The investigation and management of **nocturnal enuresis in General Practice**

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Key Concepts

- Nocturnal enuresis is common and children usually grow out of it
- Simple advice regarding fluids and use of rewards may be appropriate in the first instance
- If the child and their family are motivated to try treatment, then the use of bed alarms with support offer the best chance of long-term success
- Desmopressin can be prescribed with caution for occasional short term use

Considerations:

- At what age is bedwetting abnormal?
- What is it normally due to?
- Are any investigations needed?
- What advice can I give to parents?
- When should I refer?
- What non-drug treatments are recommended?
- What medications are recommended?

Defining bedwetting

Primary nocturnal enuresis is bedwetting in a child who has never been consistently dry at nights for a period of six months.

Secondary nocturnal enuresis is bedwetting in a child who has previously had a period of at least six months of dryness.

Bedwetting can place considerable stress on the individuals affected and their families. Although this article is aimed mainly at children, similar principles apply to adolescents and adults who are still bedwetting.

At what age is bedwetting abnormal?

The International Children's Continence Society defines nocturnal enuresis as:[1]

- A child five to six years old with two or more bedwetting episodes per month
- A child over six years old with one or more bedwetting episodes per month

However, most management strategies are aimed at children aged seven years or older, as this is when bedwetting is usually considered to be a problem by both the child and their family.

Bedwetting is common but reduces with age. It affects approximately:

- 15% of 5 year olds
- 5% of 10 year olds
- 2% of 15 year olds
- 1% of adults

Spontaneous remission occurs in about 15% of affected children each year and is more likely to occur if there is a family history of nocturnal enuresis.[2]

A recent study found that children with the most frequent bedwetting were more likely to persist with the problem.[3]

It is thought that fewer than half of parents with a child with nocturnal enuresis, consult their doctor about the problem.[4]

Causes of bedwetting

The exact cause of nocturnal enuresis is unknown. It appears to be a neurodevelopmental problem which is probably multifactorial. Discussion with patients and parents may centre around the following:

- Sleep polyuria
- Reduced night-time bladder capacity
- Lack of arousal from sleep
- Psychosocial factors
- Genetics

Sleep polyuria

Nocturnal polyuria can result from a deranged circadian rhythm of antidiuretic hormone (ADH) secretion which occurs in approximately 70% of children with bedwetting.[5] ADH, also known as vasopressin, is a peptide secreted from the posterior pituitary and plays a key role in the control of urine production. Usually ADH secretion increases during the night to concentrate the urine and this in turn helps to produce low volumes of urine.

Reduced night-time bladder capacity

A recent Chinese study included ultrasound examination of 500 children with nocturnal enuresis and showed a reduced functional bladder capacity in approximately 40% of children with nocturnal enuresis.[6]

Lack of arousal from sleep

Sleep and arousal is one of the least understood factors in the pathophysiology of enuresis. Many parents will comment that their child with bedwetting is a "deep sleeper". A 1999 study using EEG analysis suggested that both deeper sleep and impaired arousal is more common in children with enuresis,[7] however other studies have conflicting results.

Psychosocial factors

Psychological problems are rarely the cause of primary nocturnal enuresis but teasing, bullying or punishment can be the result of it. Secondary nocturnal enuresis is more likely to be due to a psychosocial stressor such as parental separation, a new baby in the family, sickness or problems at school.

Genetics

Genetic factors are strongly implicated in the etiology of primary nocturnal enuresis, so it is worthwhile taking a family history of bedwetting.

Approximately 70% of children with bedwetting have a sibling or parent who was late in becoming dry. Children with one parent who had enuresis have a 44% risk of nocturnal enuresis and those with two affected parents have a 77% risk.[4]

Most inherited nocturnal enuresis exhibits an autosomal dominant mode of transmission with high penetrance (90%). However, a third of all cases are sporadic, and the difference between sporadic and familial forms is not known.[8]

Differential diagnosis –what else might it be?

When a child presents with bedwetting, enquire about the presence of daytime symptoms, which could indicate that the bedwetting is secondary to other causes.

