# Nocturnal Enuresis in Children

Pages with reference to book, From 251 To 254

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Nocturnal enuresis is a common childhood disorder rather than a disease. It is involuntary voiding of urine on at least 2 nights per month, beyond the age at which bladder control is normally obtained (4-6 years)[1]. There are two types of nocturnal enuresis. Primary nocturnal enuresis accounts for 75-80% of all cases and is defiend as a child who has never gained nocturnal urinary control2 and Secondary nocturnal enuresis is the development of nocturnal urinary incontinence after the patient has been "dry" at night for a minimum of 6 consecutive months[2,3]. The incidence is three times higher in boys than in girls and annual spontaneous cure rate is 15%[4]. The epidemiological studies suggest that at the age of 5 years the prevalence is 15% and it drops to 1%by the age of 14 years.

Development of Urinary Control

The exact neuro-physiological process is not completely understood. But children achieve bladder control at different ages. Most of them will achieve by the age of 5 years.

There are various stages observed which are following:

Infancy: Voiding occurs frequently about 20 times per day, because of spinal cord reflex arc.

Next 2 years: It becomes less frequent because unconscious central inhibition of the voiding reflex occurs and there is also an increase in the bladder capacity.

By 3 years: Voluntary control of the distal sphincter mechanism takes place and voiding can be initiated and terminated at will.

By 5 years: 85% of children will acquire an adult pattern of urinary control.

Aetiology Not exactly known but probably multifactorial.

1. Genetic-inheritance ---It plays a major role and evidence is strong as it runs in families. If one parent has history of nocturnal enuresis, the likelihood that one of the children will have nocturnal enuresis is 40%. If both parents have, the likelihood icreases to 70%[5].
2. Development delay -- There is a delay in functional maturationof the central nervous system reducing its ability to inhibit bladder contraction at night. Spontaneous cure rate with increasing age supports this theory well.
3. Anti diuretic hormonc -- ADH is secreted in a circadian rhythm. There is increase secretion during the night in normal subjects leading to low urinaiy volumes at night. But some enuretics do not show this rise in nocturnal ADH secretion resulting in nocturnal diuresis which overloads the storage capacity of the bladde?.
4. Urinary tract abnormalities -- Anterior urethral valves, meatal stenosis and bladder neck obstruction, these are probably coincidental findings. Because correction of these abnonnalities does not result in a cure of nocturnal enuresis[6].
5. Bacteriuria-- It plays a major role in secondary nocturnal enuresis.
6. Psychological factors -- This issue is controversial. Initially secondary nocturnal enuresis was attributed to psychological stress-- that is the birth of a sibling, illness or divorce[7,8] . But recent investigations however have failed to reveal any major psychologic stress differences between children with secondary enuresis and normal non enuretic children[7,8]. It has been said that usually it is relapse of physiologic enuresis[3].

Other rare causes are; constipation, bladder calculus, bladder foreign body, Diabetes inspidus and diabetes mellitus.

Myths

Sleep disorders has been studied thoroughly: It was linitially suggested that enuretic episodes occurred during slow-wave deep sleep. But further studies have revealed that it occurs at all stages of sleep and failed to link with depth of sleep[6,9,10].
beds, Another myth is that, bad children deliberately wet their
Evaluation
Careful history, physical examination and urine analysis will suffice in majority of cases.
History-- Important questions to be asked are: Frequency and duration of wetting, whether it is primary or secondary, any associated day time voiding symptoms or urgency and weak stream. History of previous urinary tract infection in the patient and a family history of nocturnal enuresis should also be asked.
Physical examination - Abdominal and genital assessment should be done for distended bladder orfecal impaction and to look for meatitis, vulvitis or any labial adhesions. The neurological assessment is also very important - one should look for: gait, inspection and palpation of lower back, peripheral reflexes, perineal sensation and anal tone should be examined.
Investigations
Majority will have one night time wetting and no organic signs and symptoms. Therefore only urine D/R is needed.
If there is persistent bacteriuna then voiding cystourethngram and a renal ultrasound is needed.
If neurological abnormality is present, referral to a urologist for further evaluation will be appropriate.
Management
Primary goal of treatment is to cure the child's enuresis, but equally important is to protect the child's self esteem. The clinician has to spend some timewith the parents and the child, Reassurance and education -- This is the major key to success:
Etiology and prognosis of the condition should be explained to parents and the child. The clinician must emphasize tha the problem is no one's fault and it is not intentional, neither it suggests a bad behaviour. So, parents should not blame the child and should avoid punishments and angry behaviour towards their child.
When to treat the child?
This should be tailored to the patients' age, motivation and parental wishes. Usually a child with strong family history tends to delay therapy as they are aware that the problem solves as the child grows older.
Will the child outgrow bed-wetting?
This question is often asked by the parents: If the child has no othermedical or emotional problems then there isavezy good chance that the child will outgrow the problem, even without treatment.
What is the best treatment for bed-wetting? Universal treatment
The clinician should clarify the goal of getting up at night and using the toilet. There should be proper nightlight in the bathroom. Nonnal fluid intake is fine but they should avoid excessive fluids during the 2 hours before bedtime and child should empty the bladder at bedtime. Older children can be included in morning cleanups of their bed clothes. These children need support and encouragement that they eventually will become dry. They should maintain a diary to monitor progress and foliw-ups should be provided.
Different treatment modalities are:
1. Motivation therapy — The causes and prognosis of the condition should be explained to the parents and the child and they should be involved in the management plan. Unhelpful practices should be discontinued. The clinician should provide emotional support to the child and enhance his self responsibility. The child should be asked to keep a record of wet and thy nights and every dry night should be rewarded as a positive reinforcement for success. Cure rate with motivation or counselling alone is only 25%[11].
2. BehavIoral modification with an enurctic alarm -- This is the cornerstone in the successful

management of nocturnal enuresis. Enuretic alarm consists of a classic bell and a pad system. An alarm is triggered when an electrode becomes wet and awakens the child and interrupts micturition. But the main drawback is unusually high noncompliance rate, as alarm should be used a minimum of 3 weeks before a decrease in enuresis is noted. Cure rate is 65-100% after 4-6 months of treatment[12,13].

