W9: Neurourological Surgical Tips and Tricks: Meet the Experts

Workshop Chair: Melissa Davies, United Kingdom
12 September 2017 09:00 - 10:30

Start	End	Topic	Speakers
09:00	09:05	Introduction	Melissa Davies
09:05	09:20	Sphincterotomies	Rizwan Hamid
09:20	09:35	Sacral Neuromodulation	Magdy Hassouna
09:35	09:50	Enterocystoplasties	Melissa Davies
09:50	10:05	Stress urinary incontinence management in neurogenic males: artificial urinary sphincter	Juan Castano
10:05	10:20	Urinary diversion: ileal conduit	Rizwan Hamid
10:20	10:30	Techniques for tubes for continent cutaneous diversion	Juan Castano

Speaker Powerpoint Slides
Please note that where authorised by the speaker all PowerPoint slides presented at the workshop will be made available after the meeting via the ICS website www.ics.org/2017/programme Please do not film or photograph the slides during the workshop as this is distracting for the speakers.

Aims of Workshop
This course is part of the MOOC (Massive Online Open Course) project of the neurourology promotion committee. During 90 minutes, 6 12 minutes talks will be provided aimed to focus on surgical techniques dedicated to management of voiding disorders for neurologic diseases. This course will be the start of a whole programme of the committee to produce videos (teaching) and at the final step an atlas for surgery in neurourology.

Learning Objectives
- Describe tips and tricks of each of 6 selected surgical techniques specifically dedicated to neurourology.
- Explain which are the main indications for each.
- Give a quick general description of the main principle of management of patients who may be candidates and summarise the best and recommended follow-up.

Learning Outcomes
After the course, the attendees will be able to know how experts are used to perform these techniques to improve their patient's selection and to be informed about some tips and tricks.

Target Audience
Surgeons, urologists, fellows and residents for urology, rehabilitation physician who want to know more about surgeries for their patients.

Advanced/Basic
Basic.

Conditions for Learning
This will be an interactive course and some videos for techniques may be provided by speakers. This will be a very interactive course made by the top speakers in this field issued from the NU promotion committee.

Suggested Learning before Workshop Attendance
ICI report 2013 (2016 if available), EAU and AUA guidelines.

Suggested Reading
Speakers will list them all along their talks.

Sphincterotomies
Rizwan Hamid

External Sphincterotomy

In the context of a neuropathic bladder, this is generally performed to overcome DSD. It is thought that if left untreated DSD leads to a complication rate of 50% including urosepsis, hydronephrosis, stones and reflux, which can all lead to deterioration of renal function (1). External sphincterotomy is the gold standard for treating DSD. This can be performed in a staged fashion to

reduce outlet resistance (2). Quite often this has to be repeated at regular intervals but is generally effective. The complications include sepsis, bleeding and erectile dysfunction (3). A bladder neck incision might be necessary later on to overcome bladder neck dysnergia.

Urethral Stents

Urethral Stents have been used to overcome DSD. The 2 main types are Memokath (temporary) and Urolume (permanent). They are both potentially reversible and require a shorter hospital stay (4) with comparable results to sphincterotomy. The potential complications are migration, encrustation, blockage, bladder neck dyssynergia and incomplete emptying with development of AD (5,6). A memokath stent can be inserted through a Urolume to overcome bladder neck dyssynergia if needed (figure below).

Figure: A memokath stent inserted through a Urolume

Botulinum toxin A

Lately, Botox injections have been used to treat DSD where dyssynergia is abolished for few months and the treatment has to be repeated but with minimal side effects (7)

References

1 - Kaplan SA, Chancellor MB, Blaivas JG. Bladder and sphincter behaviour in patients with spinal cord injury. J Urol;1991:146;113.

2 - Madersbacher H, Wyndaele JJ, Igawa Y, Chancellor M, Chartier-Kastler E, Kovindha A. Conservative management in neuropatic urinary incontinence. In: Incontinence, 2nd edn. Abrams P, Khoury S, Wein A, eds. Plymouth: Health Publication, 2002; pp. 697-754.

3 - Stöhrer M, Kramer G, Löchner-Ernst D, Goepel M, Noll F, Rübben H. Diagnosis and treatment of bladder dysfunction in spinal cord injury patients. Eur Urol Update Series 1994;3:170-5.

4 - Seoane-Rodríguez S, Sánchez R-Losada J, Montoto-Marqués A, Salvador-de la Barrera S, Ferreiro- Velasco ME, Alvarez-Castelo L, Balsa-Mosquera B, Rodríguez-Sotillo A. Long-term follow-up study of intraurethral stents in spinal cord injured patients with detrusor-sphincter dyssynergia. Spinal Cord 2007;45:621-6

5 – Low AI, McRae PJ. Use of the Memokath for detrusor-sphincter dyssynergia after spinal cord injury--a cautionary tale. Spinal Cord. 1998 ;36:39-44

6 - Hamid R, Arya M, Patel HR, Shah PJ. The mesh wallstent in the treatment of detrusor external sphincter dyssynergia in men with spinal cord injury: a 12-year follow-up. BJU Int. 2003;91:51-3.

7 - Phelan MW, Franks M, Somogyi GT, Yokoyama T, Fraser MO, Lavelle JP, Yoshimura N, Chancellor MB. Botulinum toxin urethral sphincter injection to restore bladder emptying in men and women with voiding dysfunction. J Urol. 2001;165:1107-10

Sacral Neuromodulation

Magdy Hassouna

The US Food and Drug Administration approved sacral neuromodulation (SNM) in 1997 for treatment of intractable urge incontinence and in 1999 for urgency/frequency and non-obstructive urinary retention not responding to conservative

treatment. In 2011, the FDA approved SNM for chronic fecal incontinence in patients who had failed conservative treatment. Off label use of neuromodulation has been used successfully in patients with interstitial cystitis/painful bladder syndrome and neurogenic detrusor overactivity.

The exact working mechanism of SNM is not yet fully understood, SNM probably has an impact one or more neuronal reflexes : by inhibiting the spinal tract neurons involved in the micturition reflex as well as the neurons involved in spinal segmental reflexes.

