

Enuresis

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1. Introduction

Enuresis is defined as involuntary bladder emptying (urinary incontinence) in a child who is considered adequately mature to have achieved continence. It is the most common urologic disorder in children. The bladder functions to both store and eliminate urine. Urinary continence is dependent upon complex interactions between the somatic and autonomic nervous systems and involves both a filling and voiding phase. Bladder control evolves from complete incontinence in infancy to daytime urinary continence by age 4 and finally nighttime continence by age 5 to 7 years. Enuresis is two to three times more common in boys than girls. It affects 30% of four-year-old children, 10% of six-year-olds and 3% of twelve-year-olds and is linked to a positive family history in 50% of cases. It fortunately often spontaneously resolves by adolescence.

There are two types of enuresis: nocturnal (nighttime) and diurnal (daytime). Nocturnal enuresis is much more common than diurnal enuresis. Each type can further be classified as either primary or secondary enuresis. **Primary enuresis** is urinary incontinence in a child who has never been continent. It is usually due to a developmental delay or a urologic abnormality. **Secondary enuresis** is a relapse of incontinence following at least a 6 month period of dryness, often associated with psychosomatic causes. Persistence of enuresis into adolescence or adulthood may reflect a variety of underlying conditions.

2. Etiology

There are multiple possible etiologies for enuresis that can be classified as neurogenic, anatomic and functional. Urinary incontinence results from any disruption in the normal voiding process. Neurogenic causes include congenital anomalies (e.g. meningomyelocele) and trauma to the central nervous system. These can both disrupt the normal innervations required for voiding. Children with an anatomical cause for their enuresis usually present with primary enuresis. Such anatomical abnormalities include obstruction of the bladder outlet (e.g.

posterior urethral valves) or a defect that bypasses the bladder outlet. Constipation can also cause an obstruction when there is a large dilated distal colon which impinges on the bladder. Finally, functional enuresis refers to dysfunctional voiding without a neurogenic or anatomic cause. This includes maturation delay, abnormal acquired toilet training habits and stress.

3. History

It should be noted that enuresis is a symptom, not a disease state. It is important to get a clear history of primary versus secondary enuresis. A careful history is crucial to develop your **differential diagnosis**.

An appropriate history for enuresis should include the following:

1. Onset: primary vs. secondary
2. Nocturnal vs. daytime
3. Frequency and severity (during daytime and nighttime)
 - a. number of episodes/night
 - b. number of nights/week
4. Urination pattern - dribbling, dysuria, hesitancy, urgency, quality of stream
5. Associated symptoms
 - a. Lower back pain
 - b. Abdominal pain
 - c. Bad dreams
6. Fluid intake and dietary habits
 - a. Caffeinated beverages
7. Past history of urinary tract infections
8. History of other medical problems (such as lower back CNS trauma, diabetes mellitus)
 - a. Children with diabetes insipidus, diabetes mellitus, and chronic renal disease may have a polyuria with a compensatory polydipsia.
9. History of stressful events (and other psychosocial history including abuse)
10. Medications and allergies
11. Developmental history
12. Family history of enuresis
13. Any treatments or techniques previously attempted to resolve enuresis
14. Detailed review of systems

4. Physical Examination

A complete physical examination should be performed. Start with observation of the child and parent to assess development as well as child-parent interactions. Then measure growth parameters, blood pressure and all other vital signs. Then

complete a full, systematic physical examination with special attention paid to the neurologic, abdominal and genitourinary systems. Abdominal examination should include palpation of the abdomen and bladder with a rectal examination after voiding to assess for chronic bladder distention and/or fecal impaction. Inspect and examine the child's genitalia to assess for any anatomical abnormalities. If there is a history of abnormal voiding, try to observe the child voiding to assess their stream. Carefully examine the child for neurologic and spinal abnormalities which includes close inspection and palpation of the lumbosacral area looking for any signs of tethered cord or meningocele.

5. Lab Investigations

Urinalysis and the specific gravity of urine should be obtained after an overnight fast and evaluated to exclude polyuria secondary to diabetes as a cause of frequency and incontinence and to determine if there is normal concentrating ability. Urine culture will determine the presence or absence of a urinary tract infection, which, when treated could improve continence. If daytime wetting is occurring, a renal and bladder ultrasound may help rule out possible outlet obstruction while spine imaging or MRI may determine if there is a neurological cause.

6. Differential Diagnosis

Although the most common cause of enuresis in childhood is functional and have no identified cause, you must always make a thorough differential diagnosis. Your differential should include:

- a. Unrecognized underlying medical disorders – such as diabetes mellitus, diabetes insipidus, hyperthyroidism, sickle cell disease
- b. Maturational/developmental delay
- c. Urinary tract infection
- d. Anatomical abnormality – including small bladder capacity
- e. Neurogenic – such as spinal dysraphism, detrusor instability
- f. Encopresis or constipation
- g. Familial – primary enuresis typically has a strong family history
- h. Sleep disorders – including obstructive sleep apnea
- i. Chronic renal failure
- j. Psychogenic polydipsia
- k. Psychological – typically secondary enuresis

7. Conclusion

In summary enuresis is very common in children and has a wide variety of underlying etiologies. It is important to do a complete history and physical examination plus any appropriate laboratory investigations including a urinalysis. Management includes treating any identified cause followed by conditioning therapy, pharmacotherapy and hypnotherapy. Fortunately, despite the lack of identifying a cause in the majority of children, enuresis resolves spontaneously by adolescence in most children.

8. References

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9. Acknowledgements

Written by: Leah Wittenburg

Edited by: Anne Marie Jekyll