W29: Clean Intermittent Catheterization in Children and Adult — from Basic to Clinical Application

Workshop Chair: Jian Guo Wen, China
20 September 2025 16:00 - 17:30

Start	End	Topic	Speakers
16:00	16:05	Introduction of the workshop and speakers	Jian Guo Wen
16:05	16:20	Preparation for CIC (special anatomy different between male and female, especially for children), indication and contraindications for CIC	Tufan Tarcan
16:20	16:35	Special of CIC procedures in children and adults as well as follow up	Giovanni Mosiello
16:35	16:45	The role of nursing to guarantee successful CIC in children and adults	Jane Clarke
16:45	17:00	Morning/evening or part time CIC and application of UDS in guiding the CIC	Jian Guo Wen
17:00	17:15	Diagnosis and treatment of complications of CIC	John Heesakkers
17:15	17:25	Questions	All
17:25	17:30	Summary	John Heesakkers

Description

Background Information:

Clean Intermittent Catheterization (CIC) is an essential method for managing bladder emptying in children with neurogenic or non-neurogenic bladder dysfunction. It helps reduce risks such as vesicoureteral reflux, hydronephrosis, urinary tract infections (UTIs), and renal damage. Despite its widespread use, standardized protocols for CIC in children remain insufficient, leading to variations in practice and potential complications. This workshop is designed to provide healthcare professionals with a comprehensive understanding of CIC for children and dultapediatric patients, including indications, techniques, complications, and management strategies. It will focus on the latest consensus guidelines for CIC, the importance of early initiation, and the development of individualized protocols based on age, condition, and bladder function.

CIC is a critical intervention in managing bladder emptying disorders, encompassing both complete and partial approaches to meet the diverse needs of patients. Complete CIC is employed when patients entirely depend on catheterization to empty the bladder, typically performed 5-7 times daily, significantly reducing risks such as hydronephrosis, renal damage, and bladder calculi. In contrast, partial CIC is suited for individuals who retain some bladder voiding ability but require intermittent catheterization, often once or twice daily, to alleviate symptoms like enuresis and recurrent UTIs associated with increased post-void residual (PVR) volumes. CIC has been proven effective in preventing bladder over-distension, improving compliance, enhancing blood flow to the bladder wall, and reducing the incidence of infections, thereby supporting bladder function restoration and improving quality of life.

CIC is indicated for those with increased PVR with potential associated symptoms and/or complications of day and nighttime incontinence, urgency & urge incontinence from incomplete emptying, recurrent UTI, bladder calculi, hydronephrosis and vesicoureteral reflux.

It has been demonstrated that life-long CIC is a mainstay in the management of NBD which has resulted in significant improvement in outcomes (e.g., reduction in VUR, hydroureteronephrosis, and renal compromise). Additionally, CIC can be used as an adjunct to sacral neuromodulation and botulinum toxin injections into the bladder for neurogenic bladder dysfunction. For those who are able to void partially, but have PVR induced significant symptoms (frequency, urgency, and enuresis, etc.), part-time CIC (morning and evening CIC) should be considered. These patients are encouraged to increase the voiding frequency during the daytime.

CIC requires knowledge of the urethra and bladder anatomy, lower urinary tract function, and safe bladder capacity (SBC). The anatomy of the urethra differs by gender and age, with boys having two bends and three narrowings in their urethra. Special care must be taken for uncircumcised boys with phimosis or girls with labial adhesions, as these may hinder catheterization. The bladder's primary function is urine storage, with expected bladder capacity (EBC) increasing with age. Urodynamic studies (UDS) can help determine safe catheterization intervals and SBC by measuring bladder capacity and detrusor pressure. Controversy remains over the threshold of bladder filling pressures (over 20 cmH2O) as a predictor of upper urinary tract damage. UDS should be performed to determine SBC and PVR before initiating regular CIC. The catheterization/voiding diary (VD/CD) and UDS are useful tools to assess bladder function and guide catheterization frequency. The VD/CD records fluid intake, voiding volume, catheterization volume, and any urinary symptoms over a 48-hour period. UDS results help adjust the frequency of CIC to match the SBC. VUDS can also assess the presence of vesicoureteral reflux (VUR), bladder diverticula, urethral strictures, and other bladder issues. Catheters used for CIC vary in material, size, and coating. Hydrophilic-coated catheters, which form a lubricating film when exposed to water, are commonly used. Silicone and PVC catheters are preferred due to their biocompatibility and reduced risk of irritation, while latex catheters should be avoided due to allergic reactions. In China, disposable PVC catheters

are often used due to their low cost. Catheters suitable for children range in size from 5-12Fr, with the length varying based on gender and age. Boys generally require longer catheters than girls. The choice of catheter size should start with the smallest size and be adjusted based on the child's needs. Lubricants such as gel or aqueous solvents are used to reduce discomfort and improve ease of insertion. Hydrophilic-coated catheters are recommended for their reduced risk of urinary tract infections and urethral injury, significantly improving patient comfort and quality of life.

