# Management of neurogenic lower urinary tract dysfunction: surgical options with reference to the guidelines

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# Prevalence neurogenic lower urinary tract dysfunction

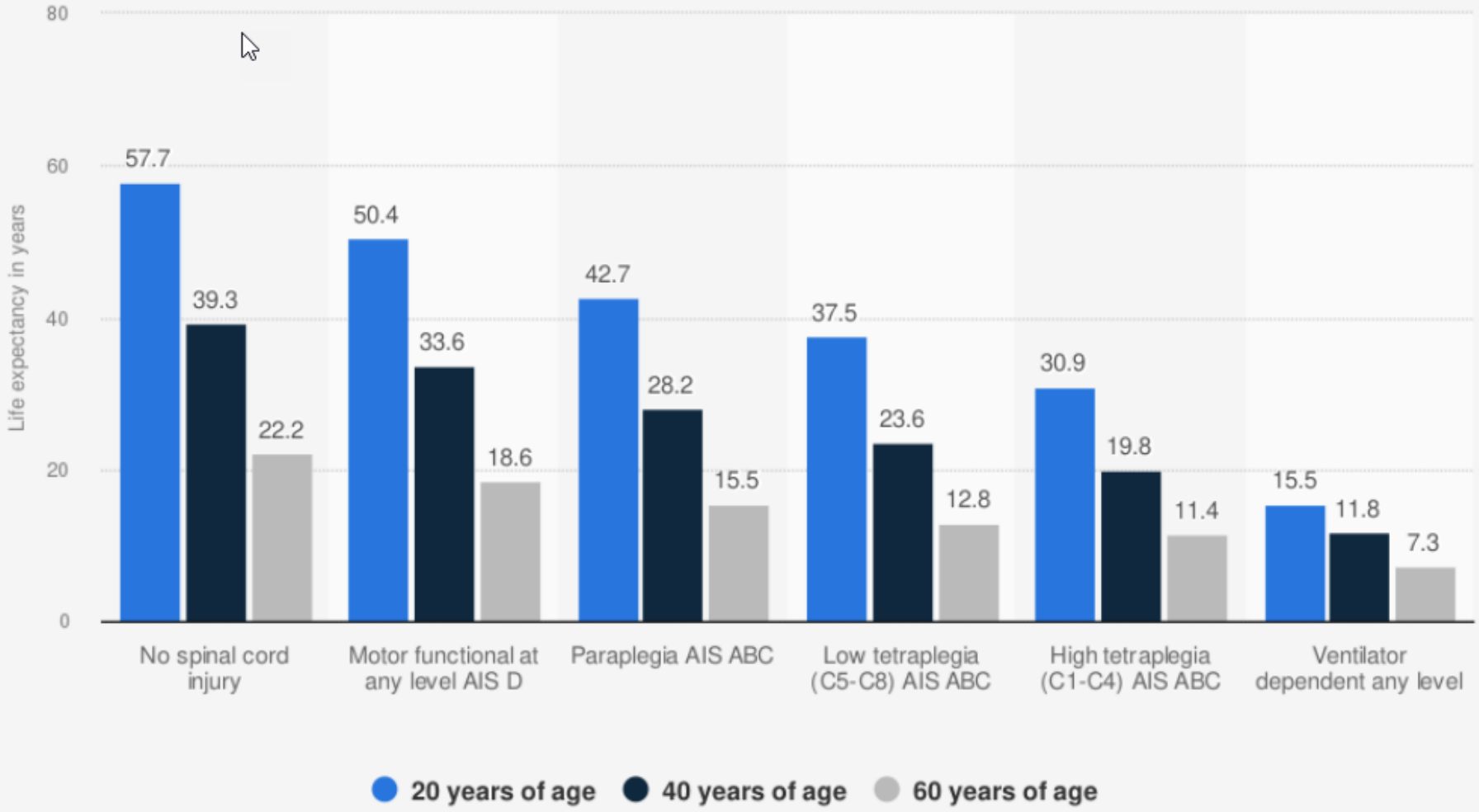
No exact figures and wide variability reported.

Incidence neurological disorder:

- Spinal cord injury: CH 13.4/Mio., Europe 12.1/Mio., Japan 27/Mio., USA 54/Mio.
- MS: 5/100’000.
- Spina bifida 0.3-4.5/1000 births.

Panicker JN et al Lancet Neurol 14, 2015
Jain NB et al. JAMA 313, 2015.

# Life expectancy for spinal cord injuries in the U.S. for those who survive at least one year post-injury as of 2022, by age and severity




