

# MANAGEMENT OF BEDWETTING IN CHILDREN

*Bedwetting is a very common problem. Up to 15% of 5-year-olds wet their beds more than 3 times per week. Among the general public considerable ignorance remains about the causes of bedwetting and the fact that effective treatment is available.*



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This article presents an approach to bedwetting that will help the general practitioner to recognise benign enuresis, and to treat children suffering from it with confidence and success.

## DEFINITIONS

The exact nature of the child's bedwetting needs to be carefully elucidated, making a clear distinction between enuresis and incontinence:

- **Enuresis** can be defined as the persistent, involuntary voiding of a normal urine volume during sleep, beyond the age of expected continence (i.e. 5 years).<sup>1</sup>
- **Incontinence** can be defined as the involuntary voiding of small amounts of urine during wakefulness or sleep.

## CLASSIFICATION OF BEDWETTING

Enuresis can be classified according to its course, the time of its occurrence, or its aetiology.

- Course
  - Primary/persistent (never been dry).
  - Secondary/regressive (previous dryness achieved for a period of at least 6 months).
- Time of occurrence
  - Nocturnal (mono-/polysymptomatic).
    - Monosymptomatic nocturnal enuresis (MNE): No other symptoms.
    - Polysymptomatic nocturnal enuresis (PNE): Abnormal voiding pattern during wakefulness.
  - Diurnal: By day and during wakeful periods.
- Aetiology
  - Organic/pathological.
  - Non-organic/functional.

## PATHOPHYSIOLOGICAL MECHANISMS OF BEDWETTING (FIG. 1)

### Non-organic causes

- Maturation delay
  - inadequate arousal response to bladder fullness (suppressed reticular activation system — deep sleeper)
  - abnormally high nocturnal urine production (inadequate nocturnal increase of antidiuretic hormone (ADH) secretion)

- Small functional bladder capacity (spontaneous voiding occurs when this is exceeded).
- Psychological disturbance (secondary enuresis).
- Genetic predisposition: Family history.

**Organic causes**

- Urological
  - infection
  - structural abnormalities.
- Renal ⇒ tubular dysfunction ⇒ polyuria.
- Neurological
  - central
    - CNS injury/cerebral palsy
    - CNS tumours
    - epilepsy
    - neurogenic bladder (spastic type)
  - peripheral
    - dysfunctional detrusor/sphincter
    - spina bifida
    - neurogenic bladder (flaccid type).
- Endocrine
  - diabetes mellitus (insulin deficiency)
  - diabetes insipidus (vasopressin deficiency).

**EPIDEMIOLOGY**

- 15% of 5-year-olds wet their beds

- 7% of 10-year-olds wet their beds
- 1% of 15-year-olds wet their beds.

Spontaneous resolution of enuresis occurs at a rate of 15% per year.

Enuresis is more common in:

- boys (5:3 girls)
- large families
- poor socio-economic circumstances.

Incidence of bedwetting by aetiology:

- MNE — 85%
- PNE — 10%
- organic causes — 5%.<sup>2</sup>

**CLINICAL APPROACH TO BEDWETTING**

**History**

Enquire about the following:

- Previous period(s) of dryness, i.e. distinguish between primary and secondary enuresis. Primary enuresis, for all practical purposes, is never caused by psychological factors other than developmental delay. Psychological disorders may develop due to persistent enuresis. Secondary enuresis could be due to psychological or pathological factors.
- Daytime wetting/voiding abnormalities/frequency of micturition (the presence of which rules out MNE).<sup>2</sup>
- Urinary tract infections (UTIs) cause enuresis by rendering the bladder irritable and unstable. UTIs may be indicative of an underlying structural or functional disorder).
- Urinary stream (weak stream suggests possible structural or functional obstruction).
- Constipation/faecal incontinence/encopresis (dysfunctional bowel is often associated with dysfunctional detrusor and hence abnormalities of voiding).
- Renal disease (polyuria causes bedwetting).
- Polydipsia/polyuria (may indicate diabetes mellitus or diabetes insipidus).
- Neurological deficits: Developmental delay/CNS disorder/epilepsy/

abnormal gait (all suggesting a possible central or peripheral disorder of bladder control).

