficult to arouse. However, a number of controlled studies have shown no difference in sleep between children who do and do not have enuresis, so this mechanism is still hotly debated currently.

Daytime Enuresis (Robson, 1997; Graham & Levy, 2009)

Daytime enuresis can be a common issue, but should be considered a problem in a child over four years of age who wets on consecutive days, or in a child who was previously continent. Like nocturnal enuresis, it too can be distinguished into a primary and a secondary form. Daytime enuresis is a fairly common childhood problem with a variety of causes. Children going through stressful events, such as divorce, death of family members, or abuse during the ages of 2-5 years have a higher incidence of daytime wetting.

The causes of primary daytime enuresis include neurogenic bladder due to problems like cerebral palsy, sacral agenesis, and myelomeningocele; congenital urethral obstruction, ectopic ureter, congenital diabetes insipidus, and any acquired cause that develops before the age of toilet training. The etiologies for secondary daytime enuresis can be broken down into a problem with storage, a problem with emptying, or a combination of the two. Storage problems include children whose bladders are hypersensitive, or children who have inadequate sphincter tone. Urge syndrome, or an unstable bladder, is the result of frequent detrusor muscle contractions causing attacks of a strong desire to urinate. Overflow incontinence can also be an issue, and is often caused by infrequent and incomplete voiding. The urge to urinate is easily inhibited, and over time, children lose the awareness of bladder feeling and have decreased sensation that they need to void. Giggle incontinence is common in females aged 10-20 years, who wet with extreme laughter. UTIs can also cause spontaneous detrusor muscle contractions, as well as constipation. The mechanism is not well understood, but is thought to be linked with the pressure effect caused by stool in the descending or sigmoid colon, causing detrusor contractions.

Problems with emptying can also lead to chronic daytime enuresis. The most common issue is micturition deferral, or holding urine in until the last minute. This is not usually a problem that needs medical attention, but it may worsen other causes of daytime wetting, as well as lead to UTIs. Vaginal reflux of urine can also occur in girls who do not open the labia when urinating. This causes some of the urine to reflux into the vagina, which will then leak out when the child stands. A similar issue occurs in labial fusion, where adherence of the labia minora following inflammation causes a pocket that can retain urine, which will leak when the child is doing activities. Lazy bladder syndrome occurs when children void less than three times a day, which may cause the bladder to become enlarged and for the detrusor muscle to decompensate. Patients must then strain to void, and they often have a weak stream and incomplete voiding. Hinman syndrome is the most serious problem, and children can develop detrusor decompensation, bladder trabeculation, and acquired vesicoureteral reflux, hydronephrosis and reflux nephropathy. Hinman syndrome can lead to renal insufficiency or chronic renal failure if not promptly identified and treated.

Evaluation (Lawless & McElderry, 2001; Graham & Levy, 2009)

In evaluating both daytime and nighttime enuresis, it is important to get a thorough history. Get an idea of the pattern of enuresis, with the number of days or nights per week, and the number of episodes per day or per night. Is this a primary or secondary enuresis? Be sure to include a detailed voiding history, information about their bowel habits, and a comprehensive toilet training history. Do they have a family history of enuresis? How much do they drink, particularly at night? What is their caffeine intake like? Do they have a history of any sleep disorders? Do they have any urinary symptoms, like dysuria or frequency or dribbling, that may point you towards a certain etiology? A social history is also very useful in these cases. Is there a history of abuse? Have there been any big changes recently, or any other psychological stressors? These can be important factors in causing enuresis. Also evaluate the family's and the child's attitude towards the wetting, and their readiness to start treatment.

In most cases, findings are usually completely normal on physical exam. Make sure to focus on the GI, urogenital and neurologic systems. Look for a distended bladder or fecal impaction. On the male urologic examination, observe the phallus and meatus. On the female examination, inspect the vaginal canal and look for labial adhesions or urethral abnormalities. Check the muscle tone and coordination of the lower extremities, as well as deep tendon reflexes and sensation. Also examine the back for any spinal cord malformations.

A clean-catch urinalysis is a useful screening test in most cases of enuresis. It can identify a UTI, renal disease, diabetes, and is usually sufficient in uncomplicated nocturnal enuresis. For more complicated enuresis, you may want to think about doing a renal ultrasound to assess for bladder wall thickness or trabeculation. A voiding cystourethrogram may be indicated, or you may want to do uroflow testing that can identify urge incontinence and emptying problems. It may be useful to do a quick test in the office to determine a child's bladder capacity. You can ask the child to drink 12 ounces of water upon arrival, and their urine output can be measured when they need to urinate. The normal bladder capacity in ounces is generally the age plus 2, with a normal adult bladder capacity being about 12-16 ounces.