Source
UAB


Additional Information:
United States; As of 2022

# Causes of death after SCI

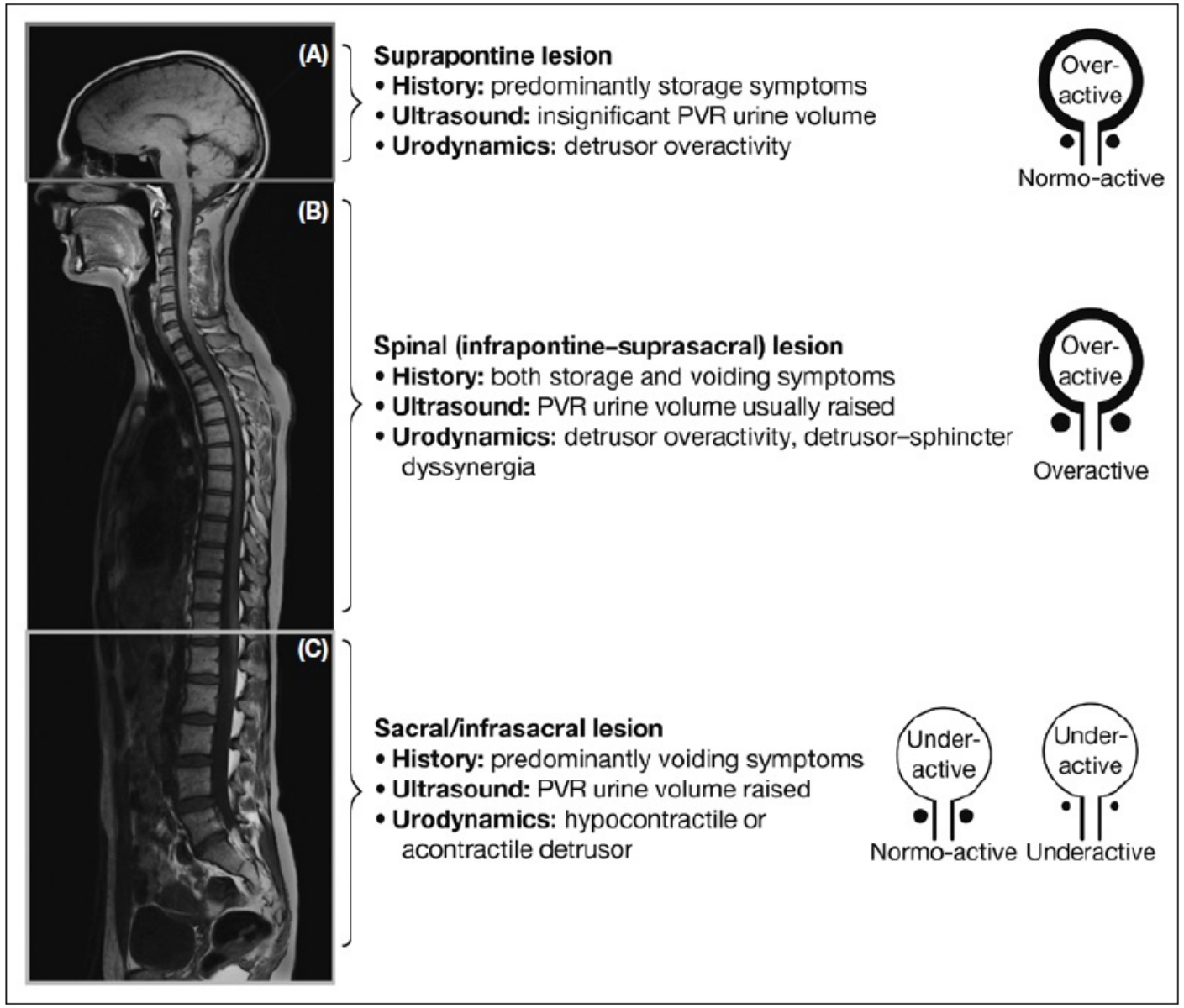
**Table 3** Causes of death after traumatic spinal cord injury, 1952–2001

| | All causes | | | | | |
|---|---|---|---|---|---|---|
| | Cervical ASIA A (complete) (n= | Cervical ASIA B–D (incomplete) | TLS ASIA A (complete) (n=39) | TLS ASIA B–D (incomplete) (n=20) | All (n=173) | All % |
| Cardiovascular disease | | | 13 | 11 | 68 | 39 |
| Respiratory disease | | | 7 | 5 | 61 | 35 |
| Neoplasm | | | 10 | 0 | 30 | 17 |
| Suicide and accidental poisoning | | | 3 | 4 | 11 | 6 |
| Nervous system disease | | | 9 | 1 | 29 | 17 |
| Digestive system disease | | | 4 | 1 | 9 | 5 |
| Musculoskeletal disease | | | 1 | 0 | 11 | 6 |
| Genitourinary disease | 6 | 7 | 6 | 1 | 20 | 12 |
| Mental disorder | 1 | 5 | 2 | 1 | 9 | 5 |
| Skin disease | 1 | 2 | 5 | 1 | 9 | 5 |
| Endocrine and metabolic disease | 1 | 4 | 1 | 0 | 6 | 3 |
| External causes | 28 | 23 | 13 | 2 | 66 | 40 |
| Other causes | 1 | 7 | 7 | 5 | 20 | 12 |

#1 Cause in 21-30 year olds and incomplete TL lesions

Hagen EM et al J Neur Nsurg Psych 2010

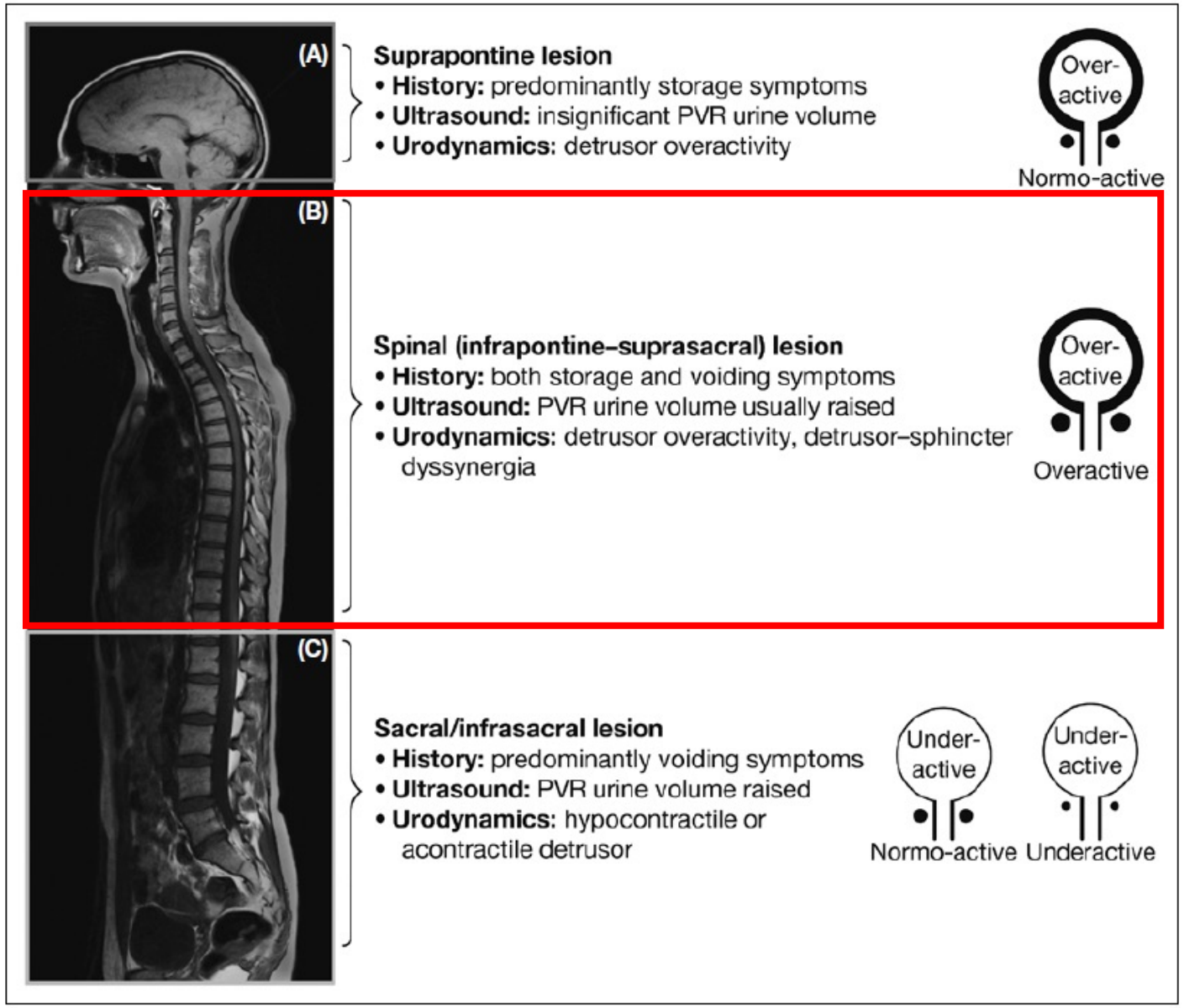
**Figure 1: Patterns of lower urinary tract dysfunction following neurological disease**




