

Good Practice in Health Care

# Continent Urinary Diversion

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Good Practice in Health Care

# Continent Urinary Diversion

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# Introduction

The European Association of Urology Nurses (EAUN) was created in April 2000 to represent European urological nurses. The EAUN's underlying goal is to foster the highest standards of urological nursing care throughout Europe. With administrative, financial and advisory support from the European Association of Urology (EAU), the EAUN also encourages research and aspires to develop European standards for education and accreditation of urology nurses.

We believe that excellent healthcare goes beyond geographical boundaries. Improving current standards of urological nursing care has been top of our agenda, with the aim of directly helping our members develop or update their expertise. To fulfil this essential goal, we are publishing the latest addition to our Good Practice in Health Care series, a comprehensive compilation of theoretical knowledge and practical guidelines on continent urinary diversion. Although there is considerable literature on continent urinary diversion, to our knowledge prior to this publication there was only limited evidence-based guidance for nurses available on this topic. The EAUN Guidelines Group believes there is a need to provide guidelines with recommendations clearly stating the level of evidence of each procedure with the aim of improving current practices and delivering a standard and reliable protocol.

In this booklet, we have included clear illustrations, case report summaries, extensive references and annotated procedures to help nurses to identify potential problem areas and efficiently carry out possible options for effective patient care. The working group decided to also include topics such as pre-and post-operative assessment (nutrition, fluid balance, pain management, etc.) which have a profound influence on both the outcome of the surgery and the urinary diversion patient's quality of life and to highlight the psychological and social aspects unique to the experience of patients with a urinary diversion.

With our emphasis on delivering these guidelines based on a consensus process, we intend to support practitioners who are already assessed as competent in this procedure. Although these guidelines aim to be comprehensive, effective practice can only be achieved if the practitioner has a clear and thorough knowledge of the anatomy under discussion and the necessary grasp and understanding of basic nursing principles.

This publication focuses on continent urinary diversion to complement the previous publication in this series on incontinent urostomy. The guidelines contain only material on adults and not children. Furthermore, these guidelines are intended to complement, or provide support to, established clinical practice and should be used within the context of local policies and existing protocols.

This text is made available to all individual EAUN members, both electronically and in print. The full text can be accessed on the EAU website (<http://www.uroweb.org/professionalresources/guidelines/>) and the EAUN website ([www.eaun.uroweb.org](http://www.eaun.uroweb.org)). Hard copies can be ordered through the EAU website via the publication order form.

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# 1. Role of the nurse in different countries

The EAUN is a professional organisation of European nurses who have specialised in urological care. In Europe, there is a great variation in the education and competency of nurses in urology, with urological nurses having different activities and roles in various countries. It is therefore difficult for any guideline to fulfil all requirements. However, the EAUN Guidelines Group has tried to ensure that every nurse may gain some benefit from using these guidelines.

## 2. Methodology

The EAUN Guidelines Group for Urinary diversion have prepared this guideline document to help urology nurses assess the evidence-based management of urostomy care and to incorporate the guidelines' recommendations into their clinical practice. These guidelines are not meant to be proscriptive, nor will adherence to these guidelines guarantee a successful outcome in all cases. Ultimately, decisions regarding care must be made on a case-by-case basis by healthcare professionals after consultation with their patients using their clinical judgement, knowledge and expertise.

The expert panel consists of a multi-disciplinary team of nurse specialists, including Piet Eelen, Sharon Fillingham, Veronika Geng, Sharon Holroyd, Berit Kiesbye, Susanne Vahr and urologist Ian Pearce. (see 'About the authors', chapter 11). Obviously in different countries, even in different areas, titles will differ within the speciality. For the purpose of this document we will refer to the specialised nurse (e.g. stoma care nurse, wound-contenance-stoma care nurse) as the 'nurse specialist' (NS).

### Literature search

The data underpinning this document were gathered through a systematic literature search. The focus of this search was to ensure identification of the available high-level data (meta-analyses, randomised controlled trials, Cochrane reviews and other high-quality guidelines documents). A critical assessment of the findings was made, not involving a formal appraisal of the data. Articles were selected from Medline, Cinahl, Scopus, ScienceDirect, PubMed and the Cochrane database, as well as from relevant textbooks and other guidance documents.

Whenever possible, the Guidelines Working Group have graded treatment recommendations using a three-grade recommendation system (A to C) and inserted levels of evidence to help readers assess the validity of the statements made. The aim of this practice is to ensure a clear transparency between the underlying evidence and a recommendation given. This system is further described in the Tables 1 and 2.



## **Search keywords**

The Working Group first tried to find randomised, controlled trials, reviews or meta-analyses. If these references did not provide enough information, the Working Group continued their search by looking for studies with lower levels of evidence. The evidence found on each topic is shown in the recommendations of each chapter or subchapter. The choice of literature is guided by the expertise and knowledge of the Guidelines Working Group. The question for which the references were searched was: “Is there any evidence for continent urinary diversion for nursing interventions in different care situations such as pre-operative, operative and post-operative, acute as well as long term?”

The references for these Guidelines were searched using the keywords listed below. Several databases (Medline, PubMed, Embase, Cinahl and Cochrane) were searched as well as private libraries, databases and books of the authors, using the keywords in different combinations. The references were searched by different experts in the field of urinary diversion. The same reference was often used repeatedly to build up the Guidelines.

## **Keywords (alphabetical order)**

- Activity of daily living
- Catheterization
- Continent caecal reservoir for urine
- Continent urostomy
- Continent urinary diversion
- Coping
- Cranberry
- Cystectomy (Mesh)
- Education
- Fatigue
- Fluid balance
- Hautmann neobladder
- Kock pouch
- Indiana pouch
- Indiana continent urinary reservoir
- Information
- Neobladder
- Nursing assessment (Mesh)
- Nutrition
- Orthotopic ileal neobladder
- Pain management
- Patient care planning (Mesh)
- Patient education
- Post-operative care
- Pre-operative care
- Psychological impact
- Sexuality
- Skin care (Mesh)
- Social issues
- Stent

- Teaching
- Urinary diversion (Mesh)
- Urinary tract infection
- Urological nursing

### **Disclosure statement**

The EAUN Guidelines Working Group members have provided disclosure statements of all relationships that might be a potential source of conflict of interest. The information has been stored in the EAU database. This Guidelines document was developed with the financial support of the EAU and Astra Tech.

The EAUN is a non-profit organisation and funding is limited to administrative assistance and travel and meeting expenses. No honoraria or other reimbursements have been provided.

### **Limitations of document**

The EAUN acknowledge and accept the limitations of this document. It has to be emphasised that the current guidelines provide information about the treatment of an individual patient according to a standardised approach. The information should be considered as providing recommendations without legal implications. The intended readership is the pan-European practising urology nurse and nurses working in a related field. This guidelines document is of limited use to, for example, urologists, other healthcare providers or third-party payers. Cost-effectiveness considerations and non-clinical questions are best addressed locally and therefore fall outside the remit of these guidelines. Other stakeholders, including patient representatives, have not been involved in producing this document.

### **Review process**

The Working Group included an extensive number of topics, which are not always only applicable to urostomies, but decided to include them because they make the guideline more complete. A draft for review was sent to the European national urological nurses societies, specialised nurses in various European countries, the EAU Guidelines Office and the EAU executive responsible for EAUN activities. We revised the document based on the comments received. A final version was presented and approved by the EAUN Board.

### **Rating system**

The recommendations provided in these documents are based on a rating system modified from that produced by the Oxford Centre for Evidence-based Medicine. [1]

Some of the literature was not easy to grade. If, however, the EAUN Working Group thought the information would be useful in practice, it is ranked as level of evidence 4 and grade of recommendation C.

**Table 1. Level of evidence (LE)**

<b>Level</b>	<b>Type of evidence (LE)</b>
1a	Evidence obtained from meta-analysis of randomised trials
1b	Evidence obtained from at least one randomised trial
2a	Evidence obtained from one well-designed controlled study without randomisation
2b	Evidence obtained from at least one other type of well-designed quasi-experimental study
3	Evidence obtained from well-designed non-experimental studies, such as comparative studies, correlation studies and case reports
4	Evidence obtained from expert committee reports or opinions or clinical experience of respected authorities

**Table 2. Grade of recommendation (GR)**

<b>Grade</b>	<b>Nature of recommendations</b>
A	Based on clinical studies of good quality and consistency addressing the specific recommendations and including at least one randomised trial
B	Based on well-conducted clinical studies, but without randomised clinical trials
C	Made despite the absence of directly applicable clinical studies of good quality

# 3. Terminology (definitions)

All forms of continent urinary diversions share a common theme of bowel utilisation to create a capacious, compliant and low pressure urinary storage structure whilst preserving upper renal tract integrity and enabling complete emptying with or without the use of clean intermittent self catheterisation (CISC). Just as the forms of continent urinary diversions share a common theme of bowel interposition, so too do they share, to an extent, a common complication burden. Other complications are specific to the particular variety of diversion and in particular the presence or otherwise of an anti-reflux mechanism at the uretero-bowel anastomosis, the utilisation or otherwise of an intussusception nipple via which clean intermittent self catheterisation is performed and to the segment of intestine utilised.

Clam ileocystoplasty and detrusor myectomy (auto-augmentation) are included as they too aim to provide a similar large capacity, low pressure storage system at the expense of a similar complication burden.

Continent urinary diversions may be classified into those relying upon surgically created continence mechanisms (intussusception nipples, Mitrofanoff principle, etc.) and hence requiring catheterisation to empty (catheterisable continent urinary diversions) and those relying upon the natural urinary sphincter for continence and in which voiding without catheterisation is possible (orthotopic urinary diversions).

A third variety of continent urinary diversion less commonly performed currently is that which diverts the urine into the distal large bowel (either sigmoid colon or rectum).