Catheterization in children with neurogenic bladder dysfunction (NBD) should be performed based on the patient's symptoms and bladder function, with the goal of achieving complete bladder emptying. Guidelines suggest catheterization should be done when the urine volume does not exceed the patient's safe bladder capacity (SBC), typically 4-6 times per day, and may be extended as the post-void residual (PVR) decreases. Early initiation of catheterization is critical, with evidence supporting early self-catheterization in children to reduce the risk of complications such as incontinence and urinary tract infections (UTI).

Complications from catheterization may include urethral issues, UTIs, and bladder-related concerns. Urethral complications, especially in boys, can result from trauma, stricture, or infection and are often linked to improper catheterization techniques or unlubricated catheters. UTI is a common complication and can arise from improper catheterization or biofilm formation on the catheter, which may harbor bacteria and lead to infections. Prophylactic antibiotics are not always effective in reducing UTIs and can lead to antibiotic resistance, but bladder irrigation and cranberry products may help reduce infection rates. Pain and discomfort during catheterization are common, especially in the early stages, and can be alleviated with proper lubrication. Bladder-related complications, such as hematuria and bladder stones, may occur, particularly with long-term catheter use. Scrotal complications like epididymitis can also develop in some boys. Standardized procedures for catheterization and regular follow-up are essential to minimizing risks and ensuring successful outcomes. Special attention should be given to maintaining complete bladder emptying with each catheterization and promoting good hygiene practices to prevent complications. Additionally, dietary measures such as cranberry juice or Lactobacillus supplements can help prevent UTIs. Early intervention, individualized catheterization protocols, and consistent healthcare support are critical for the success of CIC in children.

Clinical advocacy and follow-up are key to the success ofCIC in children. Healthcare professionals must provide education to both children and caregivers before initiating CIC, ensuring understanding through age-appropriate materials. The focus is on building compliance and reducing fears, with healthcare providers explaining urinary tract anatomy, CIC techniques, and the reasons for its necessity. Factors influencing adherence include age, gender, urethral sensitivity, pain, dexterity, mobility, and general health status. Although studies have not conclusively identified the most influential factors, education, such as videos and detailed discussions, can improve patient and caregiver understanding, dispelling fear and reluctance. For children learning self-CIC, it is crucial to offer tailored guidance and motivation while minimizing complications. Psychological support is vital for addressing emotional challenges linked to CIC, which can impact both patients and families. Regular follow-up is essential, especially for those with inadequate hand function, as CIC should be continued with caregiver support. Initial follow-up should include urinalysis and renal ultrasound, with ongoing monitoring at intervals of 6 months or as needed. Over time, bladder function may change, and biofeedback or voiding training may be incorporated to reduce reliance on CIC. The success of CIC is dependent on a collaborative approach involving healthcare providers, caregivers, and the child, ensuring personalized care and education. Regular follow-ups and evaluation of treatment outcomes are necessary to maintain long-term compliance and address complications.

In conclusion, CIC is an effective method of emptying the bladder in cases with NB and other conditions. Some patients may require lifelong CIC to empty the bladder and protect the upper urinary tract. UDS to determine the PVR and SBC in conjunction with VD/CD is an objective basis for adjusting the frequency of catheterization and for determining whether to continue catheterization. Standardized practice of CIC can minimize complications. CIC in children has its own special characteristics, requiring clinicians and nurses to pay specific attention to CIC education and follow-up, to help children and their caregivers to conduct scientific CIC, to gain time for the development of the child's bladder function.

Key Learning Points:

1.Preparation for CIC (special anatomy different between male and female, especially for children), indication and contraindications for CIC (by Tufan Tarcan)

To learn how to prepare for CIC including familiar to the knowledge of anatomy and function of bladder and urethra, different catheters used for CIC, as well as to know the indications and contraindications for CIC, especially, the specialty in preparation for CIC in children.