- Sleep disturbance, e.g. obstructive apnoea (excessive fatigue).
- Psychological disturbances, including attitude of patient and parents (leading to regression behaviour and secondary enuresis).
- Abnormalities in toilet training history (possibly causing a psychological upset).
- Family history of enuresis or renal disease (enuresis is frequently familial).
- Previous treatment or medication.

**Examination**

- General health (including growth centiles and blood pressure).
- Gastrointestinal system (faecal loading, incontinence).
- Urinary system (kidneys, bladder and genitalia).
- Neurological examination:
  - focal signs in legs (power, tone, tendon reflexes, sensation)
  - gross motor function — hopping on one leg
  - genitalia (cremasteric reflex in boys)
  - anal sensation and tone
  - sacral abnormalities — dimple/tuft of hair.

**Special investigations**

- Urine dipstick — including specific gravity — on first morning urine.
- Urine microscopy and culture (if dipstick test is abnormal or otherwise indicated).

**Recognising benign enuresis**

- No symptoms or signs of any underlying disease.
- Exclusively nocturnal enuresis (or during sleep).
- Normal urinalysis.

**Watershed question**

Is it MNE or not?

If 'Yes': Can be managed by general practitioner.

If 'No': Refer to a paediatrician, urologist or paediatric nephrologist.

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*Primary enuresis, for all practical purposes, is never caused by psychological factors other than developmental delay.*

*Bladder antispasmodics, e.g. oxybutin (Ditropan), are inappropriate for the treatment of MNE.*

#### MANAGEMENT OF MNE

Explanation of maturational delay:

- inadequate arousal response to bladder fullness
- inadequate increase in nocturnal ADH production
- small functional bladder capacity.

Reassurance: Quote epidemiological statistics (see above). Reaffirm that no disease is present.

#### General measures

These lead to some decrease in wet nights in up to 70% of patients with MNE.

- Quiet bed-time routine.
- Restrict fluid 1 - 2 hours before bedtime.
- Avoid caffeinated and citrus beverages, chocolate (cause polyuria).
- Bladder voiding before retiring.
- Waking to urinate at regular intervals during the night ('lifting').
- No punishment or belittlement.
- Protection of bedding.
- Night light (to alleviate fear of going to the toilet in the dark).

#### Specific measures

- Record dry nights (only dry nights are marked and celebrated on a star chart)

- Motivation (reward dry nights and self-arousal to go to toilet).
- Dry bed training — regular nocturnal waking to void at progressively later times or increasing intervals.<sup>2</sup>
- Medication (not before 6 years of age)
  - DDAVP (desmopressin – ADH analogue)<sup>1</sup>
  - imipramine (Tofranil — antidepressant that facilitates waking, increases ADH release and increases bladder capacity).
  - Oxybutynin (Ditropan – only given if daytime frequency occurs).
- Alarm therapy (co-operation being rewarded), which includes the following:
  - arousal training (learning to wake up to alarm)
  - cleanliness training (learning to clean up after a wet night)
  - over-learning (giving extra fluid at night to induce bladder fullness and to test waking response).
- Bladder training — delaying voiding for increasing periods when daytime frequency symptoms are present. Only possible in older co-operative children.

N.B. Bladder antispasmodics, e.g. oxybutynin (Ditropan), are inappropriate for the treatment of MNE.

#### INDICATIONS FOR VARIOUS TREATMENT MODALITIES

#### When to consider alarm therapy

- Highly motivated child and parents (obsessive-compulsivity is beneficial!).
- No daytime incontinence.
- Wetting occurs later in the course of the night.
- Relapse after previously successful alarm therapy.

#### Advantages

- Moderate cost (R500 - R700).
- High success rate if used correctly (up to 70% long-term remission).<sup>3</sup>

#### Disadvantages

- High fall-off rate.
- Not suitable for disorganised or dysfunctional families.<sup>3</sup>

#### When to consider DDAVP

- Primary enuresis in the older child without daytime frequency.
- Wetting less than 3 times per week and later in the course of the night (> 4 hours after going to bed).
- High nocturnal urine volume (nocturnal volume > 75% of daytime volume, calculated as urine production per hour). The day-night urine production ratio can be determined by recording the time and volume of each void over 24 hours. Nappies must be worn overnight and their wet weight recorded.
- Behavioural problems and dysfunctional family.
- Family history.

