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Treating nocturnal enuresis in children in primary care

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How should children be assessed?

NOCTURNAL ENURESIS IS A COMMON CONDITION THAT CAN CAUSE MUCH DISTRESS TO SUFFERERS and their families. It is defined as involuntary wetting while asleep at least twice a week in children over the age of five. Less frequent wetting can be described simply as bedwetting. Primary nocturnal enuresis describes those children who have always been wet. Secondary nocturnal enuresis is defined as a relapse after a child has been completely dry for at least six months.

EPIDEMIOLOGY

The prevalence of nocturnal enuresis reduces with age. The ALSPAC longitudinal study established that 2.6% of children at the age of seven and a half years were wetting the bed at least twice a week, and a further 12.8% were wetting less frequently.[1] Up to the age of nine years, nocturnal enuresis is twice as common in boys than girls. Thereafter there is no sex difference in prevalence.

Two cross-sectional studies of children and adults up to the age of 40 showed that bedwetting persisted in 2% of adults.[2,3] The risk of persistence was greater in children who were wetting more frequently: 2% of children were wetting every night at the age of five, and 1% were still wetting every night in their late teens. This prevalence did not fall in young adults up to 40 years of age. The risk of persistence seemed higher in young people with coexisting daytime wetting.

What are the evidence-based treatment options?

Which children should be referred?

AETIOLOGY

There is a very strong genetic basis in both primary and secondary nocturnal enuresis, whether or not there is associated bladder dysfunction.

Bedwetting is not primarily caused by an underlying psychological disorder. However, psychological problems and life events can exacerbate or precipitate bedwetting in susceptible children who have an underlying genetic basis for their condition. Children with bedwetting also suffer many psychological sequelae from the condition.[4]

A longitudinal study showed that children with bedwetting at the age of nine had poorer peer relationships as teenagers even if the bedwetting had ceased by then. Another study showed that children, when asked to »

Table 1

History
● **Recent onset (days or weeks):** consider physical illness
● **Secondary enuresis:** consider physical or emotional trigger factors
● **Pattern of wetting:** may point to nocturnal polyuria or bladder dysfunction
● **Daytime bladder symptoms**
● **Daytime fluid intake**
● **Daytime toileting patterns**

Table 2

Physical examination
● **Abdomen** - kidneys, bladder, constipation
● **Lower limb neurology**
● **Lower spine** - looking for external signs of a cord lesion e.g. lipomas
● **Blood pressure** - where renal causes are suspected
● **Further examination** as determined by pointers in the history

rate the perceived difficulty of coping with various life events, rated bedwetting as the ninth most difficult of 21 conditions even if they did not suffer from the condition.[5]

Bedwetting can cause severe emotional and financial stresses on the family. Parents may feel very guilty and helpless, particularly if they suffered as children themselves. It can also lead to parental intolerance.

PATHOPHYSIOLOGY

Bedwetting occurs when a child or young person cannot wake to a full bladder, or cannot stop nocturnal bladder contractions. This is the basis of the three systems approach to the management of the condition which was put forward by Butler and Holland in 2000, and has been generally adopted by enuresis services in the UK.[6]

The three systems are:

- poor arousal from sleep
- nocturnal polyuria
- bladder dysfunction

Poor arousal from sleep

Most parents say that their enuretic child is a deep sleeper. In fact, the problem seems to be poor non-specific arousal to any stimulus, even in light sleep. Almost all children with nocturnal enuresis have this problem. So, effectively, nocturnal enuresis is one type of sleep disorder. Wetting can, however, occur in any phase of sleep, REM or non-REM, light or deep.

Nocturnal polyuria

Elegant experiments by Rittig in 1989 established that many children with nocturnal enuresis have nocturnal polyuria.[7] This is usually caused by an inadequate rise in vasopressin levels at night, with consequent increased urine production approaching daytime levels. As a result, the bladder usually fills in the first third of the night, and wetting occurs when the child cannot wake to the full bladder. Clinically, children with nocturnal polyuria tend to flood the bed in the first third of the night, not wake up, and not wet again that night.