- UTI and other acute illness might cause short periods of bedwetting in someone who has previously been dry.
- Diabetes mellitus, diabetes insipidus or renal failure may cause bedwetting but there are usually other symptoms e.g. daytime polyuria, excessive thirst.
- Chronic constipation may result in bladder instability, a careful history of bowel pattern is required.
- Bladder instability can cause daytime and night-time incontinence.
- Caffeinated drinks may irritate the bladder.

Investigation of bedwetting

A careful history is important

- Distinguish between children with nocturnal enuresis (the majority) and children who also have episodes of enuresis during the daytime.
- Distinguish between primary and secondary nocturnal enuresis.
- Ask about the pattern of voiding, the number of dry nights in the past week or month, fluid intake at bedtime, intake of caffeine at bedtime (e.g. tea, coffee, cola, chocolate).
- Discuss practical issues such as can the child reach the toilet, do they need a light on to see their way to the toilet, any night time fears.
- Ask about any possible stressors at home, school or with friends.

- Discuss what has been tried already, including punishments and rewards.
- Elicit previous medical history, such as previous UTIs.

The examination of the abdomen, perineum, spine and nervous system is normal in a child with nocturnal enuresis. Any abnormalities found would lead to additional investigation.

Ultrasound examination of the kidneys and urinary tract to exclude anatomical abnormalities is only recommended in children who are wet during the day, after UTI or when nocturnal enuresis is unresponsive to treatment.[9]

Investigation with urine dipstick and culture can be helpful.[4] However, checking specific gravity is usually not.[10]

Treatment options for bedwetting

Waiting

Most children will outgrow bedwetting. For this reason most treatments are delayed until the child is at least seven years old. However treatment might begin earlier if the situation is perceived to be damaging the child's self esteem or relationships with family and friends.

Behavioural strategies

Parents could be advised to:

- Ensure that the child empties their bladder well at bedtime.
- Improve the child's access to the toilet (e.g. have them sleep on the bottom bunk, have a torch within reach).
- Use waterproof covers on mattress and duvet (especially for boys) and then absorbent layers over the mattress cover.
- Shower/bathe the child in the morning prior to attending school to remove odour.
- Do not restrict fluids. The child should have about eight drinks per day, spaced out throughout the day, the last one about an hour before bed. Avoid caffeine in night-time food and drink (e.g. tea, coffee, cola, chocolate).[4]
- Treat constipation if present.
- Reward systems.[11] Advise use of positive reinforcement to encourage a desired behaviour. The aim is to positively reinforce dry nights (or any steps towards that) and to reduce the negative emphasis on wet beds.
- Scheduled wakening is preferable to "lifting" a child. Scheduled wakening involves waking the child periodically (one to three times) at night and walking them to the toilet to pass urine. Eventually the time between awakenings is stretched until the child can go a full night without wetting the

bed. Lifting is thought to be counterproductive in some children as the child is denied the opportunity to learn the sensation of a full bladder and is encouraged to urinate without wakening.[4]

- Older individuals may use an alarm clock to wake themselves before their usual time of enuresis.[12]

When should GPs refer?

If after initial advice, more active treatment is sought, then referral to a paediatrician, enuresis clinic (if available in your area) or a continence advisor might be the next step to working out a programme most suited to the child. The programme would usually centre on the use of bed alarms.

Supported bed alarm programmes

Enuresis alarms emit a loud tone when moisture is sensed, so that the child is awoken as soon as they begin to wet the bed. **They are considered a good long-term and safe treatment.**

Bed alarms have a 65 to 80% success rate when used with support (such as an enuresis nurse) and if the child is motivated to become dry.[4] They help "condition" the child to wake at the sensation of a full bladder. Efficacy is better than behavioural treatments alone and relapse rate is lower than with pharmacological treatments.[4]

Alarms are usually needed for three to five months. When dryness has been achieved for 14 nights, children should be encouraged to drink extra fluid (up to 500mL of water in the hour prior to bedtime), and continue with this until there have been another seven to 14 consecutive dry nights. This form of challenge is used in conjunction with the bed alarm and is known as "overlearning". This reduces the rate of relapse from 50% to 25%.[4]

Children who relapse should be promptly offered the supported alarm programme again.