## 3.1 Cutaneous continent urinary diversion

In a continent cutaneous urinary diversion, intestine is detubularised and re-configured to create a large compliant, low pressure storage unit. The proximal extremity is anastomosed to the ureters utilising a variety of surgical techniques and the distal aspect is anastomosed onto a conduit fashioned either from a separate bowel segment or reversed appendix. This conduit provides the continence mechanism via either the creation of an intussusception nipple or sub-mucosal tunnelling. This stomal opening is located either at the umbilicus, or as a distinct entity on the lower abdominal wall and is the portal via which the patient can effect complete urinary drainage via CISC.

Catheterisable pouches (cutaneous continent diversions):

1. Kock
2. Mainz
3. Indiana

## 3.2 Orthotopic urinary diversion

Orthotopic urinary diversions, (neo-bladders), are again based upon the principle of bowel reconfiguration to create a capacious low pressure storage unit. The proximal aspect is again

anastomosed to the ureters but in a neo-bladder, the distal extent is anastomosed proximal to an intact urethral sphincter. Thus continence is gained via the sphincter and the patient voids at will, perhaps utilising abdominal pressure to effect efficient emptying (Crede principle).

Orthotopic urinary diversions (neo-bladder):

1. Camey II
2. VIP bladder
3. S Bladder
4. Hemi Kock
5. Studer
6. Mainz

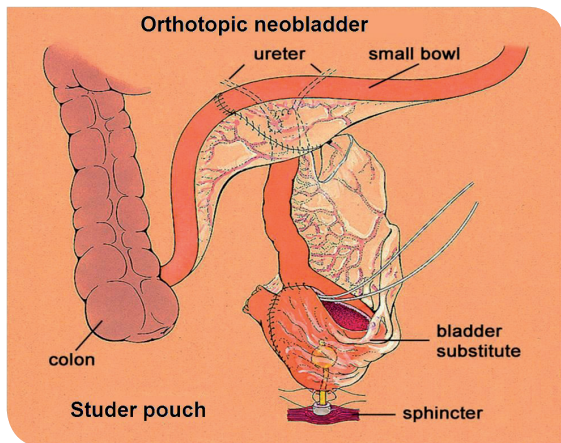


Fig. 1 The Studer pouch

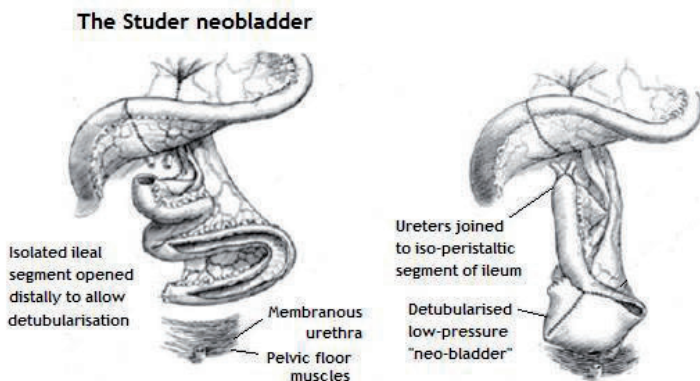


Fig. 2 The Studer neobladder

### **3.3 Recto-sigmoid urinary diversion (uretero-sigmoidostomy)**

Although less popular than previously, many patients within the urological community function perfectly well with this type of urinary diversion. In this variety, the urinary stream is directed via the ureters directly into large bowel, typically rectum and sigmoid colon. The capacity may be increased and the pressure decreased via the addition of a small bowel augmentation pouch. In this form of urinary diversion, the anal sphincter is relied upon to effect continence.

### **3.4 Augmentation ileocystoplasty**

Whilst technically not a urinary diversion, an augmentation or Clam ileocystoplasty is similar in genesis, intent and consequence to render its inclusion mandatory. In this form of surgery, small bowel, (non terminal ileum), is detubularised and interpositioned as a patch between the two halves of a bivalved bladder. This increases the capacity of the diseased bladder whilst simultaneously reducing the pressure. Continence is maintained by the natural urethral sphincter.

### **3.5 Auto-augmentation**

An auto-augmentation or detrusor myectomy is a less invasive method of achieving a large capacity, low pressure bladder without utilising bowel. The detrusor muscle itself is dissected free from the bladder mucosa and removed leaving approximately 50% of the original muscle mass. Again the natural urethral sphincter is relied upon for continence.

### **3.6 Catheterisable conduits**

Following continent urinary diversion or augmentation surgery, voiding efficiency is significantly reduced often resulting in large residual volumes. CISC is therefore commonly employed but for those patients in whom this is not possible, a catheterisable conduit may be created. Traditionally this involves the appendix with its mesentery providing an independent vascular supply. The appendix is tunnelled through the bladder wall to prevent passive leakage and is then anastomosed directly onto the anterior abdominal wall skin to create a catheterisable stoma. Often this is located at the site of the umbilicus but a separate site may be chosen. Such a configuration is known as a Mitrofanoff. In those patients who have previously had their appendix removed, a Monti procedure may be performed. This involves the utilisation of a small section of non terminal ileum with an independent blood supply. This is then opened on the antimesenteric border and re-anastomosed longitudinally thus creating a long narrow segment of bowel from the original short wide segment. This is then tunnelled into the bladder and anastomosed onto the skin in a fashion similar to that of a Mitrofanoff.

# 4. Indications for continent urinary diversion

Cystectomy and bladder dysfunction remain the main indications for continent urinary diversions and augmentation procedures but the final choice is also dependent upon the following individual issues:

1. Patient preference
2. Manual dexterity
3. Presence of intact urethral sphincter.

With the exception of a rectosigmoid diversion, lack of manual dexterity is a contra-indication to all forms of surgery defined above and with the exception of auto-augmentation the following are also contra-indications:

1. Impaired renal function
2. Inflammatory bowel disease (Crohn's disease, ulcerative colitis).

## 4.1 Cutaneous continent urinary diversion

1. Cystectomy
2. Sphincteric involvement
3. Sphincteric incompetence
4. Manual dexterity (CISC)
5. Bladder exstrophy
6. Severe interstitial cystitis (Bladder pain syndrome)

## 4.2 Orthotopic urinary diversion

Following cystectomy for invasive malignancy without urethral involvement, an orthotopic bladder substitution should be considered the management of choice provided the patient has an intact urethral sphincter and does not possess any absolute contra-indication as above.

1. Cystectomy
2. Intact urethral sphincter

## 4.3 Uretero-sigmoid urinary diversion

1. Cystectomy
2. Impaired manual dexterity

## **4.4 Augmentation ileocystoplasty**

1. Overactive bladder resistant to more conservative therapy
2. Poorly compliant bladders e.g.: tuberculosis (TB)
3. High pressure neuropathic bladder

## **4.5 Auto-augmentation**

1. Overactive bladder resistant to more conservative therapy

The number of different bowel configurations is vast and only those enjoying widespread use will be considered.

Having been initially described by Kock, (Kock NG, Nilson AR, Norlen L, Sundin T, Trasti H: Urinary diversion via a continent ileal reservoir: Clinical experience. *Scan J Nephrol*, 1978;49(23)) in the mid to late 70's, there have since been multiple modifications to the original continent cutaneous urinary diversion, all aimed at improving its status as a large capacity low pressure storage system with minimal complications. Various modifications have emerged designed to allow a continent but catheterisable stoma or conduit. An intussusception nipple using a separate piece of ileum was originally described but this has lost favour to the more acceptable Mitrofanoff principle involving a sub-mucosally tunnelled reversed appendix. This may emerge via the umbilicus, or as a distinct entity on the lower anterior abdominal wall.



# 5. Complications of continent urinary diversion

## 5.1 Stomal stenosis

The incidence of stomal stenosis in continent cutaneous urinary diversions is determined by the different continence mechanisms employed. The incidence of stomal stenosis as defined by difficulty catheterising may be as low as 1.5% for plication anti-reflux mechanisms to as much as 54% in Mitrofanoff conduits. [2, 3, 4, 5]

## 5.2 Incontinence

The incidence of incontinence is difficult to accurately define as different studies report different end points and the definition of incontinence varies significantly. If assessed strictly as the presence of ANY leakage, some studies suggest incontinence rates of up to 28% but such strict criteria are seldom used. [6] In addition the daytime continence rate is generally 5-10% greater than the night time continence rate. According to Stenzl (2001) [7] the diurnal continence rate for women is 83% and 90% in men, nocturnal rates > 80%. Studer et al (2006) [8] found that the continence rate is 92% during the day and 79% during night time after 1 year. From his earlier study (Varol and Studer 2004) [9] the diurnal continence rate is 82% and the nocturnal rate is 72% after 6 months.

**Table 3. Post-operative incontinence rates**

Procedure	Incidence	Reference
Continent urinary diversion	0.6 - 7.2%	[4, 10, 11, 12]
Orthotopic bladder	4 - 13%	[13, 14, 15, 16]
Uretero-sigmoid diversion	1 - 6%	[17, 18, 19]
Ileocystoplasty	0 - 18%	[20, 21]
Auto-augmentation	5 - 13%	[22, 23]

## 5.3 Infection

As defined by either systemic sepsis or febrile UTI (documented positive MSSU)

**Table 4. Post-operative UTI infection rates**

Procedure	Incidence	Reference
Continent urinary diversion	7%	[5]
Orthotopic bladder	1.8 - 3.5%	[13, 16]
Uretero-sigmoid diversion	8 - 18%	[17, 18, 19]
Ileocystoplasty	11 - 44%	[21, 23]
Auto-augmentation	Absence of published incidence	

## 5.4 Calculi

Calculi are a frequent encounter in urinary diversions and augmentations and are related to the presence of infection, stasis, mucus and exposed staples.

**Table 5. Post-operative calculus rates**

Procedure	Incidence	Reference
Continent urinary diversion	5 - 10.8 %	[4, 10, 24, 25, 26]
Orthotopic bladder	0.5 - 7%	[15, 16, 27, 28]
Uretero-sigmoid diversion	10%	[17]
Ileocystoplasty	2 - 22%	[21, 23, 29]
Auto-augmentation	Absence of published data	

## 5.5 Anastomotic urinary leakage

**Table 6. Post-operative urinary leakage rates**

Procedure	Incidence	Reference
Continent urinary diversion	2 - 10%	[30]
Orthotopic bladder	2.6% - 6.6%	[10, 13]
Uretero-sigmoid diversion	5%	[31]
Ileocystoplasty	Absence of published data	
Auto-augmentation	Absence of published data	

## 5.6 Anastomotic strictures

Anastomotic strictures occur secondary to excessive tension, ischaemia, recurrent malignancy, radiation and failure to achieve mucosal co-aptation during surgery.