Panicker JN et al Lancet Neurol 14, 2015

The site of the lesion determines the general pattern of NLUTD

Figure 1: Patterns of lower urinary tract dysfunction following neurological disease




Panicker JN et al Lancet Neurol 14, 2015

# Treatment goals

**Goal # 1:**

- **Protect and preserve kidney function**

**Secondary goals:**

- Regain or retain urinary continence (socially acceptable bladder management)
- Preserve independence
- Improve Quality of life, patient satisfaction

# Treament goals

**Two entities to adress**:

- Bladder function: reduce intravesical pressure, increase compliance and capacity.
- Sphincter function.

- Surgery: final resort for patients with persistent symptoms and complications not to be solved otherwise.

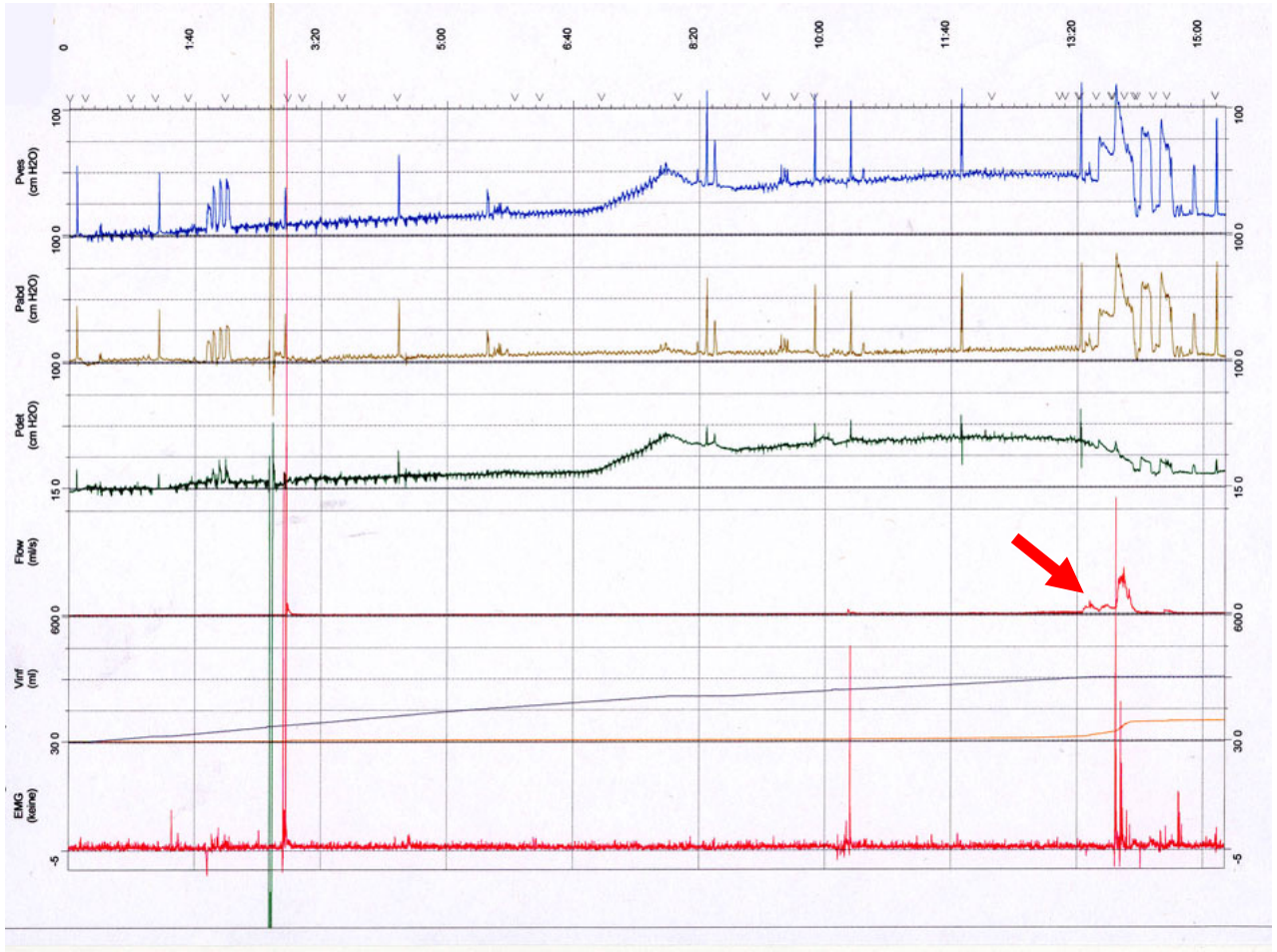
Number of substitution cystoplasties or urinary diversions in SCI patients in US about 112/ year.