Screening test is performed before the SNM implantation to assess the clinical effect of SNM. This can be one-stage or two-stage implantation. One-Stage Implantation, The percutaneous nerve evaluation (PNE) test which is done under local anesthesia involves a non-anchored test lead placed into the S3 foramen and connected to an external stimulator. The test period extends between 5 and 7 days. The procedure is done bilaterally by stimulating the S3 sacral nerves on each side to elicit the desirable response of tingling or vibration like sensation at the pelvic floor (rectum/vagina/scrotum) and big toe dorsiflexion. . After the test period, the patient can be evaluated in the clinic for 50% or more subjective and/or objective response using voiding diary. The overall response rate for PNE is about 55%. Lead migration is considered the main factor leading false negative result. If the patient has the desirable response, he or she will undergo the permanent implantation of the tined lead and internal pulse generator (IPG) under general anesthesia. In patients with doubtful PNEs test result, a two-stage implant is suggested to increase the yield of screening patients to 70 % for a permanent implant. Two-Stage Implantation, The quadripolar permanent lead is usually placed into the S3 foramen under general anesthesia, correct positioning is guided with fluoroscopy, and the lead is subcutaneously tunneled and connected subcutaneously to a temporary extension lead that exits the skin and is connected to an external pulse generator. This procedure enables test periods of up to 2 to 4 weeks used to determine which patient meets the criteria to have the permanent implant if he is a good candidate for the therapy based on the response in the voiding diary. If the patient has a good response, the present lead is connected to an IPG. This procedure is done under local anesthesia in the buttocks area subcutaneously. Because of the decreased risk of migration and the longer test duration, this test has a higher response rate.

Schmidt et al showed a success rate of 76% in urgency urinary incontinence. Jonas et al. showed that 69% of the treatment group was off clean intermittent catheterization in Non obstructive urinary retention. Several studies showed results of about 83% improvement in continence rates in patients with neurogenic bladder dysfunction.

No major or life-threatening complications have been encountered with SNM.

Enterocystoplasties
Melissa Davies

Enterocystoplasty, often referred to as Clam cystoplasty is a bladder augmentation technique frequently utilized in the management of neurogenic detrusor overactivity. The basic premise of the technique relies upon a segment of gastrointestinal tract being interposed into a divided bladder to increase capacity, provide safe storage pressures, eliminate vesicoureteric reflux and eliminate incontinence. Alternative therapies will be examined and considered.

The pre-operative work up and post-operative management of these patients are key in the successful outcomes of this technique. It would be advised that all patients being considered for this technique undergo assessment with videourodynamics and cystoscopy. It is not unusual to have to undertake concomitant surgery including mitrofanoff formation, continence surgery including implantation of an artificial urinary sphincter. Full consideration will be given to the role these additional surgeries have in the management of these complex patients.

Any segment of the gastrointestinal tract may be utilized however in reality the ileum is the most common choice , the alternatives will be covered in this talk. The surgical procedure involves bladder mobilization, bowel segment isolation and anastomosis of the bowel patch onto the bladder. Tips and advice on improving technique and common pitfalls to avoid will be covered.

Post-operatively these patients are best managed on a specialist urology ward or spinal injuries unit. The post-operative care will need to be tailor to the individual but there are some common aspects of care that will be covered in this talk.

The long-term follow up of these individuals is essential and a recommended regime of follow-up will be discussed.

Stress urinary incontinence management in neurogenic males: artificial urinary sphincter
Juan Castaño

Patients with spinal cord lesions below the level of the sacral micturition centre commonly experience weakness of the urinary sphincter leading to the development of neurogenic stress urinary incontinence (NSUI). In addition, NSUI due to sphincteric insufficiency affects 68% of school age children with spina bífida. Along with the preservation of kidney function and avoiding

some other complications as urinary tract infections, treatment of urinary incontinence is a keypoint in the integral management of neurogenic conditions associated with lower urinary tract dysfunction.

Artificial urinary sphincter (AUS) implantation between other options (slings, bladder neck reconstruction, etc) has been used , as in non neurogenic patients AUS has demostrated the best results but with higher surgical revision rates due to specific conditions such as need of catheterization and lack of sensation for this reason the pre-operative work- up must be more precise and urodynamics and videourodynamics should be performed for a better technique selection.

Bladder neck cuff implantation, concomitant bladder augmentation and other important aspects will be disscused during this talk, pitfalls and troubleshooting. Post-operative follow up, special patient training to reduce the risk of failures and complications.

Techniques for tubes for continent cutaneous diversion
Juan Castaño

When the ability to void spontaneously is compromised clean intermitent catheterization its the first option, although clean intermittent catheterization (CIC) and pharmacological treatment has changed the natural history of most of these uropathies it is not always posible in situations such as urethral strictures, lack of dexterity, female patients bound to a wheel chair etc.

The creation of a continent catheterizable conduit was initially described by Mitrofanoff, using the appendix as a catheterizable stoma. Although the appendix is the most popular channel, numerous other options have been reported. In cases when the appendix is absent, too short or has evidence of luminal stenosis, the search for an alternative is imperative. The Monti procedure consists of using a small segment of bowel (usually ileum) to create an efferent tube. To date, Monti´s technique is considered the substitute of choice of the appendix for the Mitrofanoff principle. The indications, advantages and disadvantages of each technique will be discussed.

The continence mechanism of the tube is one of the topics to conssider in this lecture, Simple and reproducible techniques such as the incorporation of the efferent segment into the pouch Wall (appendix stoma, flap-valve T mechanism, serosa lined extramural tunnel) have been developed for creating a continence mechanism.

Sphincterotomies

Rizwan Hamid FRCSEd, FRCS(Urol), MD(Res)
Consultant Urological Surgeon
London Spinal Injuries Unit, Stanmore &
University College London Hospitals

Rizwan Hamid

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Affiliations to disclose†:

Allergan
Astellas
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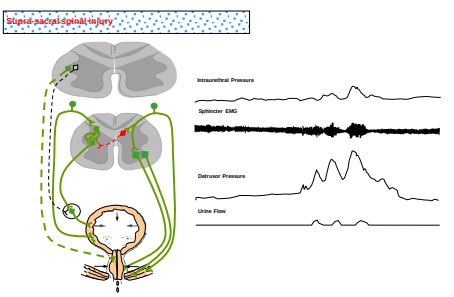
Introduction

- What is detrusor sphincter dyssynergia
- Why treat
- Management options
- How to select the appropriate patient
- Techniques & Comparisons
- Conclusions

What is DSD

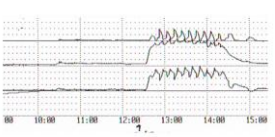


Why Treat DSD

The Pressures are high

The Bladder is obstructed by external sphincter dyssynergia

The Duration of contraction is long



Why treat – Complications

- Incomplete bladder emptying
- Automonic symptoms
- Urinary tract infection
- Lithiasis
- VUR / obstruction
- Upper tract damage - scarring

Management options for DSD

- Clean intermittent catheterisation
- Permanent catheterisation (suprapubic)
- **External sphincterotomy or stenting**
- Posterior root rhizotomy
- Supravesical Urinary diversion