In addition to these factors, the creation of an anti-reflux mechanism also increase the risk of stricture at the uretero-bowel anastomosis.

**Table 7. Post-operative anastomotic stricture rates**

Procedure	Incidence	Reference
Continent urinary diversion	4 - 7%	[4, 30, 32]
Orthotopic bladder	0.6 - 9.3%	[13, 15, 16, 28, 33, 34]
Uretero-sigmoid diversion	5 - 22%	[17, 18, 19]

## 5.7 Incomplete voiding

All forms of surgery described carry with them an inherent risk of incomplete voiding requiring the utilisation of clean intermittent self catheterisation (CISC).

**Table 8. Post-operative risk of incomplete voiding**

Procedure	Incidence	Reference
Orthotopic bladder	4 - 25%	[14, 16]
Ileocystoplasty	39 - 70%	[21, 29]
Auto-augmentation	45%	[35]

## 5.8 Tumour formation

At present the current evidence, although low level and limited to small case series and case reports, suggests that uretero-sigmoidostomy urinary diversion increases the risk of malignancy although this risk is difficult to quantify (range 8 - 7000 years) and appears related to time, being almost unheard of in the first 15 years following diversion. At 10 years the incidence has been reported to be as low as 0 %. [17] The tumour arises at or close to the line of anastomosis and is not therefore simply the result of mixing urine and faeces in the bowel.

The mean time to presentation is between 23 and 26 years [36, 37] and patients should be offered routine annual endoscopy.

Following ileocystoplasty, continent cutaneous urinary diversion and orthotopic neo-bladder formation, there have been isolated reports of malignancy at the anastomotic site but these are almost universally found in patients having had surgery for chronically inflamed or tuberculous bladders. The intrinsic risk of malignancy in patients undergoing surgery for non-inflammatory, benign condition e.g.: detrusor overactivity appears to be no greater than for the age matched population [37, 38], however patients should be warned regarding possible symptoms of malignancy (haematuria) and appropriately investigated should these occur. Annual surveillance has been advocated by some although the time of initiation remains a matter for debate.

There is no increased risk of malignancy for patients undergoing auto-augmentation (detrusor myectomy).

## 5.9 Complications relating to the use of ileum

There are several common long-term follow-up complications specifically associated with ileum resection.

**Table 9. Complications associated with the use of ileum**

- Hyperchloraemic metabolic acidosis
- Hypokalaemia and other electrolyte abnormalities
- Altered sensorium
- Disorders of hepatic metabolism
- Abnormal drug metabolism
- Vitamin B12 deficiency
- Decreased linear growth
- Bone demineralisation
- Mucus production

Adapted from Hautmann et al. (2007). [39]

# 6. Principles of management: Nursing interventions

## 6.1 Pre-operative assessment

### 6.1.1 Standardising forms, documents, tools

Several studies show that a care plan is important to reduce morbidity and to improve recovery. [40, 41, 42] Care plans are a way of documenting and communicating patient care and should include daily aims, such as mobilisation, that increase day by day.

The plan should start on the day of surgery, when the patient should be helped out of bed at least once. [42, 43]

Without a specific document delineating the plan of care, important issues are likely to be neglected and a retrospective data review showed a high degree of variability in patterns of patient care. [44] There are different rules and experiences [45] of documentation in different countries.

Recommendation	LE	GR
• Implement care plans for all patients with a neobladder/pouch following local documentation/recommendations	4	C

### 6.1.2 Nutrition

Not all patients undergoing a urinary diversion will have a cystectomy, but for those who do, an early institution of an oral diet is crucial in helping a patient to return to normal everyday living.

Radical cystectomy results in catabolic metabolism and tissue breakdown, leading to a prolonged period of negative nitrogen balance. Patients who are already malnourished prior to surgery have a higher morbidity after cystectomy, with studies showing that 17% of patients undergoing cystectomy are malnourished. [46] In addition, patients undergoing cystectomy are usually elderly (mean 71 years). [40] These patients may have multiple comorbidities and often a serum albumin in the low normal range. [41, 47] A pre-operative nutritional assessment is therefore important to ensure a goal-directed nutrition therapy.

There is evidence that pre-operative total parenteral nutrition (TPN) should be recommended in malnourished patients because TPN can reduce morbidity in this group. However, TPN has been shown to increase morbidity in well-nourished subjects [46], so careful patient selection is important. Pre-operative oral nutritional supplementation is recommended in patients with severe nutritional risk for 10-14 days prior to surgery [48]. Oral nutritional supplementation does not appear to have clinical benefit in a patient with a minimum intake of 1900 calories/ per day. [49]

The Guideline for prevention of surgical site infection 1999 recommends tobacco cessation at least 30 days before operation.

Recommendations	LE	GR
• Pre-operative nutritional assessment of the patient	1b	A
• Tobacco cessation at least 30 days before operation	1b	A

### 6.1.3 Activities of daily living (ADL)

It is defined as the things we normally do in daily living including activities we perform for self-care (such as feeding, bathing, dressing and grooming ourselves), work, home making and leisure activities. (Medicinenet.com)

The ability or inability of performing ADL can be used as a measurement of an individual's functional status.

There is no doubt that any urinary diversion constructed will have impact on patient's future life [50] and might change the ADL functional status.

Therefore assessment of the patients ADL functional status is an important measurement when counselling pre-operatively regarding future activities. Based on the present ADL status of the patient the NS can give a realistic picture of how the patient will be able to perform ADL, such as work, leisure and home care activities after surgery and with a urinary diversion resulting in a better long-term adjustment. [51]

Recommendation	LE	GR
• Pre-operative assessment of ADL functional status, including data about work, leisure, sport-activities and home making	4	C

### 6.1.4 Social context and support

Financial and social support regarding illness and/or surgery differs from country to country. Also the conditions at the patient's place of employment might differ.

There are also different rules for subvention to medical aids such as catheters, pads and dressing and to transportation to and from hospital regarding treatment and surgery.

As the financial situation could be a concern for any patient [52] it is important to discuss this issue with all patients in order to counsel and advise them regarding the individual rules for financial and social support in their specific country.

Patients may experience a change of role or status within family and among friends as illness and/or surgery make them dependent of the support and assistance from family and friends. This could cause increased stress and anxiety. [52] The other way round partners and family members too may feel fear and anxiety concerning the patient, the surgery and the future.

Partners and relatives have an important role in the initial post-operative recovery phase. Due to the decreased stay in hospital the patient will require additional family support for assistance with physical care [52] and managing catheters. [53]

All these subjects should be discussed with the patient and his/her possible partner/relatives before surgery to reduce stress and anxiety for all and get a clear overview of the resources among the family/supporters.

If no support is available from the patients nearby surroundings other possibilities should be arranged such as support from home care nurses and the community.

Recommendations	LE	GR
• Pre-operative assessment of eligibility for financial support	4	C
• Inclusion of partner/family members at pre-operative assessment to establish support mechanism	4	C

### 6.1.5 Psychological aspects, compliance and cognition

Undergoing major surgery resulting in formation of a continent urinary diversion is very distressing for most patients. The threat of complications, helplessness, alteration in body-image and body-function concerning eliminating urine and impact of future sexual function contribute to anxiety and fear of the future. [54]

Most patients undergoing surgery may experience increased fear and anxiety due to a diagnosis of bladder cancer.

Lack of knowledge regarding the diagnosis, surgery, pre-operative procedures and short- and long-term post-operative care and hospitalisation in a non-familiar environment might increase feelings of anger, grief, fear and anxiety. [55]

It is therefore important to create an environment in which patients and his/hers relatives feel free to express themselves emotionally and ask any questions. Knowledge decreases fear and anxiety and information provided should cover physical, social and psychological needs. [52] This is the task of a knowledgeable nurse such as an NS with expertise in the field of continent urinary diversions. [52] He/she also should explore the patient’s mental capacity and motivational level. This to assure that the patient understands the rationale and importance of using a catheter and follow a catheterisation plan/voiding plan. [56] It is important to discuss the impact a continent urinary diversion will have on their life.

All patients undergoing surgery resulting in an orthotopic urinary diversion should be taught CISC prior to surgery to ensure that they are physically and emotionally ready to commit to this procedure. It is important to give the patient a realistic picture of functional outcomes regarding altered voiding function and the risk of some level of daytime and night time incontinence. [39]

Some studies advise patients for cutaneous continent urinary diversions to be taught CISC pre-operatively for the same reason. [53] Manual dexterity should be assessed.

Written information and illustrations about surgery and the specific continent urinary diversions should be available to support orally provided information.

As some patients could benefit from meeting a former similar patient that has successfully undergone surgery [57], the NS should be able to arrange contact to a former patient. Sharing experiences and providing a realistic view of how life is with a continent urinary diversion, could enhance the patient's confidence with adjusting after surgery.

Recommendations	LE	GR
• Pre-operative assessment of psychological capability and motivational level	4	C
• Audio and visual information should be provided	4	C
• Opportunity to meet similar patients should be provided	4	C

### 6.1.6 Cultural and religious issues

Modern multi-cultural society requires a health-care system that reflects and respects an individual's colour, culture, religion and customs.

Being aware and responsive to culture is an essential component of care. A continent urinary diversion might influence and create problems in relation to religious and cultural practice.

This should be assessed prior to surgery and discussed with the patient. In case of doubt the patient and the NS should seek advice from the specific religious and cultural society.