# Prerequisites

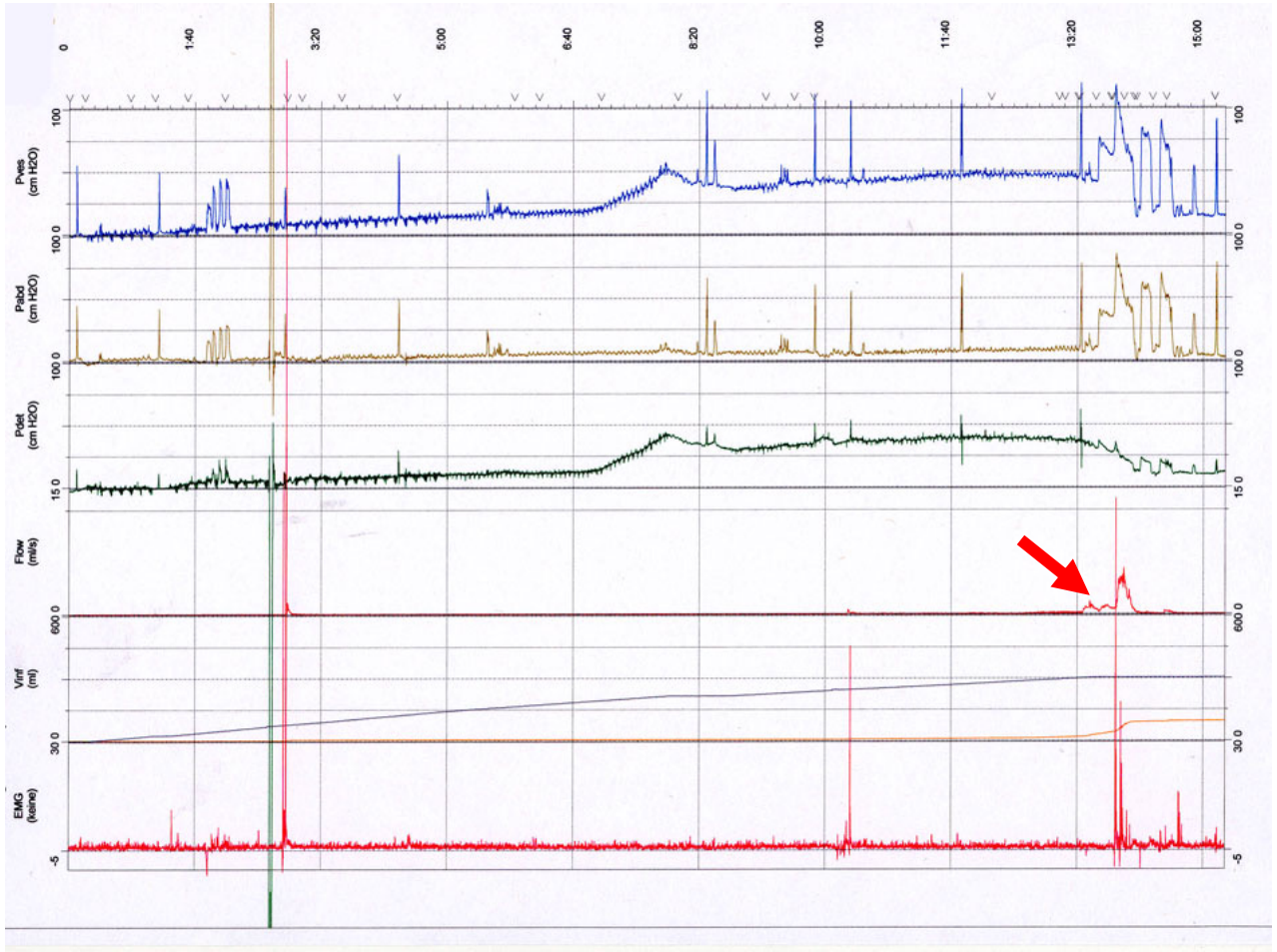
- Patient
  - Reliability
  - Manual dexterity
  - Willingness to undergo follow up examinations
  - Intellectual capacity
- Bladder
  - Low-pressure reservoir
  - Simple to manage/catheterise
  - Simple surgical technique
  - Few complications

# Typical patient

# Videourodynamics



# Videourodynamics




# EAU Guidelines

| Summary of evidence | LE |
|---|---|
| Bladder augmentation is an effective option to decrease detrusor pressure and increase bladder capacity, when all less-invasive treatment methods have failed. | 3 |

| Recommendations | Strength rating |
|---|---|
| Perform bladder augmentation in order to treat refractory neurogenic detrusor overactivity. | Strong |

# AUA/SUFU Guidelines

51. Clinicians may offer augmentation cystoplasty to select NLUTD patients who are refractory to, or intolerant of, less invasive therapies for detrusor overactivity and/or poor bladder compliance. (*Conditional Recommendation; Evidence Level: Grade C*)

# Nice Guidelines

Augmentation cystoplasty should be considered for individuals with:

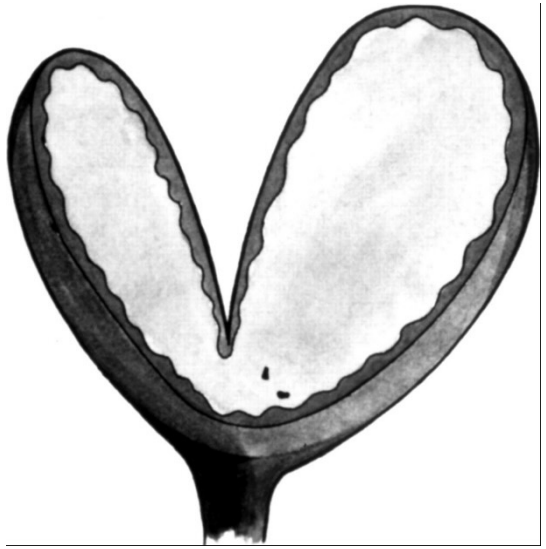
- non progressive neurological disorders
- complications of impaired bladder storage
- after thorough urodynamic and clinical assessment and discussion with the patient and care team about complications, risks, and alternatives

