



in association with



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VOIDING DISORDERS IN CHILDREN

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VOIDING DISORDERS IN CHILDREN

- ▶ The Bladder is an abdominal organ which functions to store and empty urine.

VOIDING DISORDERS IN CHILDREN

- ▶ Bladder wall has 3 layers:
 - Mucosa
 - Detrusor muscle – meshwork of smooth muscle fibres
 - Adventitia

VOIDING DISORDERS IN CHILDREN

- ▶ Detrusor muscle relaxes (compliance) to allow urine to fill the bladder.
- ▶ Micturition involves coordination of detrusor muscle contraction and bladder sphincter relaxation.

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- ▶ Micturition control mechanisms depend on
 - ▶ Intact neural pathway
 - ▶ Awareness of social norms
 - ▶ Gradual increase in functional bladder capacity
 - ▶ Maturation of Detrusor / Sphincter coordination
 - ▶ Development of voluntary control over the whole bladder sphincteric – perineal complex.

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- ▶ Normal Bladder Capacity (ml)
 - ▶ 25 mls/ year of life + 25 mls

VOIDING DISORDERS IN CHILDREN

▶ Classification of bladder dysfunction

□ Derangement of nervous system.

- Congenital Malformations – Myelomeningocele.
- Development Disturbances – Mental Retardation.
- Acquired Conditions – Cerebral Palsy, Spinal Cord injury .

VOIDING DISORDERS IN CHILDREN

▶ Classification of bladder dysfunction

□ Disorders of Detrusor and Sphincteric Muscle function.

- Congenital Conditions eg. Muscular dystrophy
- Acquired Conditions eg chronic bladder distension.

VOIDING DISORDERS IN CHILDREN

▶ Classification –

□ Structural Abnormalities

- Congenital conditions e.g. Prune belly, PUV
- Acquired conditions e.g. Traumatic stricture

VOIDING DISORDERS IN CHILDREN

- ▶ Voiding disorder / dysfunction describes a constellation of problems that interfere with efficient storage and evacuation of urine.

VOIDING DISORDERS IN CHILDREN

- ▶ Symptoms include:
 - ▶ Day and or night wetting
 - ▶ Urgency
 - ▶ Frequency
 - ▶ Urinary dribbling
 - ▶ Infrequent voiding
 - ▶ Weak or intermittent stream

VOIDING DISORDERS IN CHILDREN

- ▶ Prevalence – Age 4 – 10 years

- ▶ Female to Male 1.5 : 1

VOIDING DISORDERS IN CHILDREN

- ▶ Two Categories:

- ▶ Filling phase dysfunction

Detrusor hypertrophy → unstable contractions →
Incomplete emptying at bladder neck → altered
Closure of VUJ → VUR → infections

VOIDING DISORDERS IN CHILDREN

- ▶ Categories continued
 - ▶ Voiding Phase – Probably a learnt behaviour that results from child's attempt to suppress impending or actual bladder contractions by inappropriately contracting urethra and pelvic floor muscles rather than relaxing during voiding.

VOIDING DISORDERS IN CHILDREN

▶ Result –

Cycle of increased voiding pressure of detrusor sphincter dyssynergia that produces inefficient voiding

- ▶ Staccato voiding
- ▶ Frequency with small volumes

VOIDING DISORDERS IN CHILDREN

Overall Result

- ▶ Dysfunctional Voiding
- ▶ UTI
- ▶ VUR

VOIDING DISORDERS IN CHILDREN

▶ Symptoms - Review

- ▶ Children 4 years and older
- ▶ Diurnal enuresis
- ▶ Urgency
- ▶ Frequency
- ▶ Elevated post void residuals
- ▶ UTI

VOIDING DISORDERS IN CHILDREN

▶ Patient Evaluation

- ▶ History urinary and GIT symptoms important
- ▶ Onset and duration of symptoms
- ▶ Psychological profile

VOIDING DISORDERS IN CHILDREN

- ▶ Physical Examination
 - ▶ Look for developmental or anatomical Problems
 - ▶ Neurological examination
 - ▶ GU and GIT assessment – full bladder, soiling

VOIDING DISORDERS IN CHILDREN

- ▶ Investigations

Urinalysis and urine culture

- ▶ Treatment of UTI

- ▶ Urinary prophylaxis

VOIDING DISORDERS IN CHILDREN

- ▶ Investigations

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- ▶ Constipation
- ▶ Urolithiasis
- ▶ Spinal abnormalities

VOIDING DISORDERS IN CHILDREN

▶ Investigations

Abdomino pelvic ultrasounds

- ▶ Upper or lower tract abnormalities.
- ▶ Post void urine volume – 10% of expected capacity is significant.

