Non-Surgical Management of Neurogenic Bladders

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• The management of Neurogenic Bladders in children has undergone major changes over the years. The first milestone was the introduction of clean intermittent catheterization (CIC) in 1972.
• CIC (combined with anticholinergics if required) has made medical management a successful treatment option, with a good outcome for quality of life and kidney protection.
Non-Surgical Management

- Clean Intermittent Catheterization
- Medical therapy
  - employed to influence bladder function, sphincteric function or both.
Clean intermittent catheterisation (CIC)

- This is a process by which the bladder is drained several times daily with a catheter using a clean but non-sterile technique.
- Clean intermittent catheterisation
  - Improves bladder emptying
  - Reduces urinary leakage (wetting)
  - Reduces reflux thus protecting the kidneys from damage.
Clean intermittent catheterisation (CIC)

• In children with neurogenic bladder, CIC is the first-choice treatment to empty the bladder adequately and safely (prior to high-pressure voiding), and it is a valuable tool for achieving continence.

• Lapedes et al first popularized CIC in the early 70’s- he noticed with the use of CIC, trabeculated bladders became smooth, lesser incidence of UTI, higher success rates of surgical correction of VUR and renal deterioration of these patients did not worsen.
CIC

- The wide variety of used materials and techniques for CIC does not affect efficacy and safety as long as some basic principles are applied:
  - Proper education and training
  - Clean and atraumatic application
  - Achievement of a good patient compliance on a long-term basis
When to start CIC

• CIC has been successfully used by parents even in newborns
• Early institution of CIC in all infants with neurogenic bladder is preferred given the difficulties of starting CIC at toddler age. Most infants eventually get used to the CIC as a normal routine
• Such early institution of CIC seems to improve family compliance and their ability to assist the child in coping with their disease and with CIC
CIC

- CIC is performed 3-4 hrly when first initiated in an infant. Use of 8Fr pediatric feeding tube is the norm for infants, and as the child grows the catheter size is gradually increased.

- Eventually required frequency of catheterization depends on several factors: fluid intake, bladder capacity, and bladder filling/voiding pressures.

- In practice, it is recommended to catheterize six times a day in infants (linked with feeding time) and five times a day in school-aged children.
Urine is collected through a catheter.
Disadvantages of CIC

- Infections
- Strictures
- False tracts (in male children)

- CIC-related infection risks are variable but generally the risks are low as long as complete bladder emptying is achieved. These are easily treated with antibiotics.
- If symptomatic infections occur, these are mainly caused by incomplete bladder emptying, and CIC appliance by child or caregiver needs to be optimized.
To prevent urethral strictures and false passage (Esp in boys) catheter lubrication and avoidance of forceful manipulation during catheter insertion are advocated. Nonreusable low-friction catheters are considered valuable in high-risk male patients with urethral false passage or very tense sphincters.
Pharmacologic treatment: Anticholinergics (detrusor instability)

- Oxybutynin hydrochloride is most commonly used anticholinergic. Long-term experience supports its safety in newborns and infants.
- Oxybutynin is a tertiary amine with a well-documented therapeutic effect on detrusor hyperactivity, and its effectiveness is attributed to a combination of anticholinergic (M3-selective receptor subtype antagonism), antispasmodic, local anesthetic and calcium-channel-blocking activity.
Oxybutynin

- In children with insufficient response or significant systemic side effects to oral oxybutynin, intravesical instillation of oxybutynin has been shown to be a highly efficacious, reliable, and well-tolerated option.
- Crushed 5mg oxybutynin tablets are suspended in normal saline and inserted 2-3 times daily - it has a higher tissue concentration and better efficacy.
- However, due to problems of inconvenience and impracticability, there is a higher rate of poor patient compliance.
Combination of Oxybutinin and CIC

• Up to (~ 90%) of patients can be treated successfully with the gold standard treatment of oxybutynin (oral or intravesical) and CIC.

• Early experience have shown up to 75% of patients can become completely dry.
Side effects of Oxybutinin

- High rate of side effects (up to 57%)
- Include
  - Dry mouth
  - Flushing
  - Constipation
  - Drowsiness
  - Blurred vision
Other bladder-relaxant drugs

- Propiverine (10–15 mg in divided doses -b.i.d. or t.i.d.,)
- Tolterodine (children 0.25–1 mg b.i.d)
  Has not been approved by the FDA
A recent study-261 pediatric patients, Alloussi et al

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<thead>
<tr>
<th></th>
<th>Propiverine</th>
<th>Oxybutynin</th>
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<tbody>
<tr>
<td></td>
<td>Pre treatment</td>
<td>Post treatment</td>
</tr>
<tr>
<td>Continence (%)</td>
<td>0</td>
<td>61.6</td>
</tr>
<tr>
<td>Incontinence episodes/week</td>
<td>6.2</td>
<td>1.8</td>
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<tr>
<td>Micturition Frequency/day</td>
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<td>6.6</td>
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<tr>
<td>Dosage/day (mg)</td>
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<tr>
<td>Dosage (mg/kg body weight/day)</td>
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<tr>
<td>Final assessment of investigators (continent improved) (%)</td>
<td>-</td>
<td>82.6</td>
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Conclusion

- Medical management with CIC and anticholinergics is effective in preserving renal function and providing safe urinary continence in more than 90% of patients with a neurogenic bladder.
- Early diagnosis and treatment institution, long before continence becomes an issue at toddler age, can prevent both renal damage and secondary bladder-wall changes, thereby improving long-term outcomes.
• However some children continue to have significant incontinence despite maximal medical therapy.
• In these patients surgical mx has to be considered
Thank You

Further reading and references from AUA update Series 2007 volume 26 lesson 17 and 18