Treatment Options (Lawless & McElderry, 2001; Graham & Levy, 2009; Kiddoo, 2012)

Moving on to management. Education and reassurance may be the most important things, especially for the child who may experience low self-esteem as a result of his or her enuresis. Parents should be made aware that oftentimes, wetting is not within the child's control, so punishment or negative reinforcement is often counterproductive, both in resolving the enuresis and protecting the child's self esteem and social relationships. Motivational therapy is a reasonable first-line approach, especially with a younger child. A system of positive reinforcement can be set up by recording progress in a diary or chart, and rewarding the child for each day or night he or she is dry. If wetting does occur, the child should participate in cleanup as a non-punitive consequence of wetting. 25% of children will stop wetting with motivational therapy alone. However, if it is

unsuccessful after 3-6 months, or if the child is older than eight years, a different treatment strategy should be considered.

It is important to consider the child's age when formulating a management plan, as well as the family's and child's motivation. Lifestyle modification should be explored thoroughly. The child should be encouraged to void every 2 hours and before going to sleep. Fluids should be limited 2 hours before bedtime and dairy products 4 hours before bedtime, in order to decrease urine output from osmotic diuresis. Caffeinated drinks and other bladder irritants should be avoided. Some children who have constipation may see an improvement with their enuresis with the implementation of a bowel plan.

15% of children per year will stop bedwetting without treatment. However, for more refractory cases, children and families may want to consider pharmacotherapy. Desmopressin, a synthetic analogue of ADH, has been successfully used for treatment of enuresis by reducing urine production. It acts by promoting the reabsorption of water in the collecting duct and distal tubules. A Cochrane review found that children benefited from the use of desmopressin, but it wasn't a permanent cure and enuresis returned once the medication was stopped. Anticholinergics have also been used, which can reduce urination. Some children benefit from tricyclic antidepressants. The mechanism of action is unclear, but may have to do with increasing the bladder capacity through a weak anticholinergic effect. A Cochrane review found benefit in 20% of children, but like desmopressin, the effect stopped when the drug was stopped.

For children with nocturnal enuresis, the option of behavioural therapy in the form of a bed alarm may be explored. This is most useful for children who don't wake in response to bladder sensations, with the idea of teaching the child to respond to bladder signals while asleep. The alarm is worn directly over the child's clothing, and it is triggered by dampness in the device and it emits an audio or vibratory alarm to wake the child. A systematic review found that after 10-20 weeks, 66% of children were dry for 14 consecutive days compared to 4% of children without treatment. However, this can be very stressful for the patient and their family, and will depend on the active involvement of the whole family. Alternative therapies, like hypnotherapy, acupuncture, chiropractic treatment and psychotherapy can also be recommended, although there is weak evidence to support its success in treating enuresis. Regardless of the treatment modality chosen, it is important for everyone in the child's circle of care to maintain positivity and support for the child's self-esteem and wellbeing in their journey to achieving dryness.

Conclusion

Lets go back to our case with 8-year-old Mike Trucian. It sounds to you that Mike has primary nocturnal enuresis. You do a urinalysis, which comes back completely normal. You ask Mike and his parents about his daily habits, and counsel them about avoiding drinking pop or juice after dinner, and voiding every two hours up to Mike's bedtime. Mike and his parents are interested in trying a bed alarm, and they will also put up a

chart in his room to record each night he is dry. Mike negotiates that for every week he is dry, his parents will take him to the library to borrow a book. You also talk to them about the possibility of starting Mike on desmopressin if his wetting does not improve, and Mike and his parents leave the office happy, with a follow-up appointment in three months.

So that is an approach to enuresis. Here are a few of the key points from this podcast:

1. Daytime and nighttime enuresis are common issues in the pediatric population, and it can present as a primary or secondary issue.
2. Taking a detailed history, with a focus on enuresis pattern, voiding and stooling history, and social history may provide important insight into the possible etiologies.
3. Education and counseling are important for the child and their family in the management of enuresis. Lifestyle modifications can be explored, but pharmacological and non-pharmacological therapies can also help children stay dry.

Thank you for listening!

References

Graham K, Levy J. Enuresis. *Pediatrics in Review* 2009; 30(5):165-73.

Kiddoo A. Nocturnal enuresis. *CMAJ* 2012; 184(8):908-11.

Lawless M, McElderry D. Nocturnal enuresis: current concepts. *Pediatrics in Review* 2001; 22(12):399-407.

Robson, L. Diurnal enuresis. *Pediatrics in Review* 1997; 18(12):407-12.

Schmitt, B. Nocturnal enuresis. *Pediatrics in Review* 1997; 18(6):183-191.

Marcdante K, Kliegman R (2011). Control of Elimination. In *Nelson Essentials of Pediatrics* (7th ed.). Philadelphia, PA: Saunders/Elsevier.

CPS Position Statement: Management of primary nocturnal enuresis