VOIDING DISORDERS IN CHILDREN

- ▶ Voiding Cystourethrogram
 - ▶ VUR
 - ▶ Bladder trabeculation
 - ▶ Post void volume
 - ▶ Spinning top urethra
 - ▶ indicative of habitual high pressure voiding due to poor pelvic relaxation

SPINNING TOP URETHRA



VOIDING DISORDERS IN CHILDREN

▶ **URODYNAMIC studies** –

Measure the relationship between pressure and volume of the bladder.

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URODYNAMIC studies evaluate

- ▶ bladder filling
- ▶ detrusor activity
- ▶ rectal activity
- ▶ internal and external sphincteric activity
- ▶ urinary flow
- ▶ efficiency of emptying
- ▶ urinary leakage.

VOIDING DISORDERS IN CHILDREN

- ▶ Normal Bladder filling pressure <30 cm H₂O

VOIDING DISORDERS IN CHILDREN

- ▶ Children with

- ▶ Unstable filling phase

- ▶ Unstable voiding

} Pressure greater

} than 30 cm H₂O

VOIDING DISORDERS IN CHILDREN

- ▶ Treatment - Initially conservative
 - ▶ Combined with medical and behavioural management .

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Behavioural Management

- ▶ encourages socially acceptable behaviour
- ▶ reinforces desired behaviour

with a system of rewards

VOIDING DISORDERS IN CHILDREN

- ▶ Behavioural Management

- ▶ Diet and Fluids

- ▶ appropriate fluid intake

- ▶ avoid foods that are bladder irritants
e.g. Caffeine, chocolate, food colourings

VOIDING DISORDERS IN CHILDREN

- ▶ Behavioural Management

Toilet diaries

assess voiding patterns

VOIDING DISORDERS IN CHILDREN

- ▶ Timed Voiding
- ▶ Double Voiding

VOIDING DISORDERS IN CHILDREN

- ▶ Pelvic muscle retraining
 - ▶ **Kegel exercises**
 - ▶ contraction and relaxation of pelvic muscles.
 - ▶ **Biofeedback**

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Medical Management

▶ Pharmacologic Agents

- ▶ Detrusor Muscle (smooth muscle) relaxation.
- ▶ Bladder sphincter (striated muscle) relaxation.

VOIDING DISORDERS IN CHILDREN

- ▶ Detrusor Muscle Relaxation
 - ▶ **Antimuscarinic** drugs relax detrusor muscle
 - ▶ **Anticholinergic** drugs act on nerve terminals to block contractility of detrusor muscle
- ▶ The effective action of these 2 agents
 - ▶ promotes muscle relaxation → increased bladder capacity

eg: - Oxybutynin
 - Tolterodine

VOIDING DISORDERS IN CHILDREN

- ▶ α Adrenergic antagonists

- ▶ initiate smooth muscle relaxation of the bladder neck



- ▶ reduction of the bladder contractions
 - ▶ facilitation of smoother bladder emptying.

- ▶ e.g. - Terazosin

- ▶ - Doxazosin

VOIDING DISORDERS IN CHILDREN

- ▶ Tricyclic antidepressants exert a local anaesthetic effect on the bladder.



- ▶ Decreased detrusor contractility
- ▶ Increased outlet resistance
- ▶ Increased bladder capacity

e.g. Imipramine

VOIDING DISORDERS IN CHILDREN

▶ **Length of Treatment**

- ▶ 3 to 6 months on average.
- ▶ Up to 2 years if indicated.

VOIDING DISORDERS IN CHILDREN

▶ **Enuresis (Nocturnal)**

- ▶ Diagnosis made after age 5 years.
- ▶ Rule out UTI and anatomical abnormalities
- ▶ Fluid restriction
- ▶ Timed voiding at night
- ▶ Alarms
- ▶ Imipramine
- ▶ Desmopressin

VOIDING DISORDERS IN CHILDREN

▶ Summary 1

- ▶ Voiding dysfunction is a common problem
- ▶ Variety of symptoms
- ▶ Prone to UTI

VOIDING DISORDERS IN CHILDREN

▶ Summary 2

- ▶ Complete history and physical examination.
- ▶ Rule out anatomical or physiological causes.
- ▶ Successful management with behavioural and pharmacological therapies.