Sphincter Dyssynergia - Procedures

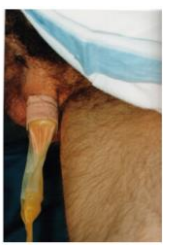
- External striated sphincterotomy
- Botox to the sphincter
- Permanent stenting
- Temporary stenting

Sphincter Dyssynergia - Considerations

- Age of patient
- Level and degree of disability
- Patients needs and desires
- Urodynamic information
- Urgency of treatment

Choose the appropriate patient

- Can the patient accept a condom drainage
- Does the condom stay on without penile retraction
- Does the condom cause skin reaction
- How disabled is the patient
- Is a condom better than a SP catheter



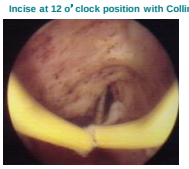
External Striated Sphincterotomy

- Most established technique
- 70 – 90% success rate
- Bleeding (clot retention) – occasionally needing transfusion
- Severe infection
- Impotence 7%
- Reoperation (30 - 60%)
- Laser sphincterotomy has better results
- Not done often now – irreversible

Barbalat Y, Rutman, Urology;2016:90:3-7

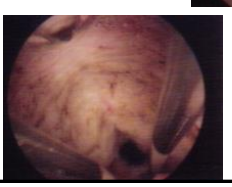
External Striated Sphincterotomy

Incise at 12 o' clock position with Collin's knife



incision beginning at the level of the proximal part of the verumontanum and ending in corpus spongiosum of bulb

Place an irrigating catheter as bleeding can be a problem afterwards



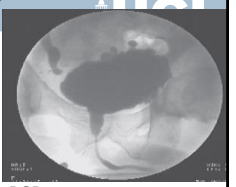
Ensure urine free of infection and give prophylactic anitbiotics

Efficacy of Sphincterotomy

- Effective in curing reflux in 75% of the patients
- Febrile and recurrent UTIs resolved in 74%-77%
- Autonomic dysreflexia resolved in 93% - 100%
- Mean residual urine volume improves by 50%

Barbalat Y, Rutman, Urology;2016:90:3-7

Failure of Sphincterotomy



- Persistence of hydronephrosis or VUR
- Continued recurrent urinary infection
- Autonomic dysreflexia

The reasons for failure may be

- inadequate sphincterotomy with persistent DSD
- impaired detrusor contractility resulting in poor
- bladder emptying and thus persistent UTIs

Management of failed sphincterotomy consists of

Repeat sphincterotomy or catheter drainage.

Persistent obstruction due to bladder neck obstruction can be managed by a trial of alpha adrenergic blocking drugs or by bladder neck incision or resection

Barbalat Y, Rutman, Urology;2016:90:3-7

Laser Sphincterotomy

- Blood loss is less than 50 mL in 97.4% of patients
- No blood transfusions generally required
- 92% had adequate voiding
- Minimal to absent autonomic dysreflexia
- 12 months of follow-up - mean voiding pressure had fallen from 87 to 47 cm H2 O and residual urine volume from 122 to 33 mL
- Recurrent sphincter obstruction at 12 months - 14%

Botulinum toxin to External Sphincter

- First Application by Dykstra in 1988
- Action in striated muscle has extensively been investigated
- Blocks the presynaptic release of Ach and
- Leads to chemo-denervation
- Reduces the tone of external sphincter
- EMG in original report confirms the decrease in maximum urethral pressure

Eldred-Evans D, Dasgupta P, Translational Andrology and urology. 2017;6:234-251

Technique of injection

- Not standardised
- Transurethral, perineal, paraurethral with or without EMG & USS
- Efficacy seems to be same and is determined by operator
- Transurethral common with scope under direct visual control
- GA or spinal
- Dose: Ona 50-200U; Abo 150U
- Mixed with 2-4 mls saline
- 1cm depth
- 4 sites – 3,6,9 & 12

Eldred-Evans D, Dasgupta P, Translational Andrology and urology. 2017;6:234-251

Efficacy of Botulinum toxin

Dykstra *et al.* 2000	Double blind, placebo controlled RCT	5	Placebo: 2; BoNT-A: 140 U: 3	Electromyography transperineal injection	MUP, PVR, $Pdet_{max}$	2 months	MUP by 25 cm/H_2O; PVR ↓ by 12.5 mL; pDet ↓ by 20 mL/H_2O	Generalised weakness: 3; autonomic dysreflexia: 2
De Seze *et al.* 2002	Double blind, active comparator controlled RCT	13	Lidocaine 0.5%: 8; BoNT-A 100 U: 5	Electromyography transperineal injection	Voiding diary, PVR, satisfaction score & MUP	To be done: <3 months: 31%; >3 months: 46%	Significant decrease in PVR (P<0.01) & MUP (P 0.04)	Transient urinary incontinence: 1
Gallien *et al.* 2005	Double blind, placebo controlled RCT	86	Placebo: 41; BoNT-A 100 U: 45	Electromyography transperineal injection	1. PVR after 30 days; 2. urodynamic variables &VAS	4 months	1. No difference in PVR Δ; 2. significant improvement in voiding volume & $Pdet_{max}$	UTI: 16; MS attacks: 6; urinary incontinence: 2; faecal incontinence: 1

Cochrane review – limited evidence small numbers
Surgical Sphinterotomy superior and more efficacious

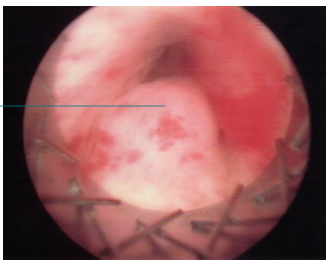
Eldred-Evans D, Dasgupta P, Translational Andrology and urology. 2017;6:234-251

Permanently Implanted Stent

The Wallstent or Urolume

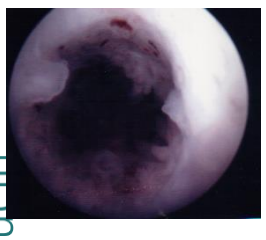
First implanted in 1988
(Shah et al BJ Urol 1990)

Deployment of Wallstent across External Sphincter

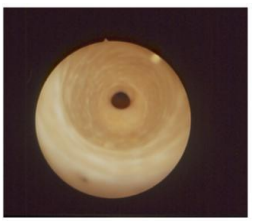


Cobbled Appearance within Wallstent

At 6 months



At 5 years



Urolume – Results in DSD

Author	N=	Follow-up	Bladder Emptying
Shah et al 1990	9	18/12	Improved
Juma et al 1994	10		Improved
Chancellor et al 1995	41	6-44/12	Improved
Sauerwein et al 1995	51	12-36/12	Improved