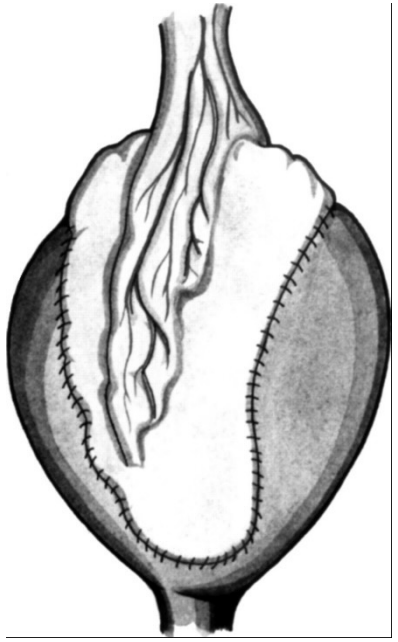
# ICI consultation on incontinence

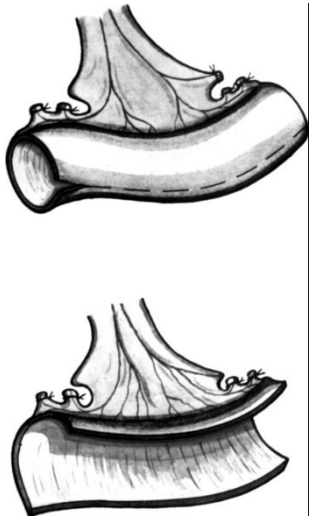
Videourodynamic assessment must be repeated prior to surgery to assess bladder and sphincteric function.

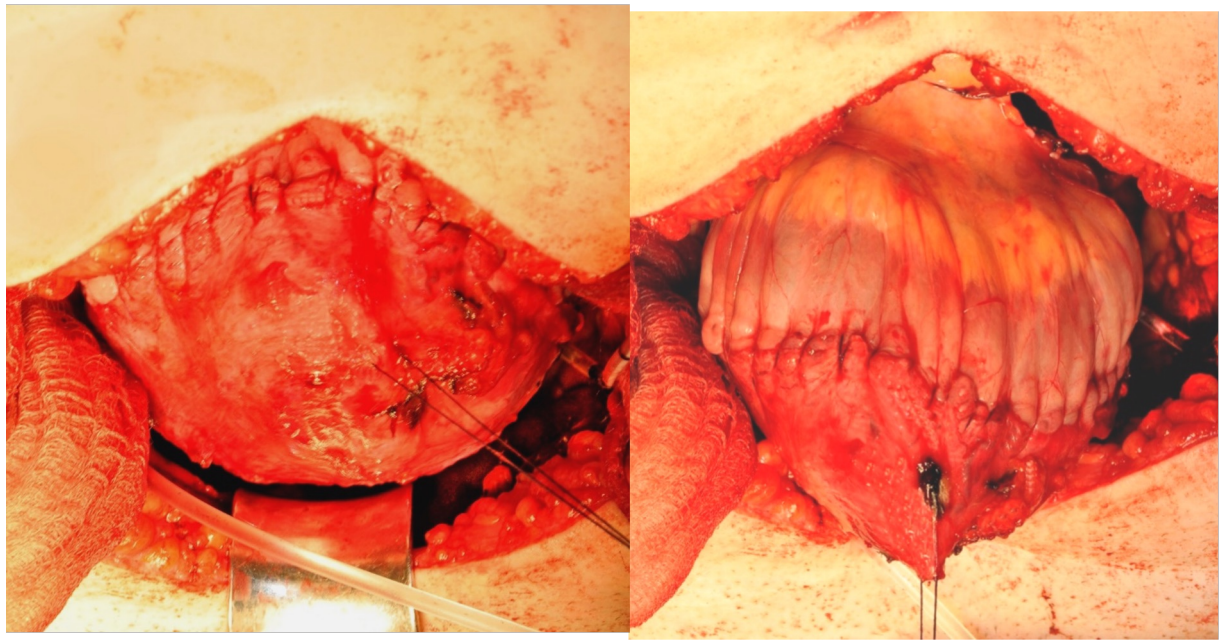
For severe neurogenic overactivity, bladder surgery using intestinal segments may be considered.
Stomach, ileum, colon or ureter may be used, ileum provided the best ease of use, lowest risk of complications and highest efficacy.

# Clam ileocystoplasty









# Outcome AC

The long-term scientific evidence shows that bladder augmentation is a highly successful procedure that stabilises renal function and prevents anatomical deterioration; however, lifelong follow-up is essential in this patient group given the significant morbidity associated with this procedure.

Urodynamic outcomes (systematic review 511 patients)

- Bladder capacity: 169 ml – 559 ml
- Pdetmax: 65 cmH2O – 19cmH2O
- Detrusoroveractivity: 77% - 18%

Continence

- 87% success rate
- CIC: 80% - 88%

EAU Guidelines 2023
Hoen et al. Neurourol Urodyn 2017

# QoL superior after Augmentation

Excellent - good results in 83 – 92%

**Table 4 Qualiveen-30 questionnaire**

| | *Arm 1 BT (n = 14)* | *Arm 2 AC (n = 16)* | |
|---|---|---|---|
| Limitations/inconvenience | 1.661 ± 0.817 (0.444–3.111) | 0.734 ± 0.691 (0–2.22) | *P* = 0.0027, IC 95% (0.353–1.498) |
| Constraints/restrictions | 2.170 ± 0.876 (0.875–3.875) | 1.539 ± 0.763 (0.25–2.75) | *P* = 0.047, IC 95% (0.0101–1.251) |
| Fears | 1.580 ± 0.882 (0.375–3.25) | 1.273 ± 0.989 (0–2.75) | *P* = 0.374, IC 95% (–0.3892 to 1.0031) |
| Feelings/impact on daily life | 1.086 ± 0.869 (0–2.2) | 0.762 ± 0.972 (0–2.6) | *P* = 0.345, IC 95% (–0.3654 to 1.0119) |
| Total score | 1.625 ± 0.690 (0.486–2.634) | 1.077 ± 0.674 (0.06–2.084) | *P* = 0.037, IC 95% (0.035–1.0599) |

Abbreviations: AC, augmentation cystoplasty; BT, botulinum toxin injections.