Bladder dysfunction

A significant proportion of children with nocturnal enuresis also have bladder dysfunction. This is usually due to a small overactive bladder. Wetting occurs when an abnormally small bladder fills up or suddenly contracts at night, in association with poor arousal from sleep. Children with bedwetting caused by an overactive bladder tend to have a very variable wetting pattern i.e. the patch size and frequency of wetting varies. They may wet several times in one night. Sometimes, they wake after they are wet. These children usually have associated daytime bladder symptoms, such as urgency and frequency. Occasionally, they also have daytime wetting.

A common comorbid factor is constipation, which can cause or exacerbate the bladder symptoms. Some children with treatment-resistant enuresis have been shown to have spontaneous nocturnal bladder contractions without any daytime bladder symptoms.

Many children with nocturnal enuresis have a mixed picture with all three systems involved.

ASSESSMENT

NICE recently published guidelines on the management of nocturnal enuresis.[8] These apply to children and adolescents up to the age of 19.

No minimum age limit is considered. Children under seven years should not be excluded from management. Healthcare professionals should persist if first-line treatment is unsuccessful because successful treatment has a positive effect on self-esteem. The parents and child should be informed that the wetting is not the child's fault, and that punitive measures are not helpful.

Bedwetting is occasionally caused by underlying medical conditions: primarily urological, neurological, or metabolic. It can also be associated with obstructive sleep apnoea. However, these causes are uncommon in primary enuresis. A basic history and examination should exclude these conditions (see tables 1 and 2, left). The history should be guided by the three systems approach.

Establish the child's and carer's views of the problem, and the impact of the condition on them. Some children/families are simply looking for short-term treatment e.g. for sleep-overs, or reassurance that there is not an underlying medical problem; others are desperate for treatment.

It is very important to elicit signs of parental intolerance, where carers are expressing anger, negativity or blame towards the child. This makes treatment more urgent because, in certain cases, there may be a risk of child abuse. For instance, up to a third of parents have been found to punish their children for bedwetting.[9] The most extreme example of child abuse associated with bedwetting occurred with Victoria Climbié.[10] Some families need a lot of support in dealing with the problem. This support can often be provided by school nurses or social care agencies.

If the bedwetting has started in the past few days or weeks, systemic illness should be considered e.g. UTI or diabetes mellitus. If there is general ill health, then underlying physical causes are much more likely. Nocturnal enuresis per se does not cause general ill health.

With secondary enuresis, symptoms or signs of medical and psychological conditions or life events may be elicited as possible causes, and may need separate treatment.

The pattern of bedwetting may point towards nocturnal polyuria or bladder dysfunction as the cause (see pathophysiology, above).

Fluid intake

Children should be taking at least 1.5 litres (six large drinks) spread throughout the day. This is much more important than fluid restriction at night. However, children with a small overactive bladder should restrict fluids for 1.5 hours before bedtime. Caffeine-containing drinks should be avoided.

Daytime micturition frequency

Normal micturition, with adequate fluid intake, is four to seven times daily.

Children with infrequent micturition (less than four times/day) should be advised to increase micturition to five to six times daily. Frequency of micturition (more than seven times/day) may point towards an overactive bladder or UTI. Obviously, children should be advised to micturate before sleep.

Other daytime bladder symptoms
Significant daytime wetting, abdominal straining on micturition, or poor urine stream should prompt referral to a paediatrician or urologist. Minor symptoms of urgency, frequency and occasional dampness may be improved by ensuring adequate fluid intake, regular toileting, and treatment of coexisting constipation or UTI.

A history of recurrent UTI may need investigation and constipation and/or soiling should be treated. NICE has issued guidance in both these areas. [11, 12]

NICE recommends that routine urinalysis is only necessary with:
- recent onset of bedwetting (days or weeks) or
- symptoms or signs of UTI or diabetes mellitus or
- signs of general ill health or
- daytime bladder symptoms.

In the absence of relevant symptoms or signs, no other investigations (e.g. ultrasound scans, blood tests) are necessary in the management of straightforward nocturnal enuresis.