The mesh wallstent in the treatment of detrusor external sphincter dyssynergia in men with spinal cord injury: a 12-year follow-up.
Hamid R, **Arya M**, **Patel HR**, **Shah PJ**. BJU 2003

- Seven of the 12 patients had a mean (range) follow-up of 12.7 (12.17-13.6) years
- Urodynamic follow-up of the seven patients showed a significantly sustained reduction in maximum detrusor pressure and duration of detrusor contraction at> 10 years of follow-up
- Five of the seven patients developed bladder neck dyssynergia of varying degrees

Complications of permanent stents

- 28% required 2 stents
- 10% stents removed for complications - migration, pain, non-epithelialisation, condom failure
- 8.3% bladder neck obstruction

Complications of removal
- Removed piecemeal
- Bleeding and urethral injury

Chancellor et al 1995
Gajweski et al J Urol 2000

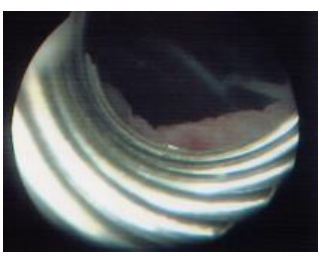
Complications of Stents v External Sphincterotomy

STENTS	SPHINCTEROTOMY
Device migration	Bleeding
Pain	Sepsis
Non-epithelialisation	Recurrent obstruction
Encrustation	Erectile dysfunction
Bladder neck obstruction	

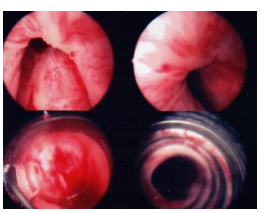
Temporary Implanted Stents

The Memokath – a thermal memory stent

The memokath is positioned just below the bladder neck prior to deployment



After positioning of the stent water at 50 degrees C is infused into the stent



Memokath and DSD - A cautionary tale

- Soni et al 1994 - Paraplegia - All improved bladder emptying
- Shah et al 1997 - J Endourol - Bladder pressure improved in all

- Low et al 1998
  - 19/26 stents removed
    - UTI
    - Migration
    - Failure of bladder emptying

Conclusions

- DSD is a complex problem in neurogenic patients and can have profound effects on renal function & quality of life
- There are many options available depending on patient's physical abilities, social situation, and physician preference.
- External sphincterotomy using a cold knife has traditionally been a gold standard procedure for patients with DSD
- Alternatives include laser sphincterotomy, Intersphincteric BTX-A injection and Stents – temporary and permanent
- A condom system must be tried on before any surgical procedure
- Long-term follow-up is necessary

Clam Ileocystoplasty

Miss Melissa Davies
Consultant Neurourologist
Duke of Cornwall Spinal Treatment Centre

Affiliations to disclose†:

Nil

† All financial ties (over the last year) that you may have with any business organisation with respect to the subjects mentioned during your presentation

Funding for speaker to attend:

- [X] Self-funded
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Neurourology Promotion Committee

Pre-operative considerations

- Body habitus
- Pre-operative education
  - Catheters
  - Bladder washouts
  - Stones
  - Metabolic FU
  - Malignancy
  - Bladder rupture
- Pre-operative assessment
  - Videourodyanmics
  - Bladder outlet – any concomitant surgery required as subsequent bladder neck cuff / AUS would be very difficult
  - Upper tract imaging – treat any kidney stones prior to augmentation

Contraindications

- Inflammatory Bowel disease e.g. IC, Crohns
- Short bowel syndrome
- Pelvic irradiation
- Significant renal disease – metabolic acidosis
- Unable to CISC
  - Occasionally SPC and clam in tetraplegics who won't have urostomy

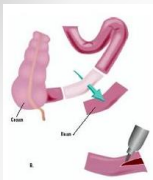
History

- First performed 1889 – von Mikulicz
- Couverlaire popularised in the 1950's for TB bladder
- Bramble published its use in urge incontinence in 1982

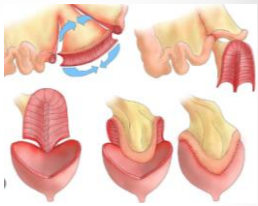
Starting the Operation

- Catheterise Bladder
  - Drain bladder and attach 500 mls Gentamycin/saline mix
- Incision
  - Infraumbilical Midline – always in men
  - Pfannenstiel Incision – in females
- Position
  - Trendelenberg
- Retractor
  - Turner-Warick – in slim patients
  - Bookwalter - in larger patients
- Mobilise bladder without opening up peritoneum

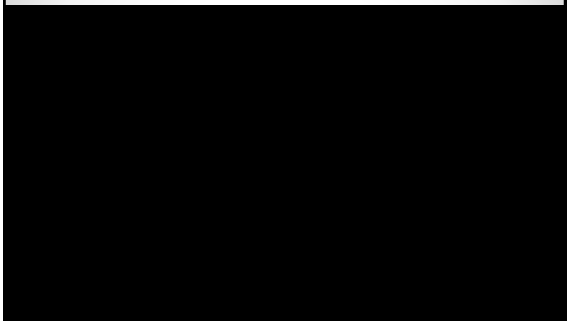
- Bladder marked out, stay sutures placed and bladder bi-valved.
- Ureteric/urinary diversion stents placed if required
- If concomitant autologous sling or AUS then now is the time to do it.
- Otherwise cover bladder with sterile damp pack



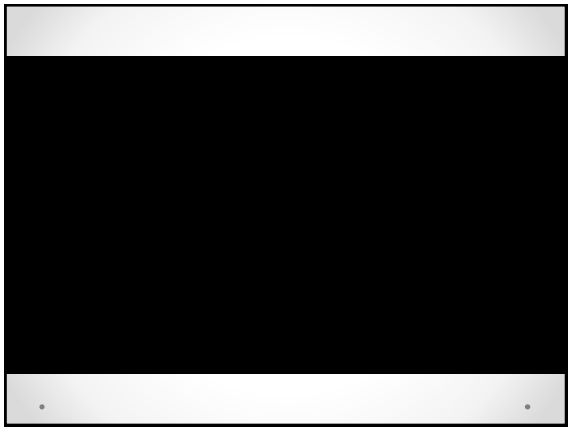
20-25 segment of ileum isolated at least 20 cm away from Ileocaecal valve. Anasomosis with GIA or hand sewn – close mesenteric defect.



Bowel segment sutured with continous 3/0 viacryl or PDS locking every 3rd stitch.