42% continent

88% continent

Anquetil et al.: Spinal cord 2016

5th ICI Revision

A low compliance bladder of small capacity with bilateral reflux and dilated upper tract.

# Urinary diversion

## EAU Guidelines

*3.4.3.5 Urinary diversion*

When no other therapy is successful, urinary diversion must be considered for the protection of the UUT and for the patient's QoL [130].

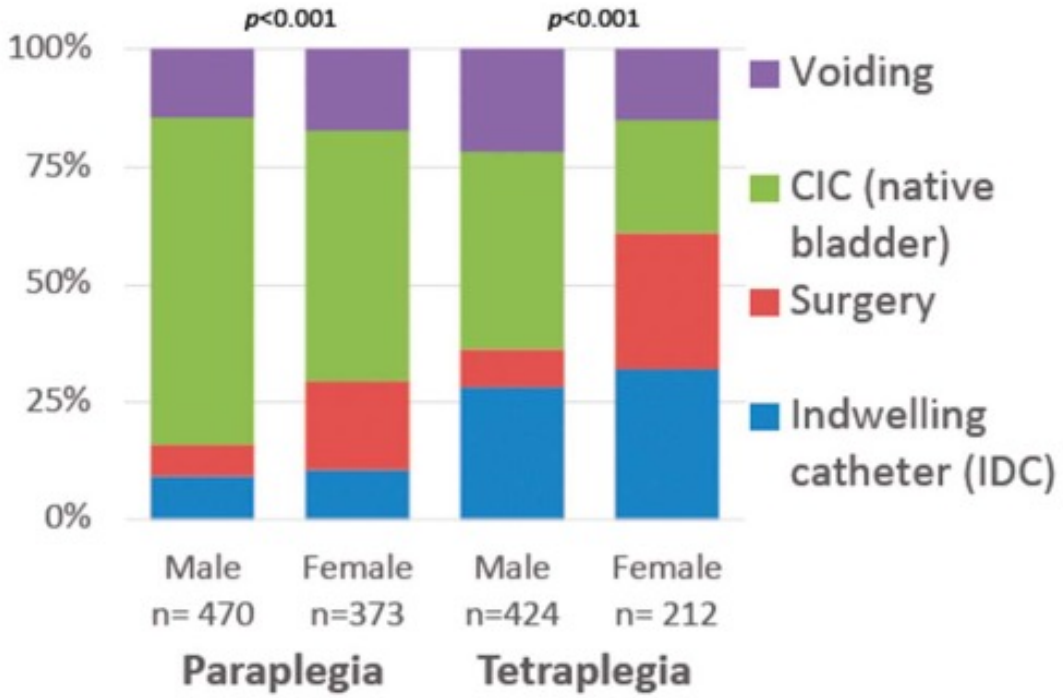
Continent diversion should be the first choice.
Bladder substitution with bowel after performing a supratrigonal cystectomy [367], to create a low-pressure reservoir, is indicated in patients with a severely thick and fibrotic bladder wall [130].
Intermittent catheterisation may become necessary after this procedure.

## AUA/SUFU Guidelines

54. Clinicians should offer urinary diversion to NLUTD patients in whom other options have failed, or are inappropriate, to improve long-term quality of life. (*Moderate Recommendation; Evidence Level: Grade C)*

# Sex Differences in Bladder Management, Symptoms, and Satisfaction After Spinal Cord Injury

Jeremy B. Myers,[1]* John T. Stoffel,[2] Sean P. Elliott,[3] Blayne Welk,[4] Jennifer S. Herrick,[5] and Sara M. Lenherr[1] for the Neurogenic Bladder Research Group




- Bladder symptoms and satisfaction worse in women.
- Surgery was associated with improved satisfaction in individuals with paraplegia or tetraplegia.
- Surgery more common in women with substantial benefit.
- Surgery associated with fewer bladder symptoms in both sexes and less incontinence in women.

Myers et al. J Urol 2023
Myers et al. J Urol 2019

# Reflux prevention in patients with VUR

- Matter of debate and not mentioned in guidelines
- VUR often improves or disappears after AC, indicating that reimplantation may not be necessary for resolving symptoms of UTI and preserving kidney function.
- In line with findings from ortho- and heterotopic bladder substitutes (low pressure)

Chiba et al. BMC Urol 2022

# Outlet

Low compliance bladder and
bilateral Reflux with dilated upper tract

Slight leakage when coughing

Majority need to self-catheterise

Intermittent catheterisation possible?