Desmopressin

Desmopressin is a synthetic analogue of ADH and is the only available antidiuretic drug. It works by reducing the volume of urine produced during the night but only on the nights it is used, **so does not cure the problem in the long term**.

In most situations, before considering this medication, it would be appropriate to have tried a bed alarm programme.

Safety concerns about desmopressin

In April 2007 the UK Medicines and Healthcare Products Regulatory Agency (MHRA) issued a drug safety alert stating that hyponatraemia, water intoxication and convulsions were associated with the use of desmopressin nasal spray. Following this, the nocturnal enuresis indication has been withdrawn from desmopressin nasal spray in the UK.

In December 2007 US drug regulators, the FDA, stated that they no longer approved desmopressin nasal spray for use in nocturnal enuresis after two deaths and a review of data that showed that 41% of hyponatraemic-related seizures occurred in people younger than 17 years old, using desmopressin most commonly for primary nocturnal enuresis.

The BNF 2008 states: "The Committee on Safety of Medicines has advised that patients should stop taking desmopressin during an episode of vomiting or diarrhoea (until fluid balance normal). The risk of hyponatraemic convulsions can also be minimised by keeping to the recommended starting dose and by avoiding concomitant use of drugs which increase secretion of vasopressin e.g tricyclic antidepressants".[13]

Occasional short term use of desmopressin

Desmopressin intranasal spray is currently available fully funded on specialist recommendation. The tablets are not currently funded. GPs might be asked to consider prescribing desmopressin for short-term use such as for

school camps or sleepovers. Desmopressin can also be offered as an adjunct to alarm therapy if required to assist family coping.[4]

A Cochrane review of desmopressin concluded that it was effective in reducing bedwetting compared with placebo. When desmopressin is used, most of the children have fewer wet nights (one night less on average per week) and more become dry (19% compared with 2% using placebo treatment in five trials involving 288 children).[14]

The usual dose of desmopressin is 20 to 40 micrograms intranasally or 200 to 400 micrograms orally, at bedtime. Fluid intake should be restricted one hour before to at least eight hours after the dose, and patients or parents should be told to report symptoms of water retention and hyponatraemia e.g. headache, nausea, vomiting, weight gain or convulsions.

There is insufficient data to reliably assess whether a higher dose is any more effective than a lower dose, so to minimise side effects and costs, the lowest effective dose should be used.[4]

Other drug options?

Oxybutynin can be useful in daytime enuresis and may also improve nocturnal enuresis. It can be considered in patients with bladder instability or in children who do not respond to desmopressin.

Tricyclic antidepressants are contraindicated for use in children for nocturnal enuresis. Tricyclic antidepressants, most commonly imipramine, have historically been used for the treatment of nocturnal enuresis and have evidence of effectiveness but with safety concerns.[15] A particular concern is overdose, which can be fatal.

Indomethacin, diclofenac and diazepam are not recommended as initial therapy for children with nocturnal enuresis.

Useful resources

KEEA – Kiwi Enuresis Encopresis Association

www.keea.org.nz

KEEA was registered as a charity in New Zealand in 2001 and helps with information and advice on bedwetting and soiling. They have a useful database which shows who to contact in your area for a bed alarm, what costs may be involved, the waiting list length and whether a GP referral is necessary.

Kidshealth

www.kidshealth.org.nz

This website covers a range of information on child and youth health – use 'bedwetting' as a search term.

NZCA (The New-Zealand Continence Association)

www.continence.org.nz

The NZCA has a children's continence section on it's website.

Patient information leaflets are also available – Incontinence in children, and Adults and bedwetting.
Email: jan@continence.org.nz
or call free 0800 650 659

Parent to Parent

www.parent2parent.org.nz

This is a support service for parents of children with a range of conditions and can put parents in touch with other parents experiencing similar situations.

Paediatric Society of New Zealand

www.paediatrics.org.nz

The society has published a best practice evidence-based guideline.

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