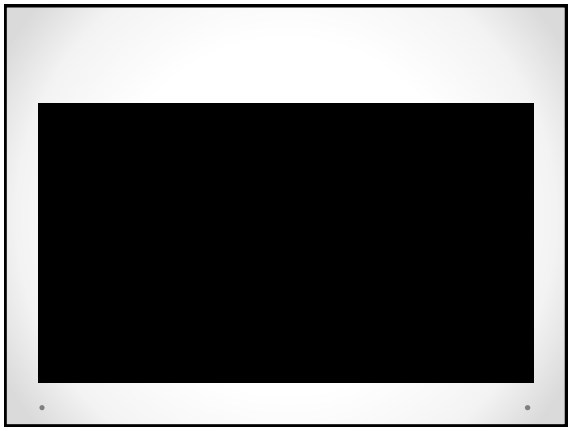


Making the patch



Bowel – Bladder anastomosis

- Do corners first
- 3 interrupted sutures in each later fold
- Then running suture Viacryl 2/0
  - Full thickness on bladder seromuscular on bowel
  - Wider bites on the bowel
- Check for leaks - gent/saline solution
- Pelvic drain – NOT suction drain



Post-operative management

- 5-10 day stay
- Common problems
  - Ileus – can be prolonged in SCI pts. Don't remove NG too soon
  - Infection-antibiotic regimen?
  - Blocked catheter – prescribe 6 hourly saline catheter flushes on drug chart
- Post-op instructions (written)
  - Free drainage 3 weeks
  - Flip flow for 3 weeks gradually increasing duration
- Follow up
  - 6 weeks post-op
  - Cystogram?
  - Get patient to stay in clinic and CISC

Surgical complications of bladder augmentation: comparison between various enterocystoplasties in 133 patients.

Shekarriz B[1], Upadhyay J, Demirbilek S, Barthold JS, González R.

TABLE III. *Surgical complications of bladder augmentation*

	IC (n = 65)	SC (n = 48)	SCLU (n = 20)	Total (n = 133)
Revision	7 (11)	6 (13)	2 (10)	15 (11)
Perforation	9 (14)	8 (17)	—	17 (12.8)
SBO	5 (8)	1 (2)	—	6 (4.5)
Stone	5 (8)	8 (17)	1 (5)	14 (10.5)
VUR	3 (5)	3 (6)	—	6 (4.5)
Renal deterioration	3 (5)	1 (2)	—	4 (3)
Incontinence	3 (5)	2 (4)	1 (5)	6 (4.5)
Total	35 (53.8)	28 (58)	4 (25)	67 (50)

KEY: IC = ileocystoplasty; SC = sigmoidocystoplasty; SCLU = seromuscular colocystoplasty lined with urothelium; SBO = small bowel obstruction; VUR = vesicoureteral reflux.
Numbers in parentheses are percentages.

How to get better?

- Do lots / assist other surgeons
- Watch YouTube
- Thorough pre-operative team briefing
  - Saves time during op if everyone knows what to expect
- Good assistant & regular scrub team
- Teach others
  - Break down procedure in bite size chunks
  - Emphasis on excellent technique
- Regularly review your outcomes (honestly!)

Failed Augmentation

- Persistent incontinence / high pressure
- New onset upper tract deterioration
- Investigate with videourodynamics

- Treatment options
  - Anti-cholinergics
  - Botox into native segment
  - Re-augmentation

Long-term FU

- Metabolic acidosis
  - Oral Na Bicarbonate
  - Blood tests : U&E's, Phosphate, Bicarbonate, Ca
- Upper tact imaging – USS
- Renal function – EDTA GFR
- Cystoscopy - ? 10-20 years post-op

Take Home Messages

- Careful patient selection and pre-operative education
- Good nursing team support
  - OR
  - Ward
  - Clinic

- Careful post-operative follow-up

Artificial Urinary Sphincter

for Neurogenic Stress Urinary Incontinence

JUAN CARLOS CASTAÑO BOTERO, MD
ICS NEUROUROLOGY PROMOTION COMMITTEE
FUNCTIONAL UROLOGY DEPARTMENT - CES UNIVERSITY CLINIC
MEDELLÍN, COLOMBIA

ICS 2017 FLORENCE
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AUS in NSUI

- INDICATIONS
- The artificial urinary sphincter (AUS), usually AMS 800™ (American Medical Systems (AMS)/Boston Scientific, Boston, MA, USA), is considered the gold standard for ISD in male patients with NBD* ([LOE 3; GOR A]; European Association of Urology [EAU] guidelines 2015, International Consultation on Incontinence 2012)

* Chartier Kastler E, Genevois S, GamŽ X, et al.. BJU Int. 2011;107(3):426–432.

AUS in NSUI

- INDICATIONS
  - Intrinsec sphincter deficiency (ISD)
  - Compliant Bladders
  - Sufficient storage capacity
  - Retained upper extremity function

AUS in NSUI

- CONTRAINDICATIONS
  - Elevated detrusor pressures
  - Poor bladder capacity
  - Patient unable to operate the device
  - Patient unable or lack of support to perform CIC if needed
  - Bulbar urethral cuff placement should be avoided in patients who spent the majority of their day seated

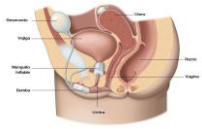
AUS in NSUI – Available literature

- Limited data on AUS for NSUI
- Based mainly on pediatric population
- Longest follow up, Lavesque *
  - 10 years
  - Continence rate 85% with functioning devices
- Recent review (Cochrane database)**
  - No enough evidence to support the AUS in women

*Levesque PE, Bauer SB, Atala A, et al. J Urol. 1996;156(2 Pt 2):625–628.
**Lipp A, Shaw C, Glavind K.. Cochrane Database Syst Rev. 2014;(12):CD001756

Technique

- **FEMALE**
- Transverse abdominal approach
- Open, laparoscopic o robotic techniques
- The endopelvic fascia is incised adjacent to the urethra bilateraly
- The bladder neck is dissected from the vagina below the peri-urethral fascia
- Cuff placement around the bladder neck
  - Size range 6-9 cm
- The pump is implanted in the labia majora
- Critical step: developing the uretrovaginal space for the cuff, high risk of injury (urethral, vaginal or bladder)
- Catether removal at day 5
- Activation after 6 weeks



Results - Female

- N: 26 (1984-2011)
- Follow up 3, 6 and 12 Months
- Median follow up 7.5 years
- 88% SCI - 73% CIC
- Revision rate 35.2%
- Explantation rate 19%
- Continent 71.4%
- Device survival rate on last follow up 57 % (15 patients)
- Survival rate at 20 y, without revision: 51% - Without exp: 74%
- Reserved for specialized centers

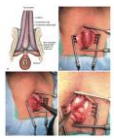
Neurourol Urodyn. 2017 Mar;36(3):764-769

Stress Urinary Incontinence in Female Neurological Patients: Long-Term Functional Outcomes After Artificial Urinary Sphincter (AMS 800™) Implantation