# Indications catheterisable channel

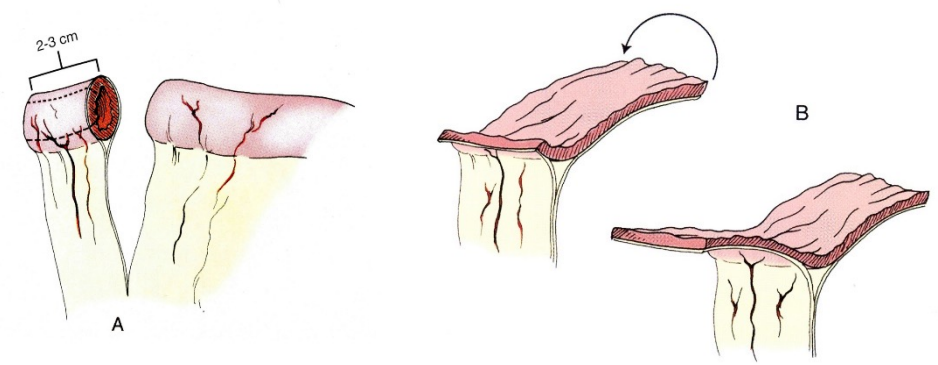
## AUA/SUFU Guidelines

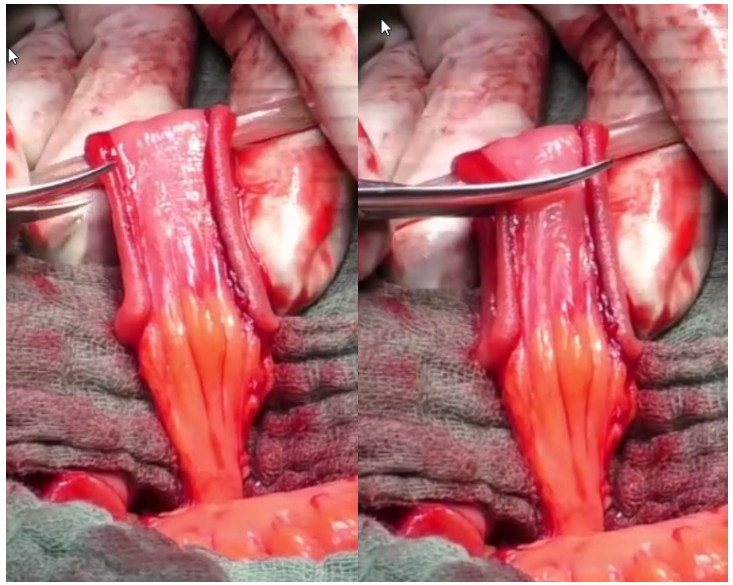
47. After a thorough discussion of risks, benefits, and alternatives, clinicians may offer bladder neck closure and concomitant bladder drainage methods to select patients with NLUTD and refractory stress urinary incontinence. *(Expert Opinion)*

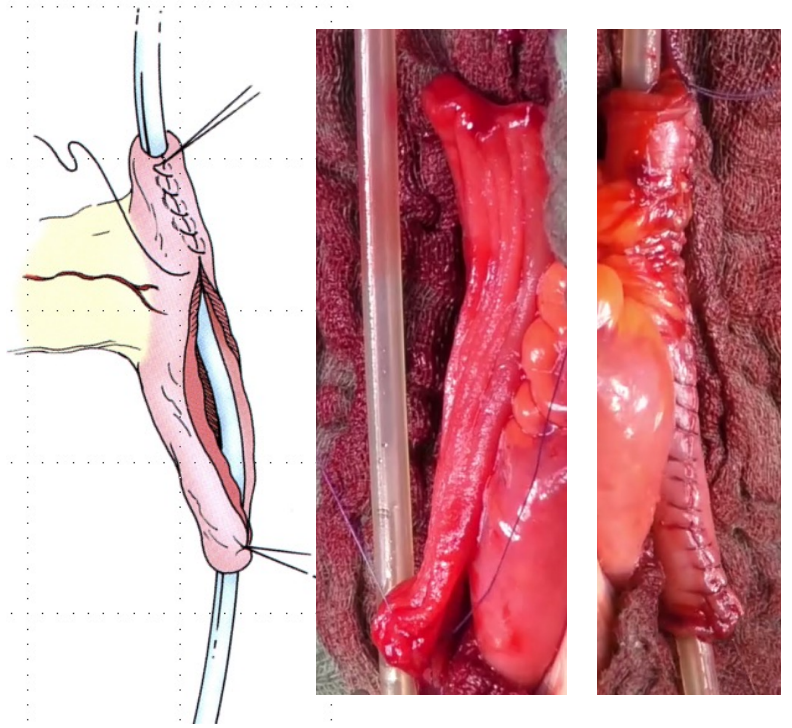
Select patients:

- Incapable of transurethral catheterisation
- Incompetent bladder outlet

# Yang-Monti procedure



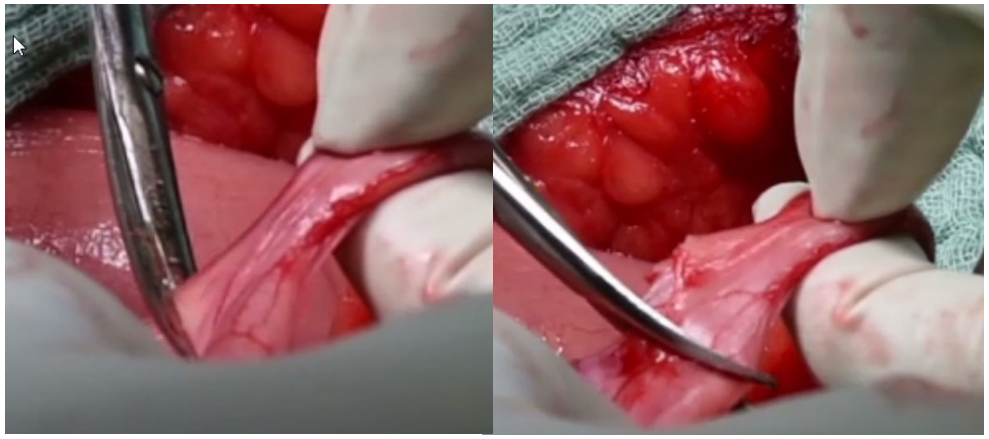


*From Adams MC, Joseph DB. (2007) Campbell-Walsh Urology, 9th ed.* Philadelphia: *Saunders Elseviel; .*