For example Islam has a fasting period, Ramadan, which requires fasting from dawn to dusk, which could mean a 12 hour period without fluid intake and high risk of dehydration. Here it would be advisable to ask the patient's imam whether there are exceptions related to the specific Islamic patient with a continent urinary diversion. [58]

Recommendations	LE	GR
• Be aware of the patient's cultural and religious background	4	C
• Maintain the patient's dignity at all times	4	C
• Provide translation services when necessary	4	C



## 6.2 Patient preparation

### 6.2.1 Nutrition and hydration

Fasting before surgery is necessary because general anaesthesia reduces the efficiency of laryngeal reflexes and increases the risk of tracheobronchial and pulmonary aspiration. [47] However, resulting abnormalities of fluid and electrolyte balance may affect organ function. The goal of pre-operative fluid therapy is to maintain an effective circulatory volume while avoiding interstitial fluid overload. [59] This involves minimising the period of pre-operative fasting. In response to fasting, insulin resistance also develops. As clear fluids transit the gut extremely fast, it is recommended the patient drinks a glass of clear fluid 2 hours before surgery.

Patients undergoing bowel preparation can be moderately dehydrated. Randomised controlled trials have shown that careful concurrent administration of either intravenous or oral hydration solutions may help restore normal fluid balance. [59]

Recommendations	LE	GR
<ul style="list-style-type: none"><li>• The patient should receive verbal and written instructions to ensure compliance with no food intake 8 hours, and no fluid 2 hours, before surgery [47, 60]</li></ul>	1a	A
<ul style="list-style-type: none"><li>• Assess the fluid balance of the patient to identify dehydration and start fluid therapy pre-operatively</li></ul>	1a	B

### 6.2.2 Bowel preparation and bowel function

Bowel preparation varies between hospitals and individual surgeons.

The bowel preparation strategy for surgery involving the use of intestine has been redesigned in the last few years.

One example of bowel preparation uses polyethyleneglycol and sodium phosphate. New studies have shown that systematic bowel preparation fails to offer significant benefit for the patient [61, 62] although there is no general consensus in the literature.

Scientific literature warrants a practice based on solid evidence, which includes correct antimicrobial prophylaxis and a meticulous surgical technique, because this offer the best surgical expectations and an increased patient comfort. [61]

The new mechanical bowel preparation (MBP) consists of a fibre free low residue diet during the 5 days preceding surgery, although with adequate hydration and a simple cleansing enema the night before. [63] The sole purpose of the enema is to avoid the presence of faecal remains in patients who will spend several days before normal bowel transit is restored after surgery.

Recommendations	LE	GR
Patient should be assessed:		
• regarding the need for bowel preparation within local guidelines	4	C
• regarding their hydration status	4	C

### 6.2.3 Shaving

Guidelines about pre-operative shaving differ in European countries.

Recent studies have shown that the most important pre-operative skin preparation act in this concern is the disinfecting bath with chlorhexidine. [64]

Concerning the way of shaving, electric clippers are preferable to razor blades.

The areas that are most commonly shaved are: the abdomen, the pubic area, the upper legs and the peri-anal region.

To prevent site infections, it is recommended that hair should not be removed from the operative site unless it is to assist surgery. If hair is removed, removal should be immediately before surgery, preferably with electric clippers. [65, 66, 67]

Recommendations	LE	GR
• If hair is removed it should be done with electric clippers directly before surgery	1a	A
• Disinfecting chlorhexidine bath reduces surgical site infection during the post-operative period	2b	B

### 6.2.4 Patient education

#### 6.2.4.1 Pre-operative patient education

The NS is a vital resource pre-operatively for patients, families and other nursing staff. Discussion with the NS provides the patient an opportunity to have their procedure explained, time for questions and provide practical instructions for tasks such as catheterisation [69] or the correct procedure for Pelvic Floor Exercises for patients who undergo neobladder formation. [68]

Patient expectations and preferences may be influenced by the nature of their pre-operative education, therefore this preparation should be factual and realistic. [55] Teaching requirements of an individual who is undergoing surgical alteration to their urinary tract are significant due to the risk of multiple post-operative complications, the potential for altered body image, incontinence and change in sexual function. [70] Length of stay in hospital is ever decreasing leading to a greater responsibility for the patient and family/carer to manage post-operative care. [52] Well planned teaching pre- and post-operatively will facilitate an easier transition from hospital to home.

#### 6.2.4.2 Patient organisations and brochures

Many countries have national patient organisations to support patients following surgery to form a continent urostomy or neobladder. The objectives of these organisations are to safeguard the quality of specialist urological care, represent patients and their interests, provide the most recent and appropriate educational material and to facilitate networks that offer support from a patient perspective.

#### 6.2.4.3 Optimal timing for learning and practising skills

Learning was defined by Bloom et al (1956) [71] as an acquisition of psychomotor skill, cognitive knowledge or affective attitude achieved through study, experience or teaching. These 3 elements are independent but inter-related. Metcalf (1999) [72] further describes how practical skills can be taught, stating that psychomotor skills are effectively learned by repetition.

Patients must be physically ready to learn as all types of learning require energy. Motivation of the patient and any prior experience are important. The healthcare professional must be flexible and able to adopt a variety of educational strategies. Principles of social learning theory [72] underpin the strategy used to teach a patient catheter skills. There are two main concepts that explain how learning works in a practical situation – it is vital that the healthcare professional with a teaching responsibility understands these concepts. The first is giving praise to an individual, thereby providing a reward. Operant conditioning used deliberately as positive reinforcement, provides encouragement. When an individual has begun to acquire some skills, negative feedback may be useful if used appropriately as it helps the learner to establish areas of strength and weakness. [72] On discharge patients are at the ‘organising phase’ of learning – that is to say they are competent at a skill such as catheterisation, but have not yet achieved a level of confidence. It is therefore vital that patients have continued support at home from an appropriate healthcare professional to enable them to move to the ‘perfecting phase’ of learning.

Recommendations	LE	GR
• Patient education should be done by a NS and should start pre-operatively and continue as soon as able in the post-operative period	4	C
• Families/carers should be included in education with patient consent	4	C
• Written information should be provided to support any discussions	4	C

### 6.2.5 Procedure before and after surgery and at discharge

#### 6.2.5.1 Pre-operative Information

Patients are ideally admitted to hospital 1-2 days before surgery. During this time information given prior to admission should be reviewed and repeated.

Patients should be informed about the surgical procedure [69] and aspects of pre- and post-operative care. The important role they themselves have in maximising their early post-operative recovery by cooperating regarding physical activity and early post-operative nutrition should be emphasised.

They should know which catheters, drains and tubes they will wake up with after surgery, their purpose and function.

Expected short- and long-term outcome of the surgery should be explained, the maintaining of drainage tubes and CISC should be taught.

Patients should know CISC has to be performed more often in the beginning, which can be very fatiguing. If they have a suprapubic catheter this will be in situ until bladder capacity reaches a 'normal' capacity (500 ml). The newly created bladder must not be filled too much (preferably not more than 500 ml) because of the risk of leakage. Obviously practices may vary, but patients should be aware of this initial fatigue as a result of constantly having to empty their bladder.

All questions patients and families ask should be answered and they should be given opportunities to verbalise fears and concerns regarding the diagnosis, the surgery and anaesthesia, body function and lifestyle changes. [73]

Printed material which can help patients and families to remember information and instructions should be provided. [73]

<b>Recommendations</b>	<b>LE</b>	<b>GR</b>
• Information about all issues regarding surgery, pre- and post-operative care, short- and long-term outcome should be given to all patients	4	C
• Printed material as a supplement to orally given information should be available	4	C

#### *6.2.5.2 Post-operative teaching*

Patients are admitted to hospital for 7 - 14 days after surgery, depending of their early post-operative recovery.

The patient may be discharged with a variety of tubes/catheters (dependent on the physicians preference) for a variable number of weeks (dependent on various preferences) to allow healing of the suture lines in the continent urinary diversion. [74]

Irrigation of these catheters should be taught to the patient and trained as soon as possible after surgery. This to maintain a constant flow of urine and prevent mucus clots to block the catheter which may lead to distension and leakage of the continent urinary diversion.

Patients should know the warning signs of dysfunction such as decreasing drainage, inability to irrigate, low abdominal pain or feeling of abdominal fullness. [53]

The patient will attend hospital again when it's time for removal of the various tubes/ catheters.

After removal the patient with an orthotopic urinary diversion will be taught voiding by relaxing the rhabdosphincter and pelvic floor along with increasing the intraabdominal

pressure through the vasalva maneuver. [56] After catheter removal the patient is instructed to void while seated every 2 hours during the day and every 3 hours at night. [7, 9] Patients must be taught that the technique of voiding is mastered gradually. [70]

The patient should be instructed to use a voiding plan that over weeks increases the time between voiding in order to extend the capacity of the orthotopic urinary diversion. [70] The aim is to expand the bladder and achieve a capacity of 400-500 ml. [9] In case of night time incontinence the patient must be told that excluding alcohol, diuretic or hypnotic medications may prevent this. [9]

Continence should be obtained by teaching the patient how to exercise and rehabilitate the pelvic floor following a training plan. [70]

Due to the grade of incontinence the need of pads, size and shape, should be assessed.

All patients should be taught CISC in order to irrigate the orthotopic urinary diversion for intestinal mucus and secure complete bladder emptying. [75]

Patients with a continent cutaneous diversion should after removal of various tubes/catheters be taught how to empty the diversion. The first intubation should be demonstrated by the NS to assess the direction of the efferent limb and identify the difficulties the patient could meet when they themselves are trying afterwards. [69] They will also assess which catheter, shape and size, will be appropriate for the patient to use.

They also should use a schedule of catheterisation to gain an increment of the capacity of their cutaneous continent diversion. As example they could begin to catheterise every 2 hours during daytime and every 3 hours during night time increasing with 1 hour for every following week. [69] Irrigation to wash out intestinal mucus should also be demonstrated. [75]

The need for a cover of the continent cutaneous stoma should be assessed and the best suitable chosen. The patient should be taught how to care for the stoma, cleaning it carefully with lukewarm water and gently drying it afterwards using a soft material.