Véronique Phé,[1]* Priscilla Léon,[2] Benjamin Granger,[2] Pierre Denys,[3] Marc-Olivier Bitker,[1] Pierre Mozer,[2] and Emmanuel Chartier-Kastler[2]

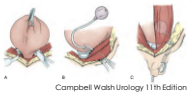
Technique

- **MALE**
- Cuff placement: **Bulbar urethra** – Bladder neck
- Cuff sizes: **3.5 cm** to 11 cm
- Urethral instrumentation across smaller cuffs is associated with high risk of erosion
- Bladder neck cuffs have less risk of erosion
  - Bladder neck is larger and allows for safer instrumentation
  - Less pressure aplied to the perineal area compared with bulbar urethral placement



Technique

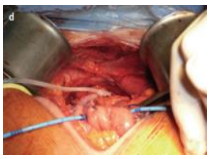
- **MALE**
- Lateral and posterior bladder neck dissection for cuff placement
- Open, laparoscopic and robotic techniques has been decribed
- Cuff sizes range from 6-11 cms (Bladder neck)
- 71-80 cms H2O pressure regulating balloons is placed either in the retropubic or submuscular space



Campbell Walsh Urology 11th Edition

Technique

- **MALE**
- Midline incision, the bladder is separated from the peritoneum
- Ureters must be above the dissection plane: disect seminal vesicles
- Incise endopelvic fascia bilateraly and measure the bladder neck
- Implant the cuff at the junction between the bladder neck and the prostate
- Balloon is placed lateral to the bladder



*Chartier-Kastler E, Genevois S, Gamez X, et al. BJU Int 2011;107(3):426–32

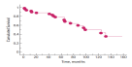
Results - Male

- Largest available series* N: 51 – Bladder neck AUS
- SB 31% - SCI 69%
- Follow up 83 months (65-101)
- 74% had perfect or moderate continence with a working AUS after a 10-year follow-up
- 21% had AC concomitant with AUS implantation
- Life span of AUS was not correlated with current or previous AC or other surgery

*Chartier-Kastler E, Genevois S, Gamez X, et al. BJU Int 2011;107(3):426–32

Results - Male

- Median survival of the device 8 years*



- Complications rate 48 % (required new procedure)*
- Revision rate is higher in neurogenic Vs non neurogenic 85% vs 59 %**

*Chartier-Kastler E, Genevois S, Game« X, et al. BJU Int 2011;107(3):426–32
**Murphy S, Rea D, O'Mahony J, et al Ir J Med Sci. 2003;172(3):136–8..

Results - Male

Neurourology and Urodynamics 35:21–25 (2016)

Surgical Treatment of Neurogenic Stress Urinary Incontinence: A Systematic Review of Quality Assessment and Surgical Outcomes

Fawzy Farag,[1,2]* Martin Koens,[1] Karl-Dietrich Sievert,[3] Dirk De Ridder,[4] Wout Feitz,[1] and John Heesakkers[1]

- Both implantation of AUS and slings at the bulbar urethral showed statistically higher rates of complications when compared to implantation at bladder neck 45% vs. 16% P.0.04
- AUS is superior in terms of continence but has a higher rate of complications compared with other procedures

TABLE I. Summary of Surgical Outcomes per Individual Technique

	AUS (n = 8)	Slings (n = 15)	Bulking agents (n = 6)	P-value (ANOVA)
Follow-up (months)	72 ± 18	37 ± 30	30 ± 13	0.004
Success%	77 ± 16%	58 ± 25%	27 ± 20%	0.001
Failure%	10 ± 11%	22 ± 20%	50 ± 16%	0.001
Complications%	32 ± 27%	14 ± 14%	4 ± 6%	0.020
Reoperations%	51 ± 25%	7 ± 9%	12 ± 14%	0.000

AUS and simultaneous AC

- In some cases it is necessary to perfomed procedures to lower detrusor pressure concomitant with AUS implantation
- 33% to 75% AUS implantation is performed with AC *
- Higher risk of complications?
- Yes, up tp 50%. Small number of patients and short follow up studies**
- Long term follow up studies support the implementation of AUS + AC based on their good results ***

*Murphy S, Rea D, O'Mahony J, et al. Ir J Med Sci. 2003;172(3):136–138.
**Simeoni J, Guys JM, Mollard P, et al. Br J Urol. 1996;78(2):287–293.
***Chartier-Kastler E, Genevois S, Game« X, et al. BJU Int 2011;107(3):426–32

Thank you!

ICS neurourology promotion committee

Ileal Conduit

Rizwan Hamid FRCSEd, FRCS(Urol), MD(Res)
Consultant Urological Surgeon
London Spinal Injuries Unit, Stanmore &
University College London Hospitals

Rizwan Hamid

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Introduction

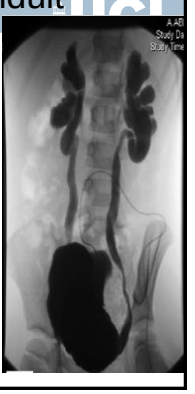
- Reconstructive options
- Indications for conduit
- Patient considerations
- Pre-operative preparation
- Surgical techniques
- Post-operative follow up
- Management of complications
- Conclusions

Bladder Reconstruction Options

- **Ileal Conduit**
- Enterocystoplasty
  - Clam (Augmentation)
  - Substitution (Supratrigonal or subtrigonal)
- Neobladder
  - Orthotopic
  - Heterotopic
- Ureterosigmoidostomy

Indications for Conduit

- Unable / unwilling to perform SIC
- Unable to tolerate SPC
- Severe reflux +/- hydronephrosis / ureter
- Uncontrolled NDO with incontinence



Patient Considerations

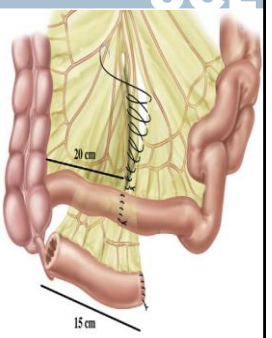
- Patient Factors
  - Wishes
  - Hand function
  - Comprehension
- Clinical Factors
  - Neurological diagnosis
  - Anatomical considerations
    - Bladder, Sphincter, Urethra
  - Availability of bowel segments

Pre-operative preparation

- Adequate counselling
  - Position of bag
  - Care of stoma
  - Life long follow-up
- Anaesthetic considerations
  - High tetraplegics
  - MS patient
  - Spina bifida with VP stunt
- Social Support