#### Advantages

- Safe. The only danger is hyponatraemia if excessive water is ingested overnight.
- Very few side-effects (nasal symptoms when using nasal spray, headache, abdominal pain).
- Rapid response within 48 hours (by the second dose).
- Can be used intermittently (e.g. for camps and sleepovers, starting the night before).<sup>2</sup>

#### Disadvantages

- High cost (the better medical aids only pay for 4 months of DDAVP therapy).

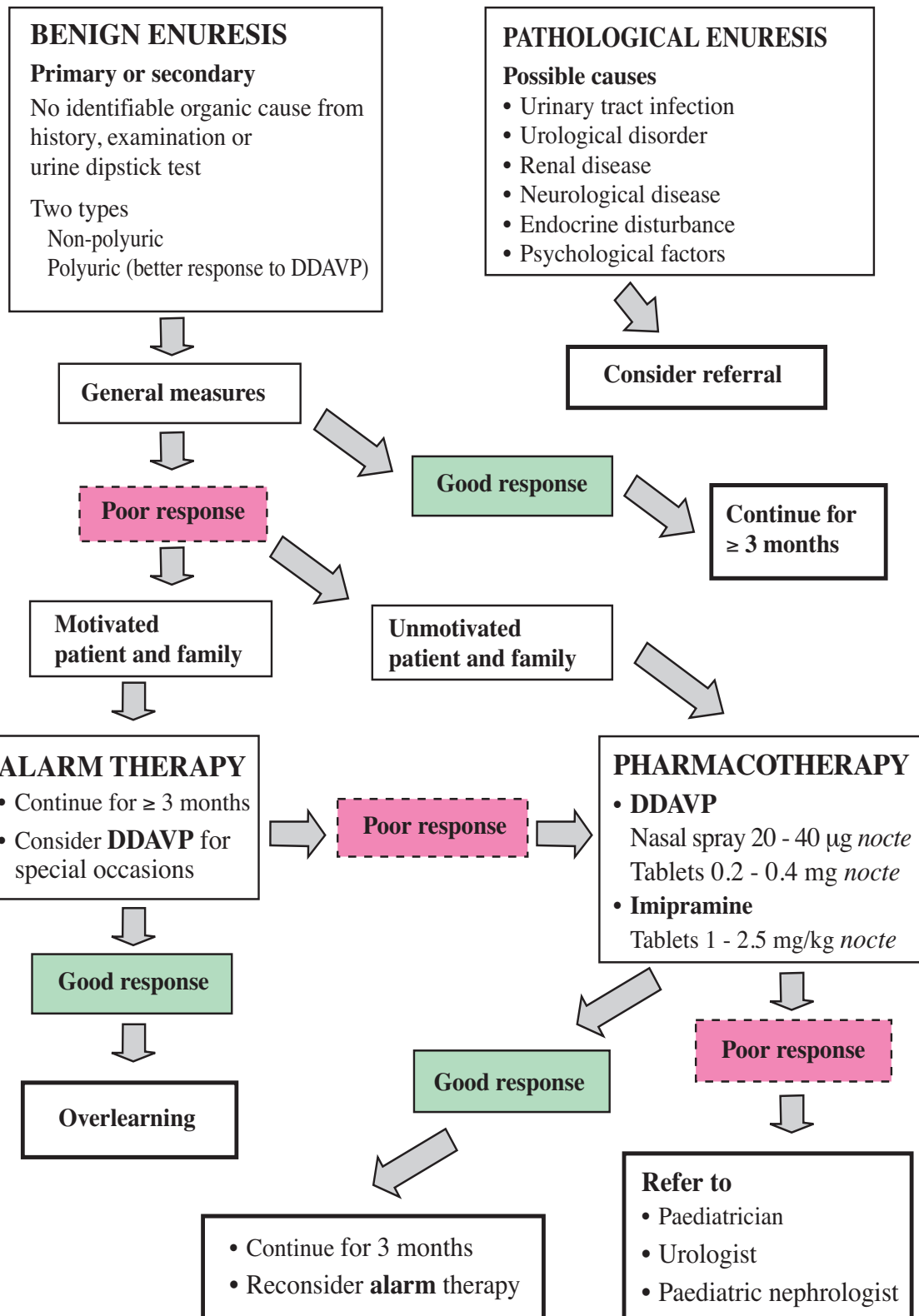


Fig. 2. Algorithm for management of enuresis.