MANAGEMENT

Key aspects of management are to:
- Exclude treatable medical conditions
- Explain the problem to the child and family in terms of the three systems approach
- Address abnormal fluid intake and toileting behaviour
- Provide information to the family on support groups. The most useful group is ERIC (see 'Useful information' box, p26)
- Use reward systems only for agreed behaviours which are under the voluntary control of the child e.g. increasing fluid intake, toileting before bed etc. They should not generally be used for dry nights as the wetting is involuntary

Some children are lifted in the night by their parents and taken to the toilet. This does not cure the wetting but may avoid a wet bed. It should generally be discouraged unless it eases significant family stresses.

Some children wear nappies or pull-ups at night. This should generally be discouraged unless it eases family stresses and is not distressing to the child. If a child continues to use nappies, regular trials for up to a week without nappies every few months should be advised.

Serious emotional or behavioural problems may necessitate involvement of a healthcare professional with psychological expertise.

Alarm treatment
If general advice is not effective, then first-line treatment is usually alarm treatment. This applies whatever the cause of the bedwetting, and whether primary or secondary.

Alarm treatment should be considered in any child over seven. It is occasionally useful in slightly younger children.

Alarms are usually provided by local community enuresis services. However, alarm treatment is contraindicated in certain circumstances (see below).

The enuresis alarm depends on the child waking to the alarm. As poor arousal from sleep is usually a major cause of the wetting, the alarm often does not work. The alarm takes several weeks to be effective. It needs commitment from both child and carers. It is not suitable in chaotic families, or where urgent treatment is required.

NICE recommends that the alarm should not be used if it is considered undesirable by the child or carers, or if the healthcare professional thinks it is inappropriate because:
- the wetting is infrequent (<1-2 wet beds per week) or
- carers are having difficulty coping with the problem or
- carers are expressing anger, negativity or blame towards the child i.e. parental intolerance

Desmopressin
Desmopressin is a synthetic form of vasopressin. It may be used as first-line treatment if:
- rapid onset and/or short-term improvement is the priority of treatment (e.g. significant family stresses, school trips, holidays, sleepovers) or
- an alarm is inappropriate or undesirable

Desmopressin for bedwetting is usually prescribed in the convenient form of melting tablets (120 µg). These are easier to take, equally effective and cost the same as ordinary 200 µg tablets. Desmopressin sprays should no longer be used in nocturnal enuresis as there is an increased risk of hyponatraemia.

Desmopressin should be given in the hour leading up to bedtime. It is effective within one to two nights if low vasopressin levels are the main cause of the bedwetting. The dose can be increased to a maximum of two tablets (240/400 µg) after a week if one tablet does not achieve complete dryness. Specific precautions include fluid restriction for an hour before, until eight hours after, administration of the medication; and stopping the medication during any intercurrent episode of diarrhoea and vomiting.

NICE recommends that desmopressin should be used for children over the age of seven if alarm treatment is not appropriate. It can also be considered for children as young as five if treatment is required.

Desmopressin may not be fully effective if there is also coexisting bladder dysfunction (though it may reduce the size of the wet patches or number of wet nights). If the child becomes dry on desmopressin, the medication can be continued for three months, and then stopped for up to a week, to see if it is still needed. Most children then relapse but can restart the medication for a further three months.

No serious side effects have yet been described with long-term use of desmopressin, and some adults have been using it for years. However, many children become dry spontaneously within nine to twelve months of starting the medication.

Desmopressin should not be excluded as a treatment option in children with emotional or behavioural problems, learning difficulties or ADHD, provided they can comply with nighttime fluid restriction.

Desmopressin does not alter endogenous vasopressin levels. Routine measurement of weight, serum electrolytes, blood pressure and urine osmolality is not necessary in children being treated for bedwetting with desmopressin.

Bladder dysfunction
If there is obvious bladder dysfunction, general advice includes adequate fluid intake (six large drinks/1.5 litres per day) and regular toileting (five to six times per day). If this does not improve matters after a few weeks, alarm treatment should be considered. However, if there are troublesome daytime bladder symptoms, such as »

key points

SELECTED BY
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Nocturnal enuresis is a common condition and is defined as involuntary wetting while asleep at least twice a week in children over the age of five. Primary nocturnal enuresis describes those children who have always been wet. Secondary nocturnal enuresis is defined as a relapse after a child has been completely dry for at least six months. Up to the age of nine years, nocturnal enuresis is twice as common in boys than girls but thereafter there is no sex difference in prevalence. At the age of five, 2% of children wet every night, and 1% are still wetting every night in their late teens.