2.CIC procedures in children and their education and follow up (By Giovanni Mosiello)

(1)To learn the standardized techniques for performing CIC and how to ensure hygiene and minimize trauma during catheterization.

(2)The practice of clinical advocacy and patient education in ensuring successful CIC, including how to support families in performing and transitioning to self-catheterization.

(3)Follow-Up and Long-Term Management including adjusting catheterization protocols based on the changes of bladder function and urodynamics monitoring.

3. The role of nursing in guarantee the successful CIC in children and adult. (by Jane Clarke)

4.Morning/evening (part time) CIC, the role of UDS/CIC diary in guiding CIC.
(by Jian Guo Wen)

To understand the concepts of morning/evening or part time CIC, and the role of urodynamic studies (UDS) and voiding/CIC diary in guiding CIC frequency.

5.Diagnosis and treatment of complications and Management of CIC (by John Heesakkers)

To identify common complications associated with CIC, such as UTI, meatitis, urethritis, urethral stricture, haematuria, urethral false passage and bladder stones.

Take Home Messages
1.CIC is a safe and effective method for managing bladder emptying in patients with bladder emptying difficult and indued related low urinary tract symptoms. Children.
2.Early initiation of CIC, personalized to the child's bladder function, significantly improves clinical outcomes and reduces the risk of upper urinary tract damage. The practice of clinical advocacy and patient education as well as follow up is important for ensuring successful CIC.
3.Morning/evening or part time CIC are encouraged for cases with partially voiding function, which might increase of quality of like in those cases. UDS and voiding/CIC diary played an important role in guiding the CIC frequency.
4.The most common complications associated with CIC is UTI, meatitis, urethritis. Early diagnose and treatment is import in control complications of CIC

Additional References:
Jian-guo Wen, Editor. Progress in Clean Intermittent Catheterization[M]. First edition. Springer Nature,2024. (https://link.springer.com/book/10.1007/978-981-97-5021-4)
Editors: Mosiello, G., Del Popolo, G., Wen, J.G., De Gennaro, M. (Eds.). Clinical Urodynamics in Childhood and Adolescence[M]. First edition. Cham, Switzerland: Springer International Publishing AG,2018 (https://www.springer.com/us/book/9783319421919）
J. Lapides, A.C. Diokno, S.J. Silber, B.S. Lowe, Clean, Intermittent Self-Catheterization in the Treatment of Urinary Tract Disease, J Urol, 197 (2017) S122-s124.
M. Le Danseur, S.E. Stutzman, J. Wilson, I. Sislak, D.W.M. Olson, Is the CABIC Clean Intermittent Catheterization Patient Education Effective?, Rehabil Nurs, 43 (2018) 40-45.
J. Groen, J. Pannek, D. Castro Diaz, G. Del Popolo, T. Gross, R. Hamid, G. Karsenty, T.M. Kessler, M. Schneider, L. t Hoen, B. Blok, Summary of European Association of Urology (EAU) Guidelines on Neuro-Urology, Eur Urol, 69 (2016) 324-333.
R. Stein, G. Bogaert, H.S. Dogan, L. Hoen, R. Kocvara, R.J.M. Nijman, J. Quaedackers, Y.F. Rawashdeh, M.S. Silay, S. Tekgul, C. Radmayr, EAU/ESPU guidelines on the management of neurogenic bladder in children and adolescent part II operative management, Neurourol Urodyn, 39 (2020) 498-506.
C. Chapple, P. Abrams, T. Lam, A. Mangera, M. Belal, C. Curtis, J. Emkes, S. Hillery, K. Irwin, K. Logan, P. Weston, A. Yates, A consensus statement on when to start clean intermittent self-catheterization: An untapped resource?, Neurourol Urodyn, 43 (2024) 459-463.
J. Liu, Y. Bi, Y. Liu, L. Tang, A. Wang, Value of sufficient clean intermittent catheterization in urinary tract infection and upper urinary tract protection in children with neurogenic bladder, J Pediatr Urol, 18 (2022) 499.e491-499.e496.
C. Sager, U. Barroso, Jr., J.M.N. Bastos, G. Retamal, E. Ormaechea, Management of neurogenic bladder dysfunction in children update and recommendations on medical treatment, Int Braz J Urol, 48 (2022) 31-51.