# Mitrofanoff procedure

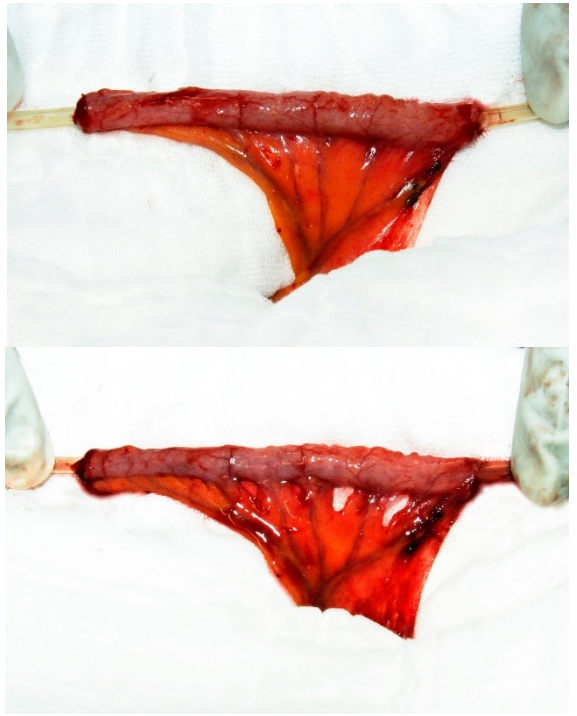
The appendix can be transected with a small cuff of cecum:

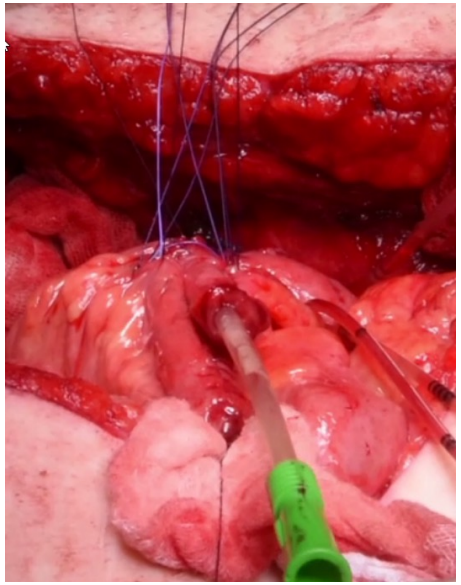
- more length
- larger cutaneous stoma



Intravesical approach: submucosal tunnel

Extravesical approach

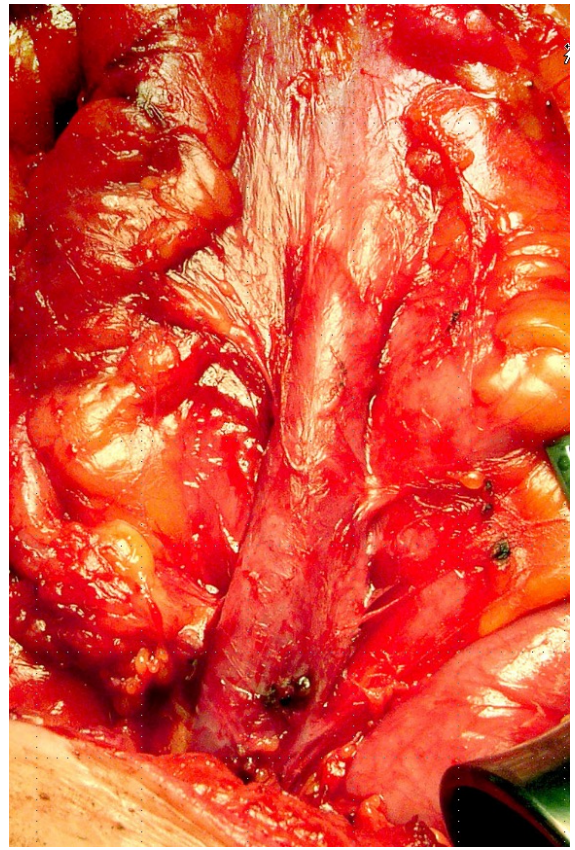




# Outcome

Systematic review 213 patients

- ≥ 84% able to catheterise
- > 75% continent
- Tube stenosis 4-32%
- Reoperation for tunnel complications approx. 40%



Better continence when implanted in the native bladder

Furrer et al. Eur Urol Focus 2021
Phé et al. Neurourol Urodyn 2016

# Bladder neck closure

## BNC approaches:

### Suprapubic, perineal, transvaginal:

### Advantages suprapubic approach:

- Direct visualisation and separation of the bladder neck and prostate/urethra
- Ability to mobilize bladder for tension-free closure
- Better separation from prostate or urethral stump
- Easy tissue interposition after bladder neck closure

# Bladder neck closure

## Results:

Main problem urethral leakage

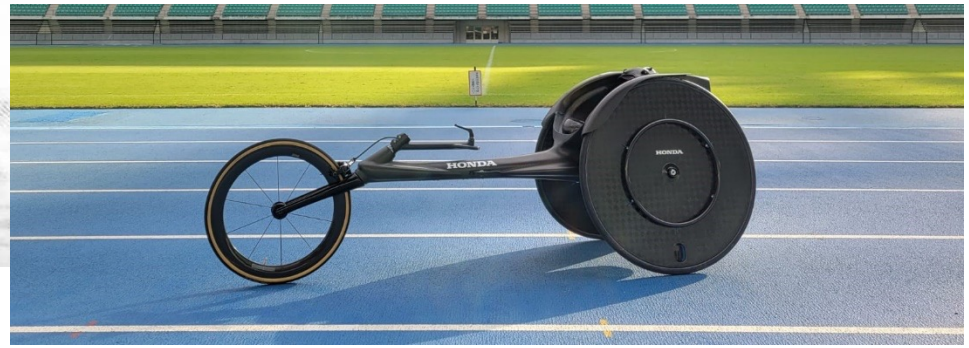
- 14% in 28 children Jayanthi et al. 1995
- Pediatric series 0-24%

- Important to avoid overlapping suture lines
  - Cover with omentum
  - Mobilize dorsal bladder

# Mitrofanoff stoma and bladder neck closure

Winner New York Marathon 2023


Winner Tokyo Marathon 2023



# Summary

- Overall similar recommendations in the guidelines
- Variations in the grading of recommendations
- Surgery improves
  - urodynamic outcomes
  - renal outcomes
  - patients quality of life
- Attention should be placed on patients perspective
- Complication rate is high
- Life long follow-up necessary


Catherine Debrunner
Paralympic athlete
C. Debrunner
Für Fiona
VIELEN DANK dass
du extra nach
Doha gereist bist!
Dein grosses
Interesse weiss ich
sehr zu schätzen!

# Thank you