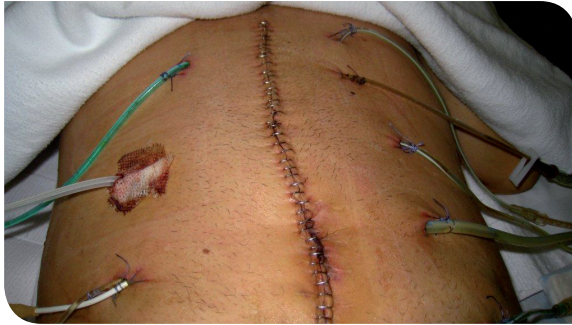
All patients should also know signs that indicate that the continent urinary diversion is full in order to adapt the new sensations as a replacement for natural desire to void. These signs could be the feeling of fullness, discomfort or cramping of the lower abdomen.

Recommendations	LE	GR
• All patients should be taught management of their continent urinary diversion by an NS	4	C
• A short- and long-term care plan regarding the management of the specific continent urinary diversion should be provided to all patients	4	C
• All patients should know signs of dysfunction/possible complications that might occur regarding their continent urinary diversion and where to find support	4	C

## 6.3 Post-operative care

### 6.3.1 Stents / catheters

Catheters and ureteric stents (originating in the renal pelvis) may be utilised to maintain adequate urinary drainage and to protect anastomoses. [73, 76] Some patients may also have a suprapubic catheter as a safety valve. [69, 77, 78]



*Fig. 3 Stents and catheters in the post-operative period*

The ureteral stents prevent upper urinary tract obstruction due to mechanical compression caused by post-operative oedema. The urine output from the urethral catheter should preferably be > 50-100 ml/hour and at least 30 ml/h. [79]

The potential for blockage of the drainage catheters always exists because all intestinal segments secrete mucus. It is important to prevent obstruction of the catheters to avoid overdistention of the reservoir which may prevent healing. Catheters should be flushed at least twice a day with 30-60 ml NaCl 0.9% using a sterile technique to avoid the formation of mucus plugs.

Intestinal segments continue to produce mucus after transposition into the urinary tract. Mucoregulatory agents have not proved to be effective in reducing the amount of mucus produced after bladder reconstruction. [80]

Regular bladder washouts with saline (0.9%) commenced post-operatively whilst catheter remains in situ is effective in cleaning mucus and debris from the neobladder. [81, 82, 83]

Recommendations	LE	GR
• The nurse should assess catheter function for urinary output	4	C
• Decreased urinary output should be investigated	4	C
• Fluid balance and recent serum creatinine levels should be measured and recorded [60]	4	C
• Catheters should be flushed at least twice a day	4	C

### 6.3.2 Fluid balance

The metabolic reaction to surgery involves not only the well-known metabolic response, but also important changes in fluid and electrolyte physiology. Patients are therefore extremely susceptible to errors in fluid prescription early after surgery. [59] In health, the average human requires 25-35 ml/kg/day of fluid and 400 calories per day to prevent starvation ketosis.

Research shows that peri-operative fluid therapy has a direct bearing on outcome. The goal of fluid therapy in the elective setting is to maintain the effective circulatory volume, while avoiding interstitial fluid overload, which may cause nausea and post-operative ileus. [59, 84, 85] These studies recommend an individualised goal-directed fluid management plan. Fluid therapy should be procedure-specific and take into account individual patient characteristics. Weight gain in elective surgical patients should be minimised to aim for 'zero fluid balance'.

However, fluid balance charts have inherent inaccuracies and reliance upon them alone can lead to inaccuracies in fluid prescription. Daily weighing is the best measure of fluid gain or loss. [84]

Recommendations	LE	GR
• Daily weighing in the post-operative period	1b	C
• Fluid balance documented on charts daily	4	C
• Clinical observation of the patient to identify fluid overload or dehydration	4	C

### 6.3.3 Nutrition

Nutritional support is an important area of post-operative care, which is known to improve recovery from cystectomy. [86, 87] Despite this, there is limited evidence to support specific nutritional strategies. Resting the bowel and feeding orally after bowel recovery is still a common post-operative strategy [46, 88], so that patients are often left without adequate nutrition for a prolonged time. This approach may be a result of research that has shown post-operative paralytic ileus to be the most common minor complication after radical cystectomy. [47, 89, 90, 91, 92] However this cannot be confirmed as several studies show that early oral intake does not foster prolonged post-operative ileus. [42, 88, 92, 93] On the other hand more studies are required before general recommendations are made concerning the benefit of early oral feeding upon post-operative ileus. [93]

Post-operative observations of bowel function should be part of a goal-directed nutritional therapy. There is little evidence that early TPN affects the return of bowel function and improves the outcome of cystectomy. [46, 47, 48]

Routine use of nasogastric tubes is not recommended because it is ineffective in reducing the duration of postoperative ileus and it might increase pulmonary complications such as atelectasis. [93, 94]

Post-operative nausea and vomiting is a common problem. Risk factors for post-operative nausea and vomiting (PONV) in adults are: history of PONV/motion sickness, female gender,

being a non-smoker (Society for Ambulatory Anesthesia 2007). [95] The use of nasogastric tubes in order to prevent PONV is not mentioned in this guideline.

Regular gum chewing may speed recovery of bowel function and hence reduce time to enteral feeding. [91] Another study has investigated the effect of removing the nasogastric tube to reduce time to oral diet. [40] The median time to tolerate a regular diet was 4.2 days. These results are similar to those of Maffezzini et al. (2006) [41], who evaluated the effect of early parenteral and enteral post-operative nutritional support on the restoration of normal bowel function. Early post-operative artificial nutrition had no effect upon bowel function or post-operative protein depletion and the median time to normal diet resumption was post-operative day 4 (POD). [41]

Recommendations	LE	GR
• Daily observation of the bowel function	4	C
• Daily screening of the patient's oral intake with a view to supplying with artificial nutrition	1a	A
• Counselling to involve the patient in the post-operative nutritional strategy	4	C
• Instruct patient in chewing a piece of gum every 2-4 hours for 10 minutes from POD1 until return of bowel function	3	C

#### 6.3.4 Post-operative wound management

Generally, post-operative care follows the standard protocol for any major abdominal surgery. However, post-operative infections of the surgical site are a major source of illness [65, 96] and several recommendations can be made to minimise the risk of infection.

The Guideline Prevention of surgical site infections (2008) [97] recommends control of blood glucose (to help wound healing). Current evidence does not support pre-operative showering or bathing with chlorhexidine to reduce surgical site wound infection rates. If hospitals choose to use pre-operative showering with chlorhexidine soap as an surgical site infection strategy, staff responsible for presurgical evaluations shall educate patients on the appropriate showering technique. [97]

Recommendations	LE	GR
• Protect the incision with a sterile dressing for 24-48 hours	1b	B
• Wash hands before and after dressing changes and any contact with the surgical site	1b	B
• When changing an incision dressing, use sterile technique	1b	C
• Educate the patient and carers regarding proper incision care, symptoms of Surgical Site Infection (SSI) and the need to report such symptoms	1b	C
• Control blood glucose level	1b	A



### 6.3.5 Post-operative pain management

Even though clinical practice guidelines are widely available for post-operative pain assessment and management, many patients still suffer from moderate to severe postoperative pain. This is because post-operative pain management continues to be based upon local nursing traditions and nurse judgement rather than a systematic, goal-directed, evidence-based clinical intervention.

Pre-operative information has positive effects on pain intensity and patient satisfaction. [98, 99] Poorly managed pain may interfere with wound healing, cause patient suffering and prolong recovery. Both patients and nurses accept pain as a normal component of the post-operative experience. [98] A visual analogue scale (VAS) can be used to assess pain and to manage the post-operative pain. Pain management should be procedure-specific and reduce the use of opioids, because opioids delay normal organ functioning. [100] Well-managed pain improves the learning ability of the patient concerning continent urinary diversion management and helps them to become mobile and to re-establish bowel function.

In the early post-operative phase the patient may be admitted to an intermediate care unit for intensive post-operative pain observation.

Post-operative pain may be managed by PCEA (= Patient Controlled Epidural Analgesia) or PCIA (= Patient Controlled Intravenous Analgesia).

Besides these analgesics paracetamol and/or NSAID will be administered post-operatively for a period of several weeks.

Recommendations	LE	GR
• Pre-operative information about the pain strategy should be provided	4	C
• A visual analogue scale both at rest and during activity should be utilised to evaluate the effects of prescribed analgesics	4	C

### 6.3.6 Post-operative physical activity

Early mobilisation is important to prevent cardiovascular and pulmonary complications and for faster recovery. Mobilisation can be initiated as early as day 1. [60] It is important to motivate the patient towards achieving an early, high level of post-operative activity.

Recommendation	LE	GR
• Patients should be encouraged to mobilise from the first post-operative day	4	C

### 6.3.7 Post-operative fatigue

The North American Nursing Diagnosis Association (NANDA) has defined fatigue as: “an overwhelming, sustained sense of exhaustion and decreased capacity for physical and mental work.” [101] It is characterised by feelings of tiredness, weakness and lack of energy. [102] Studies show that of all surgical interventions patients undergoing major abdominal surgery appear to experience the greatest increase in fatigue with 92% suffering from fatigue

following surgery. This proportion dropped to about 10% 3 months after surgery. In this meta analysis an increase in fatigue is reported from day 4-7 and day 8-15 for these patients. [103]

Factors contributing to post-operative fatigue are sleep disturbance [104], pain and concern about one's psychological and physiological condition. [105]

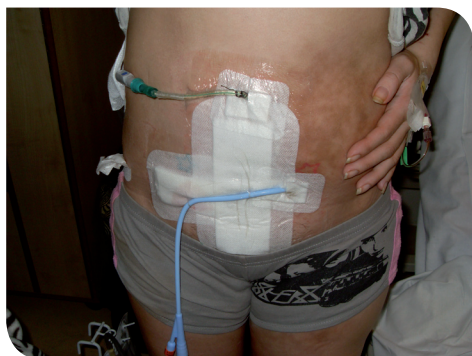
Recommendations	LE	GR
• Assess the patient's ability to perform activities of daily living (ADLs)	4	C
• The patient's sleep pattern should be assessed	4	C
• The patient's emotional response to fatigue should be addressed	4	C

### 6.3.8 Post-operative observation of pouch/neobladder

Post-operatively, the patient may have several stents and catheters.