Aims of Workshop

Clean intermittent catheterization (CIC) is an effective method to help patients with neurogenic bladder dysfunction and other disorders that cause difficulty in urination, to empty their bladder and reduce the risk of upper urinary tract damage. This workshop provides healthcare professionals with a comprehensive overview of CIC, emphasizing basic knowledge, standardized procedures, part time CIC (morning and evening CIC) in patients with LUTS related to PVR increase, the role of UDS in making detail protocol of CIC individually.

Educational Objectives

This workshop will provide participants with a comprehensive understanding of Clean Intermittent Catheterization (CIC), a crucial intervention for children with bladder empting dysfunction. Audiances will engage with experts through case presentation and discussions, demonstrations on proper CIC techniques, its indications, and related complications. By learning how to customize CIC protocols based on age, anatomical considerations, and urodynamic data, audiances will implement evidence-based practices in clinical settings in their practice. The knowledge will be translated into improved patient care, reduced complications, and enhanced quality of life for patients with neurogenic and non-neurogenic bladder empting dysfunction.
(1)Explanation of Engagement and Interaction: audiances will actively engage with the faculty through interactive discussions, real-life case studies, and hands-on demonstrations of proper CIC techniques in slides or video. This participatory approach ensures delegates fully understand the clinical, anatomical, and practical aspects of CIC in children and adult.
(2)Justification of the Workshop Outline: The workshop focuses on the comprehensive application of CIC, addressing its indications, contraindications, procedural techniques, and complications. By covering both theoretical knowledge and practical skills, it ensures that delegates are equipped to apply CIC protocols safely and effectively in their clinical practice.
(3)Translation to Clinical Practice: The knowledge shared in this workshop will empower delegates to enhance patient management by implementing CIC safely and efficiently. This includes personalized catheterization schedules, minimizing complications, and improving patient outcomes through tailored approaches based on urodynamic assessments and bladder function.

Learning Objectives

1. To learn the basic knowledge on bladder and urethral morphology and function as well as the standard procedure of CIC, special CIC stratagem of morning and evening CIC in patients who are able to void partially but with significant increase in PVR that related to LUTS (enuresis, frequency and incontinence, etc).
2. To learn how to use CIC diary and urodynamic study to guide the CIC (determining the interval of cauterization and when begin to start part time CIC or end the CIC).
3. To learn how to prevent, diagnose and treat the CIC complication, especially the CIC related urinary tract infection.

Target Audience

Urology, Urogynaecology and Female & Functional Urology, Conservative Management

Advanced/Basic

Advanced

Suggested Learning before Workshop Attendance

1. Jian-guo Wen, Editor. Progress in Clean Intermittent Catheterization[M]. First edition. Springer Nature,2024. (https://link.springer.com/book/10.1007/978-981-97-5021-4)
2. Editors: Mosiello, G., Del Popolo, G., Wen, J.G., De Gennaro, M. (Eds.). Clinical Urodynamics in Childhood and Adolescence[M]. First edition. Cham, Switzerland: Springer International Publishing AG,2018 (https://www.springer.com/us/book/9783319421919)
3. M. Le Danseur, S.E. Stutzman, J. Wilson, I. Sislak, D.W.M. Olson, Is the CABIC Clean Intermittent Catheterization Patient Education Effective?, Rehabil Nurs, 43 (2018) 40-45.
4. R. Stein, G. Bogaert, H.S. Dogan, L. Hoen, R. Kocvara, R.J.M. Nijman, J. Quaedackers, Y.F. Rawashdeh, M.S. Silay, S. Tekgul, C. Radmayr, EAU/ESPU guidelines on the management of neurogenic bladder in children and adolescent part II operative management, Neurourol Urodyn, 39 (2020) 498-506.
5. C. Chapple, P. Abrams, T. Lam, A. Mangera, M. Belal, C. Curtis, J. Emkes, S. Hillery, K. Irwin, K. Logan, P. Weston, A. Yates, A consensus statement on when to start clean intermittent self-catheterization: An untapped resource? Neurourol Urodyn, 43 (2024) 459-463.
6. J. Liu, Y. Bi, Y. Liu, L. Tang, A. Wang, Value of sufficient clean intermittent catheterization in urinary tract infection and upper urinary tract protection in children with neurogenic bladder, J Pediatr Urol, 18 (2022) 499.e491-499.e496.