3. Self-Awakening-- Helpful for children who are capable of getting up during the night but do not understand its importance. Every wet night can be a reminder for them.

Techniques of self awakening:

a) These children should be asked to rehearse a particular sequence of events every night before going to sleep: The child liesinbedwitheyes closedandpretendsthatitisthe middleofthe night and the full bladder is trying to wake him or her up by starting to hurt. He or she then runs to the bathroom and empties the bladder. The child can remind himself or herself to get up in the same manner if them is need to urinaate dring the night.

b) Another approach is daytime rehearsal - when the child has an urge to urinate, he or she should go to the bed and pretend he or she is asleep. After a few minutes, the child should walk to the bathroom to urinate.

4. Parent-Awakening — Indicated if self-awakening fails. This is a parent-awakening technique and it must be provided at the child's request. This involves a waking regime as frequent as every hour over night in orderto ensure adiy night. First night - Awaken the child once every hour until 1 AM.

- Next five nights, wake the child only once. Second night - Wake him 3 hours after falling asleep. Third night - Wake the child 2-1/2 hours after falling asleep. Fourth night - Wake the child 2 hours after falling asleep.

Fifth night - Wake the child 1-1/2 hours after falling asleep. Sixth night - Wake the child 1 hour after falling asleep.

Seventh night - Child is asked to self-awaken from then on Cure rate was 92% in several studies and the average time required to achieve cure was 4 weeks[3].

5. Increasing Bladder Capacity — Functional bladder capacity means, volume of urine voided after micturition has been postponed for as long as possible. The normal bladder capacity is calculated in ounces, by - age in years + 2.

Bladder capacity can be incrreased by bladder training exercises such as holding urine as long as possible during the day and then starting and stopping the urine stream during micturition. This can be practised several times in a day. Aim is to produce progressively larger voids, with longer intervals between voids.

6. Pharmacotherapy -- Preferred by most of the doctors and patients. But results are less durable.

a) Imipramine - This is a most extensively used drug. Exact mechanism is not-understood. It has been said that anticholinergic effect increases bladder capacity and noradrenergic effect decreases bladder detrusor excitability. Impiramine is taken 1 hour before bed time and duration of action is 8 to 12 hours. Starting dose is usually 25 mg per day. Maximum dosage is 50 mg/day for children from 8-12 years of age and 75mg/day for children older than 12. Larger doses do not increase the success rate and medication is maintained for about 3-6 months before tapering it off. Side effects are anxiety, insomnia, dry mouth, constipation, nausea, nervousness and other personality changes. Over doses canbe potentially fatal. e.g. cardiac arrythmias, hypotension, respiratory complications, coma and convulsion. Cure rate ranges from 10-60%3 Relapse rate is more than 90%[3].

b) Desmopressin - It is an analogue of argiine vasopressin and is used extensively in western countries. It is available as both a nasal spray and an oral preparation (100 micro gram/nil). Duration of action is 10-12 hrs. The mechanism of action is to reduce nocturnal urine output to a volume lower than the functional bladder capacity. Initial recommended dose of nasal spray for children is 20 micro gram (one spray each nostril) at bed time upto a maximum of 80 micro gram per night. Initial dose of oral preparation is 1 mg at night. Therapy can be continued for 3-6 months and ceased intermittently. Side

effects are rare e.g. fluid retention and hyponatraemia on few occasions. Cure rate varies from 10-70%[3]. Relapse rate is more than 90% afte discontinuation of therapy[3]. Therefore this agent should be primarily used during special occasionsl - for example school camps or sleep overs.
c) Oxybutynin chloride (Ditropan) -- It has anticholinergic and anti-spasmodic effects, increases bladder capacity and reduces the frequency of detrusor contractions. This is helpful for the patient with a small capacity bladder who has daytime frequency or urge incontinence. Dose for childrenolder than 7 years is 5 mg orally 2 or 3 times daily and a 6 months trial can be given. Side effects are thy mouth, flushing, drowsiness, blurred vision and constipation. It has a small primary mole in nocturnal enuresis. This is first line therapy in patients with significant daytime symptoms suggestive of bladder instability. Cure rate is 33% fo children who have signs of unstable bladder3. Recurrence rate is almost 100% after discontinuation of therapy.
Indications for drugs
Indicated when there is need for short term dryness e.g. when the child has to be away from home such as camping, school trips, vacations and overnights.

**Summary**

This common condition can be managed by the general practitioners. The key answer to nocturnal enuresis is nocturnal self-awakening and recently more emphasis is given on this which is an area of greatest promise. Behavioural modification in conjunction with an enuretic alarm also teaches this skill and has the highest cure rate and the lowest relapse rate. Enuretic alarms can be used any time from age 5 onwards. But drugs are only indicated when there is need for shoittenndiynesse.g. whenthe child has tobeaway fmmhome.

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