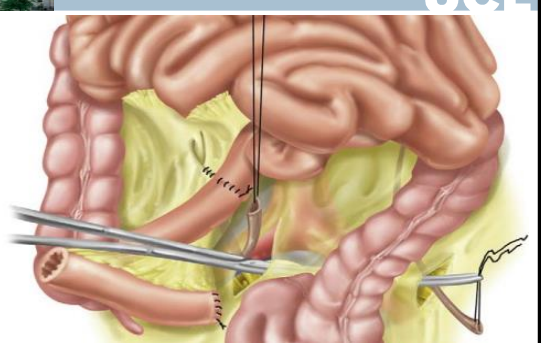
Surgical Technique – ileal isolation

- 12–18 cm of ileum proximally to the ileo-caecal valve is isolated tagged by sutures
- Preserve intact at least 15 cm of terminal ileum to avoid metabolic disturbances
- Adapt the length of isolated ileal segment to the physical conformation of the patient (obese)
- Avoid the use of a redundant segment to prevent residual urine volume and urinary infections
- The mesentery of the iliac segment selected is incised and prepared in a sequential manner using Kelly clamps and 3-0 free ties
- Water under the bridge



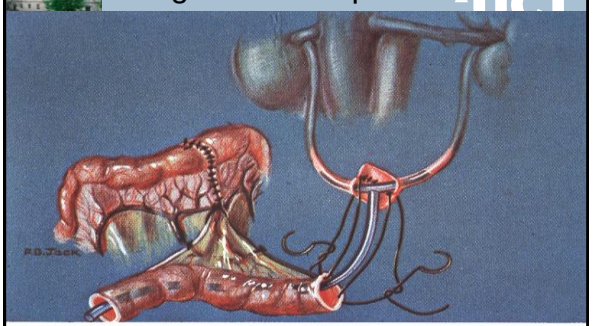
Colombo R, Naspro R.Eur Urol:2010;supp 9:736-744

Surgical Technique - ureters



Colombo R, Naspro R.Eur Urol:2010;supp 9:736-744

Surgical Technique - ureters

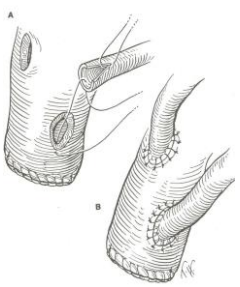


Ileal loop diversion. The ''69'' technique

Colombo R, Naspro R.Eur Urol:2010;supp 9:736-744

Uretero-ileal anastomosis

Bricker



The Stoma

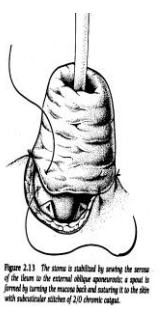


Figure 2.13 The stoma is stabilized by sewing the serosa of the ileum to the external oblique aponeurosis: a spout is formed by turning the mucosa back and suturing it to the skin with subcuticular stitches of 2/0 chromic catgut.

Colombo R, Naspro R.Eur Urol:2010;supp 9:736-744

Post operative care

- Routine care post major surgery
- Drain removed when less than 50 mls/24hrs
- Ureteral stent 2 weeks
- Review by stoma therapist
- Patient learn to change bag before discharge

Complications

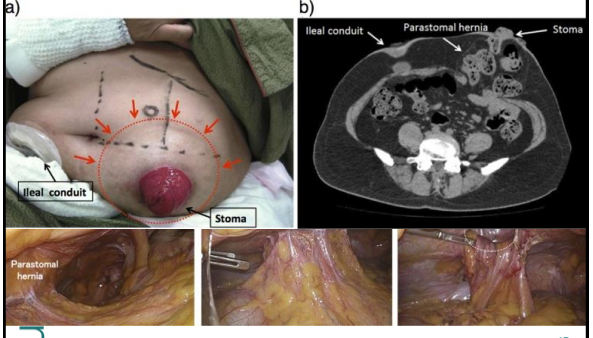
Early	Late
Bowel related	Stoma related
Intestinal anastomosis related	Abdominal wall related
Ureteral-ileal anastomosis leakage	Conduit stenosis
Enteric fistula	Uretero-enteric anastomosis stricture
Bowel obstruction	Hydronefrosis
Prolonged ileus	Kidney failure
Conduit necrosis	Metabolic changes

Conduitogram

- Complications;
  - Leakage from ureteric anastomosis 7%
  - Leakage from intestinal anastomosis – rare
  - Paralytic ileus 22%
  - Anastomotic stricture – 7-14%
  - Redundant loop 0-13%
  - Incisional hernia 3-5%
  - Stones 0-9%
  - Ureteroileal obstruction 0-14%
  - Metabolic 0-1%
  - UTI 0-23%

Complications

- Complications are quite common (15-65)
  - Parastomal hernia
  - Stomal stenosis
  - Stomal retraction
  - Stomal bleeding



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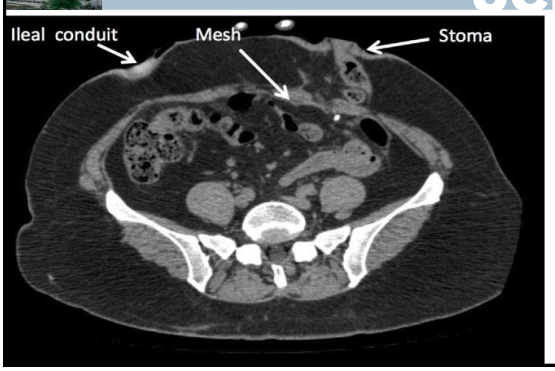

18

Conclusions

- The IC is considered an appropriate surgical solution in most patients
- Relative simple surgical technique
- Acceptable complication rate
- Satisfactory postoperative QoL
- Favoured option with compromised renal function or who are unfit for other options
- The test of time has demonstrated that the long-term reliability of this procedure strictly depends on a rigorous surgical technique
- Long term follow up is required

Techniques for channels for continent cutaneous diversion

JUAN CARLOS CASTAÑO BOTERO, MD
ICS NEUROUROLOGY PROMOTION COMMITTEE
FUNCTIONAL UROLOGY DEPARTMENT - CES UNIVERSITY CLINIC
MEDELLÍN, COLOMBIA

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Indications for continent cutaneus diversions

- Continent bladder emptying when an alternative route is desired
- Native urethra compromised or inaccessible
- CIC technically challenging:
  - Quadriplegia
  - Body Habitus - obesity
  - Poor hand dexterity

Patient Selection

- **COMORBIDITIES:**
- Crohn's or ulcerative colitis
- Poor nutritional status
- Abdominal or pelvic radiation
- Progresive neurologic dysfunction
- Reabsortion concerns
  - Renal dysfunction?
  - Liver dysfunction?