It's important that the pouch remains completely empty so that the internal suture of the pouch can heal.

Around the catheter there may be an appropriate dressing to protect the stoma.



*Fig. 4 Catheters must be fixed securely*

Catheters must be fixed securely and tension free. It is important to check this daily.

Catheters are removed per local policy and procedure and will vary with the type of operation performed.

Recommendation	LE	GR
• Check that the catheter is tension free and draining effectively	4	C

### 6.3.9 Changes in urine

With a new bladder made from intestine, the urine may be cloudy. Depending on the fluid intake patients may experience this.

Colour and/or odour changes are described in paragraph 6.5.4.

### 6.3.10 Role of carers

Patient education begins before surgery and continues as soon as possible following the operation. However, most patients are unable to focus on instructions during the first 72 hours post-operatively. It can then be helpful that carers are involved at all stages of assessment and teaching. [68] The patient may also find themselves temporarily unable to perform some of the practical aspects of care once at home. In this situation it is vital that a family member can offer support and have the competence and confidence to perform the necessary skills for the patient. Involving family and carers will allow the patient to have access to immediate support at home and also may help the family and carers to understand the challenges faced. Although it is important to focus on the patient's needs, it is vital that the health care professional remembers to include the family/carers at all stages as they are also likely to have concerns and fears regarding the patient and the home environment. Family will have questions of their own which require answering. The role of the specialist nurse is not only one of knowledge giving, but includes also counselling for patient and carers/family. Expert education and careful follow-up will ensure confidence and satisfaction in the family and patient. [76]

Recommendation	LE	GR
• The role of the family and carer should be recognised and acknowledged	4	C

#### 6.3.10.1 Catheterisation management by carers

Caring for some patients with a urinary diversion may require both patient and carer to acquire new skills. Verbal and written instructions along with an opportunity to practise skills required for urine drainage are important pre- and post-operatively. The carer and patient will achieve competence and a level of confidence that will make transition from hospital to home easier to negotiate. [68] Use of a dvd, cd-rom or other visual aids will enhance the teaching/learning experience. Patients may feel more confident with the presence and support of a carer during the teaching phase.

Patients who require intermittent self-catheterisation (CISC) as a means of draining urine will eventually develop their own routine often catheterising up to 6 times a day depending on what volume of urine they can tolerate, and the sensation associated with the filling of the neobladder. It is important but not essential that a carer is competent at catheterisation in case a patient is temporarily unable to care for themselves. [68]



Fig. 5 Patient undertaking a bladder washout in the home situation

Recommendation	LE	GR
• Catheterisation techniques should begin to be taught pre-operatively	4	C

#### 6.3.10.2 Procedure for discharge care

From early admission the patient should be prepared for discharge.

Prior to discharge, it must be ensured that bowel function has returned, patients are nutritionally independent and can care for themselves with or without support. Patients and their carers should be familiar with managing tubes and/or catheters.

They should be able to recognise warning signs (such as temperature rise, infection, retention) and know how to react to these. [73] Patients should be provided with information to whom they can address their observations or concerns.

They should be provided with supplies and know where to obtain them from, in order to manage the continent urinary diversion. [74]

After tubes/catheters are removed and patients have been trained in the management of their continent urinary diversion, the following should be assured before discharge:

- Patients or carers should be confident with the new skills obtained in order to maintain and uphold the function of the continent urinary diversion.
- All information and knowledge given is comprehended by patient, family and carers in order to follow prescribed management of the continent urinary diversion. They should have achieved tools to mentally adjust to a life with an altered body function concerning urinating and processing the fear and anxiety they might have experienced during the course of surgery and admission to hospital. The need for follow-up psychological care should be assessed.
- The patient should be given a plan for appointments regarding follow-up visits and tests, and a contact number to the NS where they freely can address any case of concerns or problems.

- Regular follow-up is important for a long term satisfactory outcome.
- They should be familiar with the supplies they need for managing their continent urinary diversion and how and where to obtain these.

The NS helps the patient in making a decision on the right product.

NS should be independent in advising of the most appropriate material to the patient.

At discharge, the nurse should have discussed with the patient or carers the following self-care management aspects:

- the self catheterisation technique and different kind of catheters
- the reimbursement of catheters
- the daily management of the continent diversion concerning bathing, clothing, travelling, work, hobby, sexuality, etc.
- explain the colour of normal urine, red or cloudy urine, offensive odour and which action to take
- explain that a stoma can bleed
- explain that mucus is normal and what to do when there is more mucus than normal
- explain what to do when problems occur, such as odour, UTI, leakage, etc
- provide a contact telephone number for acute problems or questions
- explain the process of follow-up and control visits.

Dormann 2009 [106]

Recommendations	LE	GR
• Patients with continent urinary diversions should be offered life-long follow-up	4	C
• Patients should be given permission to contact the NS in case of problems or concerns	4	C
• Patients should be well-equipped with skills, knowledge and tools to manage life with a continent urinary diversion	4	C
• A teaching plan will increase learning by the patient	3	C
• At discharge the nurse should discuss self-care management items with the patient and his carers	4	C

## 6.4 Discharge care

### 6.4.1 Patient diary

Encouraging a patient to maintain a diary from the initial pre-operative experience may enhance the teaching and learning process. The diary can contain any pertinent facts and information that the patient may refer to as required. It can also become a valuable resource when liaising with the other healthcare professionals involved in the care of the individual during and after their initial hospitalisation. The diary is portable and of great significance should a patient require emergency care in an alternative healthcare environment.

Recommendation	LE	GR
• Patients should be encouraged to complete a diary of their experience.	4	C

#### 6.4.2 Reimbursement of appliances

The care for a continent urinary diversion does not require any specific appliance. Nor does the patient need any specific material for the management of the diversion itself once the continent stoma is established.

However, for intermittent self catheterisation the patient will need catheters.

Reimbursement differs in European countries as each country has its own healthcare insurance system and the personal insurance schemes also vary. Nurses should be aware of the national rules for reimbursement.

Notwithstanding the differences in national reimbursement systems, a good standard for reimbursement could be: 'as many catheters as the patient needs per day, with a maximum of 8 per day'. If the patient needs to catheterise more than 8 times a day, the patient should contact their urologist or NS.

Recommendation	LE	GR
• Patients should be informed about the reimbursement for appliances	4	C

#### 6.4.3 Information about possible complications

At discharge, oral and written information about possible complications should be provided to the patient.

The patient has to be aware that when serious problems occur, he/she should contact the NS, the urologist or the urology department.

#### Table 10. Common complications

- Skin irritations due to leakage of urine or infection
- Incontinence and leakage
- Urinary tract infections
- Fever for several days without cause
- Excessive mucus production
- Metabolic problems
- Persisting lumbar pain
- Painful catheterisation or urinating
- Sexual dysfunction
- Low urine production although sufficient fluid intake
- Bleeding in or around the stoma
- Persisting difficulties when introducing the catheter
- Obstructed access to the neobladder
- Persisting fatigue or weakness

- Losing weight without possible explanation
- Nausea and vomiting

Extensive information about this topic: see Chapter 8 ‘Nursing management of complications’

Van der Aa 2009, Gharajeh 2008. [107, 108]

## 6.5 Proactive and preventive care

### 6.5.1 Travelling with a pouch/neobladder

Travelling should not cause any major problems for the patient who has undergone surgery for a continent urostomy/neobladder. However the following advice should be discussed with the healthcare professional:

- If using appliances such as catheters always take extra items and pack them in hand and other luggage in case of any missing luggage;
- Ensure information is readily available on where and how to obtain extra supplies;
- Save space in luggage by arranging for catheters to be delivered to the destination address by the company supplying them, or remove products from boxes;

Extra luggage allowance is available on some carriers on provision of a medical letter.

### 6.5.2 Medic alert bracelet, ‘Can’t Wait’ card, disability card

Patients may feel more confident if they can carry aids such as a Medic Alert bracelet. This is an item that is worn at all times by the patient and contains a brief medical history in case a patient requires emergency care. Many companies who supply urology products produce a “Can’t Wait” card to use in the community. This allows the user rapid access to toilet facilities without the need for lengthy explanations or queuing.

### 6.5.3 Insurance/travel

Travel certificates are available from most manufacturers of catheters and are a useful aid to the patient who travels abroad. It explains to customs and airport staff about the patient’s need to carry medical devices/products and relieves the patient of the obligation to provide public explanations that may be embarrassing. The certificates are available in a variety of languages.

Conditions of travel insurance are variable depending on the insurance provider. Patients should be advised to check with their individual provider for any specific concerns. Insurers often request a medical report prior to agreeing cover.

Recommendations	LE	GR
• The NS should give advice on travelling	4	C
• The NS should provide patients with travel certificate and ‘Can’t Wait’ Card on discharge for future use	4	C

#### 6.5.4 Treatment for UTIs, fluid intake and effect of food and medication on urine

Urine from any type of urinary diversion is usually bacteriuric. [90, 109] It is important that patients are aware of the signs and symptoms of urinary tract infections. These include:

- Cloudy urine
- Offensive odour
- Visible blood
- Raised temperature
- Influenza like symptoms
- Pain and tenderness in the kidney area
- Nausea and vomiting

Treatment is not recommended in asymptomatic patients [109] even with a positive urinary culture. Studies identify that UTI occur in 50% of patients with enterocystoplasty. [110] Escherichia coli (E. coli) is the infecting organism in 50% of cases. Symptomatic patients with high levels of colonisation of E. coli should be treated with the appropriate antibiotic.