Bedwetting is not primarily caused by an underlying psychological disorder. However, psychological problems and life events can exacerbate or precipitate bedwetting in susceptible children who have an underlying genetic basis for their condition. Children with bedwetting suffer many psychological sequelae and it can cause severe emotional and financial stresses on the family.

The three systems approach to the management of the condition addresses: poor arousal from sleep, nocturnal polyuria and bladder dysfunction. Most parents say that their enuretic child is a deep sleeper. In fact, the problem seems to be poor non-specific arousal to any stimulus, even in light sleep. Many children with nocturnal enuresis have nocturnal polyuria. This is usually caused by an inadequate rise in vasopressin levels at night, with consequent increased urine production. Some children with nocturnal enuresis also have bladder dysfunction, usually due to a small overactive bladder. They may wet several times in one night and sometimes wake after they are wet. Many children with nocturnal enuresis have a mixed picture with all three systems involved.

Bedwetting is occasionally caused by underlying medical conditions; primarily urological, neurological, or metabolic. It can also be associated with obstructive sleep apnoea. However, these causes are uncommon in primary enuresis. A basic history and examination should exclude these conditions. If the bedwetting has started in the past few days or weeks, systemic illness should be considered e.g. UTI, diabetes mellitus. With secondary enuresis, symptoms or signs of medical and psychological conditions or life events may be elicited as possible causes, and may need separate treatment.

Reward systems should only be used for agreed behaviours which are under the voluntary control of the child, they should not generally be used for dry nights. The parents and child should be informed that the wetting is not the child's fault, and that punitive measures are not helpful. Alarm treatment should be considered in any child over seven. The alarm takes several weeks to be effective and needs commitment from both child and carers. Desmopressin may be used as first-line treatment if rapid onset and/or short-term improvement is the priority of treatment or an alarm is inappropriate or undesirable. Desmopressin should be given in the hour leading up to bedtime.

severe urgency or daytime incontinence, which do not respond to general advice plus treatment of any coexisting constipation, then the child should be referred to a paediatrician. Bladder dysfunction is often complex and needs careful assessment.

Do not recommend strategies that encourage interruption of urinary stream or infrequent micturition during the day. These strategies may over-strengthen the pelvic floor muscles. This can lead to dysfunctional voiding, with difficulty relaxing the urethral sphincters during micturition, and increased pressure in the bladder with secondary reflux.

Failed first-line treatment

If first-line treatment fails, the child with nocturnal enuresis should be referred to an appropriate specialist. Some children are only cured by combinations of medical treatments. Tricyclics such as imipramine have been used successfully in the past to treat bedwetting and are still licensed for such use. However, they should only be used in specialist clinics as they have potentially serious side effects.

Young children

NICE suggests the following advice for children under five years:

- Reassure parents - 20% of children wet the bed at least once a week at the age of four and a half
- Attempt toilet training if appropriate
- Suggest a trial of at least two nights without nappies if toilet trained by day for at least six months
- Take the child to the toilet if he/she wakes at night
- Consider further assessment for children over two years who are wet by day and night despite awareness of toileting needs and appropriate toileting behaviour
- Exclude and treat constipation

CONCLUSION

Bedwetting is a very common, and often distressing, condition which can be treated very effectively. Contrary to previous belief, many children do not grow out of it, particularly children with frequent wetting or coexisting bladder dysfunction. Treatment should be instituted in all children over the age of seven years, where desired by the child or parents.

Treatment should be considered in children aged five to seven years, especially when wetting is frequent or causing severe family stresses.

The NICE quick reference guide for nocturnal enuresis gives more detailed information on treating the condition.

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Useful information

NICE
CG111. Nocturnal enuresis – the management of bedwetting in children and young people can be downloaded from the website **www.nice.org.uk**

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