- High relapse rate after discontinuation (but less than imipramine).

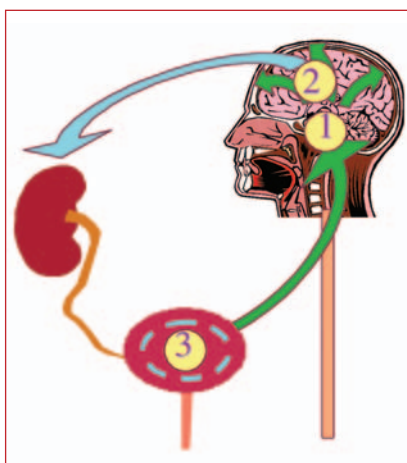


Fig. 1. Pathophysiology of monosymptomatic nocturnal enuresis: Maturation delay (1 — suppressed reticular activation system; 2 — inadequate nocturnal increase in ADH secretion; 3 — small functional bladder capacity).

#### Dosage

- Nasal spray (10 µg/spray): 20 - 40 µg on retiring
- Tablets (100 µg/tab): 200 - 400 µg, 1 - 2 hours after supper.

#### When to consider imipramine

- If the cost of treatment is a problem.

- In the presence of significant psychological factors.
- When there is evidence of a small functional bladder capacity.
- When mild daytime symptoms occur.

#### Advantages

- Low cost.

#### Disadvantages

- Response time up to 14 days.
- Side-effects include irritability, dry mouth, headache, anorexia, constipation.
- Severe (irreversible) cardiotoxicity in overdose (beware of younger siblings).
- Very high relapse rate after discontinuation.

#### Dosage

- Tablets are available in 10 mg or 25 mg strengths.
- Start with 1 mg/kg at suppertime, increase to a maximum of 2.5 mg/kg nocte. Some patients respond better to divided doses: 1/3 mane and 2/3 nocte or simply 1/2 mane 1/2 nocte.

#### When to consider oxybutynin

- Small functional bladder capacity or mildly dysfunctional detrusor.

- Daytime frequency, urgency and urge incontinence.
- Multiple wetting episodes per night.
- Variable wetting volume (size of wet patch).
- Wakening after wetting.<sup>1</sup>

#### Advantages

- Moderate cost.

#### Disadvantages

- Anticholinergic side-effects, e.g. dry mouth, constipation, blurred vision.
- Ineffective for MNE.

#### Dosage

- 2.5 - 10 mg at supper time (0.15 - 0.2 mg/kg).
- Sometimes 2 - 3 divided doses are helpful.

Fig. 2. gives an algorithm for management of enuresis.

References available on request.

## IN A NUTSHELL

Fifteen per cent of 5-year-olds, 7% of 10-year-olds and 1% of 15-year-olds wet their beds.

The exact nature of a child's bedwetting needs to be carefully elucidated, making a clear distinction between enuresis and incontinence.

Enuresis can be defined as the persistent, involuntary voiding of a normal urine volume during sleep, beyond the age of expected continence (i.e. 5 years).

The most common cause of bedwetting is benign enuresis.

Benign enuresis (monosymptomatic nocturnal enuresis) is caused by a combination of (i) inadequate arousal response to bladder fullness; (ii) inadequate increase in nocturnal ADH

production; and (iii) a small functional bladder capacity.

Benign enuresis is recognised by (i) the absence of symptoms or signs of any underlying disease; (ii) wetting that occurs exclusively during sleep; and (iii) normal urinalysis.

Primary enuresis is almost never caused by psychological problems.

The most common causes of secondary enuresis (relapse after 6 months of dryness) are urinary tract infection and psychological disturbance.

The most effective treatment for benign enuresis is alarm therapy.

The most effective medication for benign enuresis is DDAVP (desmopressin).