Studies identify that UTI occur in 50% of enterocystoplasty patients. [110] E. coli is the infecting organism in 50% of cases. There is some evidence that UTI in patients with ileal bladder may cause urinary incontinence. [111]

Patients with diabetes mellitus and reconstructed bladders have a greater risk of contracting a UTI. [112]

Recommendation	LE	GR
• Patients should be educated before discharge regarding signs and symptoms of urinary tract infection	4	C

#### *Fluid intake*

An individual's ideal daily fluid intake depends on various factors including body size and weight, age, exercise schedule and dietary intake. [113] Maintaining an adequate fluid intake is essential to minimise the risk of urinary tract infection. Ideally fluid intake for individuals with enterocystoplasty should be between 2.5 - 3 litres. [114, 115]

Inadequate oral intake is associated with increased incidence of bacteriuria [110], stone formation [116] and bladder cancer. [117, 118]

Recommendation	LE	GR
• Daily fluid intake of 2.5 - 3 litres	3	B

#### *Colour and odour changes in urine*

Individuals with an augmented bladder often have a heightened awareness of changes in their urine output. Normal urine is clear, straw coloured with almost no odour. [119] Certain food products, fluids and medication can affect the colour and odour of urine, however these changes do not necessarily occur in everyone.



**Table 11. Examples of colour and odour changes in urine**

<b>Medication</b>	<b>Colour or odour</b>
Amitriptyline	Blue-green
Anthraquinones	Red-brown (in alkaline urine)
Antibiotics (not all)	Offensive smell
Chloroquine	Rusty brown, yellow
Danthron	Orange
Ferrous salts	Black
Ibuprofen	Red
Indomethacin	Green
Levodopa	Darkens
Methyldopa	Darkens (red-black on standing)
Metronidazole	Red to brown
Nitrofurantoin	Brown or rust yellow
Phenolphthalein	Pink (alkaline)
Phenothiazines	Pink to red-brown
Rifampicin	Red to brown
Senna	Yellow-brown (acid urine); yellow-pink (alkaline urine); darkens on standing
Sulphonamides	Greenish blue
Triamterene	Blue
Vitamin B complex	Dark yellow
Warfarin	Orange
<b>Food and drink</b>	
Alcohol	Lightens colour
Asparagus	Green colour and offensive smell
Beetroot	Pink to dark red
Red fruit drinks	Pink to dark red
Oily fish	Fishy
Total parenteral nutrition	Offensive
Certain food smells appear to pass through into the urine, e.g. onions, garlic, some spices.	

Adapted from Landowski (2008), Mason (2004), Wallach (1992) and Watsons (1987) [120, 119, 121, 122]

### 6.5.5 Urine testing from a continent urinary diversion

All dipstick (Multistix) testing should be carried out on a freshly produced urine sample. Older samples become alkaline due to ammonia formation caused by bacterial breakdown.

*E. coli* is a natural inhabitant of the gut and will therefore be present in small amounts in stomal urine samples. Dipstick tests showing positive results for leukocytes and nitrites [123] may not be indicative of a urinary tract infection. Specimens should therefore be sent for culture and sensitivity. If the causative organism is found to be *E. coli*, with high levels of

colonisation, and the patient is symptomatic, this should be treated with antibiotics. Urine samples have no value in patients with rectal bladders. [124]

Recommendation	LE	GR
<ul style="list-style-type: none"> <li>Patients should be educated regarding the changes in their urine as a result of the procedure</li> </ul>	4	C

#### 6.5.5.1 *Glucose levels in patients with diabetes*

Urine testing in the patient with diabetes may be inaccurate due to glucose absorption by gastrointestinal segments. [125] A blood test should therefore be used to determine glucose levels.

#### 6.5.5.2 *Pregnancy testing*

The accuracy of “over the counter” pregnancy testing has been questioned in women who have had bladder reconstructed from bowel. [126, 127] Urine that has had exposure to segments of intestine has been identified as creating false positives. It is therefore recommended that pregnancy in women with reconstructive bladders is confirmed by blood test.

Recommendation	LE	GR
<ul style="list-style-type: none"> <li>A blood test should be done to confirm pregnancy in women with reconstructed bladders</li> </ul>	3	B

# 7. Products

## 7.1 Catheters

There is a large array of catheters available and the choice of which size to use is dependent on the type of continent urinary diversion.

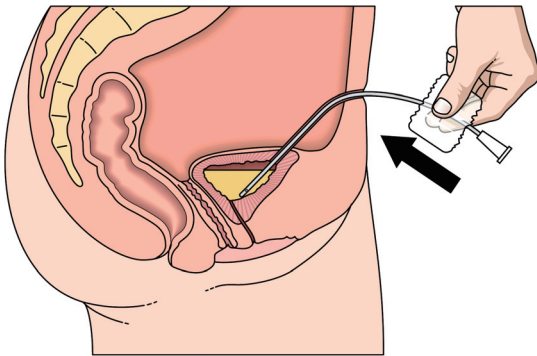
The choice for the patient with an orthotopic urinary diversion will be similar to the choice for patients performing regular CISC.

For patients with cutaneous continent diversions the choice will vary according to the specific surgical technique used.

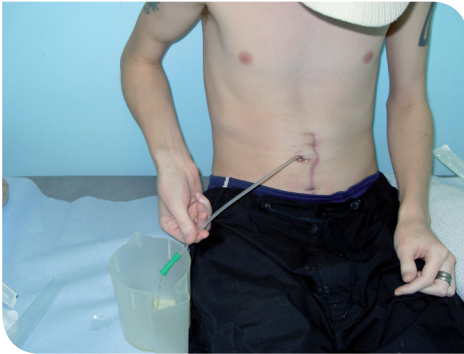
The two main types of catheters are the ones who need to be lubricated with water-soluble gel and the ones with a hydrophilic coating. [128] They can have a straight or bent tip. Some catheters have 'bigger eyes', this can sometimes be helpful when there is a problem with mucus blocking the catheter.

Choosing a catheter can be a very individual process and considerations regarding the patient's manual dexterity and lifestyle are important. [128] For wheelchair users using a catheter with integrated bag or a catheter with a urinary bag placed before catheterisation can be helpful.

### Catheterising channel post-operatively



*Fig. 6 Schematic drawing of intermittent self catheterisation of an access channel (Mitrofanoff)*



*Fig. 7 Intermittent self catheterisation of a Mitrofanoff channel*

Many prefer disposable catheters. Rolstad and Hoyman in Hampton and Bryant [129] though describe and advise the use of a rubber catheter, which is washed with water and soap and dried after catheterisation and stored in a clean plastic bag between catheterisations. Some urological departments still use this procedure.

<b>Recommendations</b>	<b>LE</b>	<b>GR</b>
• A large variety of catheters should be available for the patient with a continent urinary diversion	4	C
• The NS should guide the patient in the use of an appropriate catheter	4	C



*Fig 8a Various catheter tips*



*Fig. 8b For an access channel a standard length catheter is used (40 cm)*

## 7.2 Covers and activity pouches

Patients with a cutaneous continent urinary diversion often need a cover to protect the stoma, protect clothes from being soiled with intestinal mucus and for discretion. The cover could be an adhesive, absorbing cover similar to the ones used for wounds. Covers with a hydrocolloid adhesive with an absorbing centre similar to covers used by patients irrigating their colostomy, but without a filter, are available.

Patients who experience leakage might have to use a pouching system similar to what patients with an incontinent urinary diversion use. However, they should use a two-piece bag in order to be able to disconnect the bag from the wafer and catheterise and afterwards put the bag back on again.

The choice of a suitable cover or pouch is individual and should be carefully assessed together with the patient.

Recommendations	LE	GR
• A wide range of covers and pouches should be available for the patient to choose from	4	C
• The NS should guide the patient in the use of an appropriate appliance	4	C

## 7.3 Pads

Due to the risk of incontinence (see 5.2) patients with a neobladder will need pads to collect urine.

Pads are available in many different sizes and shapes with different ability to absorb urine, and the grade of incontinence will determine which pads are most suitable.

Patients may need different sizes as daytime incontinence commonly is less severe than night time incontinence.

Recommendation	LE	GR
• Patients should receive individual advice regarding their need for pads	4	C

# 8. Nursing management of complications

## 8.1 Physical aspects

### 8.1.1 Skin irritation

Skin disorders in connection with a continent urostomy is often caused by leakage of urine pooling on to the skin. The enzymes and the moist may irritate the skin and cause fungus infection or contact dermatitis. A skin barrier that resists urine erosion could be used in the case of very small amounts of urine getting in contact with the skin.

The adhesive cover can also contain material that has an impact on the skin resulting in skin damage. In that case a different product to cover the skin should be found.

Patients may also suffer from underlying skin diseases such as psoriasis and eczema. These should be assessed pre-operatively.

Recommendations	LE	GR
• Patients with skin irritation should consult their NS for help	4	C
• It is important to assess the aetiology in order to provide proper treatment	4	C

Geng 2009. [67]

### 8.1.2 Leakage

Some patients with a cutaneous continent diversion may experience leakage (see 5.5).

Leaking may make it difficult to live a normal life and may cause skin problems.

They should always consult their urologist in order to determine the cause and get possible treatment.

The NS can help solve the immediate problem by finding a solution to collect the leaking urine and prevent skin irritation.

If a urostomy appliance is used it should be a two-piece bag in order to let the patient take off the pouch and catheterise the cutaneous continent diversion according to the usual schedule and apply the pouch back on the wafer again afterwards. The pouch allow leaking urine to be released through a tap at the bottom.

Recommendation	LE	GR
• Patients should consult a urological specialist if they experience leakage	4	C

### 8.1.3 Bladder stone formation

Bladder stone formation has been found to be the most common complication in patients with bladder augmented with bowel. [110, 130, 131]

The most common urea splitting organisms cultured from individuals with reservoir stones are proteus mirabilis [132], providencia and klebsiella [110] which may lead to struvite stones. [133] These stones develop when urine is alkaline and bacteria are present. [134] The composition of struvite stones is usually triple phosphate. Patients who catheterise via an abdominal stoma have a higher risk (66%) than those who pass urine via their native urethra (15%). [132] The presence of stones increases the incidence of urinary tract infection.