Patient Selection

- **ANATOMIC FACTORS**
- Body habitus
- Prior bowel surgery
- Short appendix
- The surgeon should be familiar with multiple approaches, techniques and management of bowel segments

Patient Selection

- DEXTERITY
- How is upper extremity function?
- Coordination and strength to self catheterize with clean technique
- The surgeon should be supported by a team of occupational, therapists, social workers and a care coordinator

Ideal channel for diversion

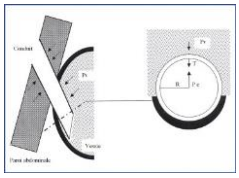
- Ideal length
- Straight – no kinks
- Well supported by associated blood supply and surrounding adventitia
- Easy for catheterization

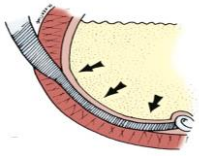
Surgical Options:

Continence Mechanism

- Tunel Channel (flap valve)
  - Appendix—"Mitrofanoff"
    Reconfigured ileum—"Yang-Monti"
    • Single segment
    • Double segments
    • Spiral configuration
    Other structures: bladder, stomach, large bowel, ureter, fallopian tube
- Nipple Valve
  - 1. Intussuscepted ileum
    2. Reinforced ileocecal valve—"CCIC"

Tunneled channels





The Mitrofanoff appendicovesicostomy

- **Good Candidates**
  - Pediatric patients
  - 4-6 cms
- **Bad candidates**
  - Need of longer channels
    - Generally Adults
    - Obese patients
    - 10-12 cms

MAIN RESTRICTION FOR ITS USE: THE LENGHT

The Mitrofanoff appendicovesicostomy

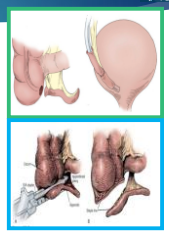
- **ADVANTAGES:**
- Diameter
- Length

Natural structure for catheterization

- No digest or metabolic side effects

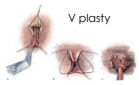
The Mitrofanoff appendicovesicostomy

- **PROXIMAL END**
- The appendix should be transected with a small cuff of cecum
  - More length
  - Larger cutaneus stoma



The Mitrofanoff appendicovesicostomy

- **PROXIMAL END**
- Must be accessible to the patient or caregiver
- Umbilicus
  - Absence of adipose tissue
  - Shorter course to the skin
- Abdominal wall
- Skin anastomosis
  - U, V, VWZ plasty

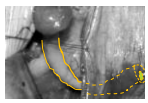


The Mitrofanoff appendicovesicostomy

- **DISTAL END (continence mechanism)**
- Distal tip should be prepared (transected and spatulated) for anastomosis
- Submucosal tunneling of 2-4 cms
- Location of implantation:
  - Length
  - Location of the stoma
- Lateral, anterior or posterior

The Mitrofanoff appendicovesicostomy

- **DISTAL END (continence mechanism)**
- Intravesical approach
  - Opened mucosa and then close
  - Submucosal tunnel with a clamp
- Extravesical approach
  - Fill the bladder
  - Detrusor flaps closed over the apendix



Reconfigured ileum ("Yang-Monti")

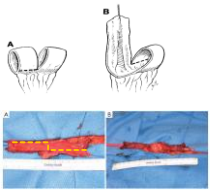
- **Indications**
- Short appendix
- absence of appendix
- Creating simultaneus catheterizable channels
  - Apendix for M-ACE
  - Yang-Monti for Bladder
- In the case of simultaneus ileal enterocystoplasty
  - Allows for harvesting the tissue for the tube with a single small bowel anastomosis

Reconfigured ileum ("Yang-Monti")

- **Tecnique**
- 2 cms ileum segment
- retubularized transversely along the antimesenteric border
- Create a good caliber and longer tube
- For longer tube 2 segments can be harvested retubularized and anastomosed "double Monti"

Reconfigured ileum ("Yang-Monti")

- **Spiral Monti "Casale"**
- Allows for 12-14 cms Tube
- Obesity, spinal abnormalties, etc
- 3.5 cms ileal segment
- Divided in to 2 equal segments
  80% of its cinrcunference
- Transected close to the mesentery
- Retubularized as in conventional Monti



Surgical results – Flap Valves

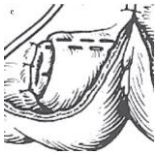
Continence > 95% *
Stomal stenosis 5-10%
Revisión rate: Mitrofanoff 5-20%
Yang-Monti 10-20%

- Revision rate for Monti two times higher than for Mitrofanoff **
- Revisión rate for spiral Monti Four times higher than for Mitrofanoff**

* Guillotreau J, Castel-Lacanal E, Roumiguiex M, et al. Neurourol Urodyn. 2011;30(8):1503–6.
** Narayanaswamy B, Wilcox DT, Cuckow PM, et al. BJU Int 2001;87:861-5

Nipple Valve

- Cimcurferential coaptation
- Intussucepted ileum
- Poor Technical reproductivity
- Poor long-term durability
- Dessusception of continence mechanism



Continent catheterizable ileal cecocystoplasty

- Modification of the Indiana pouch for use as a bladder augmentation with an integrated catheterizable channel (Hemi-Indiana)
- Robust pedicle - Blood suply for augment and the channel
- Single bowel resection
- Channel lenght can be easily modified
- Larger channel (16 f)- allows for faster bladder emptying
- Continence mechanism is provided by the ileocecal valve
- Not need to create a detrusor tunnel for continence ideal for hostile bladders

Continent catheterizable ileal cecocystoplasty

- **Technique**
- Harvest 10 cm of the cecum and 10 cm of the Ileum
- Can be tailored for obese patients or larger augmentation – up to 25 cm
- Side-to-side ileocolonic anastomosis
- The cecum is detubularized
- Appendix if present, it is removed

Continent catheterizable ileal cecocystoplasty

- **Technique**
- Simple- tapper over a 12-14 catheter to create the tube with the ileum segment
- Bladder is incissed for augmentation
- Detubularized colon is anastomosed to bladder
- Stoma ideally at the umbilicus

Continent catheterizable ileal cecocystoplasty

- **Challenging procedure, reserve it for:**
- absence of appendix
- Need for concurrent augmentation
- Obesity
- Hostile bladder, no detrusor tunnel option available

Surgical Results
Continent catheterizable ileal cecocystoplasty

Continence > 95% *
Stomal stenosis 3-9%
Revisión rate 5-13%

- Disadvantages:
- Risk of fecal incontinence and vitamin B12 deficiency from ileocecal valve resection
- Colon resection/ileocolic anastomosis is less familiar to urologists
- Often requires mechanical bowel preparation (controversial)

*Cheng JN, Lawrentschuk N, Gyomber D, et al. J Urol 2010; 184(1):92-8.

Thank you!

ICS neurourology promotion committee