*Fig. 9 X-ray showing bladder stones*

The incidence of stone formation is recognised to be higher in the immobile patient and those who catheterise via an abdominal stoma. The use of staples in the formation of the reservoir also presents an increased risk. [132]

Stones smaller than 5 cm may be able to be removed endoscopically. However open stone removal may be required for those over 5 cm. [116]

Study data suggests that following a bladder reconstruction a bladder irrigation regime reduces the incidence of reservoir calculi from 43% to 7% [132], with saline irrigation recommended twice weekly. However recurrent stones form in some patients despite mucus management. [135]

### 8.1.4 Use of cranberry in reduction of UTI, mucus and stone formation

Mucus production can be a problem causing blockage of catheters both in the immediate post-operative period and when intermittent self-catheterisation is necessary.

To date the most effective treatment in mucosal adherence is the cranberry. [82]

The cranberry, in both juice and capsule format, has become widely used in urology for the control of:

- urinary tract infection [136]
- mucus formation [137]
- formation of urinary stones. [138]

A native North American wetland fruit, cranberry (unlike most citrus fruits) does actually acidify the urine [139]. Early studies [140] identified the production of hippuric acid which had a bacteriostatic effect on the urinary pH (i.e. pH 5.5), although the concentrations required to achieve this was argued. Later studies advocated the use of cranberry juice in combination with oral medication, e.g. ascorbic acid and methenamine hippurate. [141]

*E. coli* are natural inhabitants of the gut and are therefore present in small amounts in the urine of patients with reconstructed bladders. If large amounts of mucus are produced and urine remains static it becomes an ideal medium in which to colonise *E. coli* and the patient may become symptomatic with fever, malaise and offensive urine. Under these circumstances the patient would be given antibiotics.

A meta analysis of studies into the effectiveness of cranberry concluded that there is some evidence that the juice may decrease the number of symptomatic UTI. [142] This may be achieved by decreasing bacterial adherence. [143]



*Fig. 10 Mucus in a jar*

A review on cranberry to prevent recurrent UTIs (2008 updated from 2004) included 10 randomized or quasi-randomized clinical trials. Most (7) studied cranberry in the form of juice, and 4 studied tablets (1,049 participants in total). The review found “some evidence” that cranberry juice may decrease the number of symptomatic UTIs over a 12-month period compared with placebo/control, especially in women with recurrent UTIs. The effect on UTIs may be achieved by decreasing bacterial adherence. [143]

A 2009 review on cranberry to treat UTIs concluded that there is no good-quality evidence on this question. [142]



Recommendations	LE	GR
• Bladder washout should be undertaken to reduce catheter blockage, UTI and stone formation in high risk patients	4	C
• Advise cranberry products to reduce the risk of UTI	3	B

### 8.1.5 Metabolic complications in patients following urinary diversion

Any metabolic complications in patients following urinary diversion depend mainly on the type of diversion used. In patients having an orthotopic neobladder or a urinary pouch, the urine remains in contact with the bowel segment for a longer period of time than in patients having a urinary conduit. The specific type of urinary diversion including the length of used bowel in the creation of the diversion may influence the severity of the metabolic alterations. [144]

In the continent type of diversions metabolic alterations can be recorded in up to 50% of the patients. [144]

The increased acid load in these patients originate mainly from reabsorption of ammonium chloride from the urine. Consequently, a low urine pH will lead to an increased reabsorption of acid.

The common symptoms of metabolic acidosis following urinary diversion are fatigue, muscular weakness and lethargy, anorexia as well as nausea and vomiting. There may also be symptoms like abdominal pain, epigastric burning, dehydration, weight loss and an increased respiration in order to compensate the acidosis. [70, 144, 145]

It is likely that many patients may have alterations in bone mineral density due to the long lasting acidosis. Women in the post climacterium phase or children seem to be at greatest risk of developing low bone mineral density. [144]

In order to reduce the reabsorption of acid it is important to ensure regular emptying of the orthotopic neobladder or drainage of the pouch.

Apart from metabolic complications, malabsorption of vitamin B12 and bile acid can be seen. Vitamin B12 deficiency may lead to severe non-reversible neurological damage. Malabsorption of bile acid may lead to cholegenic diarrhea. [146]

#### Table 12. Metabolic consequences of continent urinary diversion

- Acidosis
- Electrolyte disturbances
- Vitamin B12 malabsorption
- Bone demineralisation
- Stone formation
- Periodic stool frequency
- Hypomagnesemia

Recommendations	LE	GR
• All patients should be monitored regularly for B12 deficiency	2b	B
• Patients should be informed to contact the hospital when non-specific illness occurs	2b	C
• Patients must be advised to consume 2-3 litres of fluids daily	4	C
• Patients must be advised to void regularly/catheterise their pouch to completion	2b	B

### 8.1.6 Pain

Once the patient is fully recovered and rehabilitated, the management of the continent urinary diversion is mostly painless. However, some patients continue to experience pain.

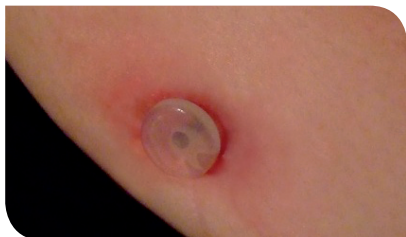
In case of pain when inserting the catheter in the pouch it can be helpful to re-evaluate the kind of pre-lubricated catheter the patient uses. Sometimes a catheter with another tip can be useful or prescribe the use of an extra gel to insert the catheter.

Persisting lumbar pain can sometimes occur, in which case a referral to the urological specialist and a renal check-up will be indicated.

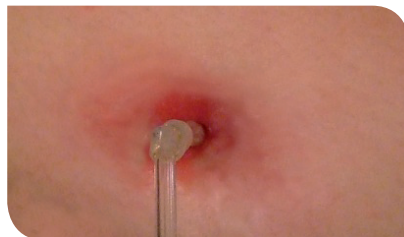
Recommendation	LE	GR
• In case of persisting pain patients should be referred to the urological specialist for a renal check-up	4	C

### 8.1.7 Stomal stenosis

Sometimes in cutaneous urinary diversion channels stomal stenosis occurs. This can sometimes already be within the few hours between the catheterisations, in which case an ACE-stopper can be helpful. This stopper can be used for one month and can be placed between the catheterisations [147] Or an I-stent (knotted catheter) can be used.



*Fig. 11 ACE-stopper*



*Fig.12 Knotted catheter*

Recommendation	LE	GR
<ul style="list-style-type: none"> <li>• Patency of the cutaneous channel can be maintained at surface level by use of an ACE stopper</li> </ul>	4	C

## 8.2 Psychological and social issues

### 8.2.1 Post-operative social considerations

Early promotion of self care and management skills can significantly help patients adapt psychologically following their surgery. [148]

Many patients will return to work following their surgery but may need to adapt their activities to follow a less strenuous or physically demanding lifestyle. This in turn may lead to a reduction in their income and alter their circumstances. There may be additional costs incurred through the necessity of attending follow-up appointments and visits to hospital. Patients may also experience a change in their role or status within their family maybe even becoming dependant. This can lead to increased stress, anxiety and depression. [149] identified that patients need to feel a part of a community. Patients need to be involved with family and friends on a social level as well as in the role of care assistants. [52]

Patients requiring catheters may need to consider bathroom facilities within their workplace or social environment. Advice on how to adapt inadequate facilities must be offered by the healthcare professional in the post-operative phase prior to discharge. [150, 151]

### 8.2.2 Cultural aspects

Modern multi-cultural society must be supported by an appropriate healthcare system that respects and reflects an individual's culture, religion, race and customs. Being aware and responding appropriately to cultural differences is an essential part of the healthcare professional's role. HCP need to recognise beliefs, values and health practices of different cultures to ensure that appropriate care and advice is provided. [58] For example; a patient observing the Sabbath in the Jewish faith may require support if they are required to use catheters during that time. A patient who fasts during Ramadan may limit their fluid intake for a 12-hour period, leading to a higher risk of UTI or renal damage in extreme cases. It is therefore recommended that the nurse specialist or patient should seek appropriate advice from the religious leader. [58]

### 8.2.3 Psychological aspects

Having a neobladder or stoma formation is a major event in anyone's life, patients can very easily become depressed or anxious. Counselling is vital and should begin prior to surgery and include family members. [152] Introducing the patient to another who has undergone the same procedure may be a valuable tool to enable the patient and family to adapt to the concept of surgery and prepare for the challenges ahead. Communication is integral in a nurse-patient relationship and necessary for education to be successful, thereby ensuring a patient is well-prepared to deal with the challenges of surgery and aftercare. [52]

### 8.2.4 Impact on quality of life (QoL)

QoL can deteriorate post-operatively for a lot of patients. The first few weeks post-operative are the most crucial. [153] Practical challenges such as catheters, stomas, access to public

toilet facilities may contribute to a low mood – support from family and friends is vital at this time. A psycho social assessment pre-operatively will identify potential challenges and allow the patient time to adapt facilities or develop coping mechanisms that will reduce the risk of post-operative depression. [154] A highly skilled nurse specialist with good communication and observation skills will play a critical role in promotion of health and well-being in patients who are undergoing urinary diversion surgery. [52]

## 8.3 Sexual function

Radical pelvic surgery can create difficulties with sexual function in both men and women. Sexual desire is often seriously affected even when nerve sparing techniques are used. [155] During pelvic surgery damage may be caused to:

- Nerve supply – of the superficial and deep nerves;
- Vascular supply – affecting engorgement and lubrication;
- Tissue-causing tenderness and reduced space.

### 8.3.1 Sexual dysfunction in males

Erectile dysfunction is defined as the persistent or recurrent inability to attain or maintain an erection sufficient for satisfactory sexual activity causing marked distress or interpersonal difficulty. [156]

Erection is a neurovascular phenomenon dependant on the flow of blood in and out of the penis. During pelvic surgery damage to the blood flow to the corpus cavernosum results in an inability to maintain satisfactory tumescence.

A significant percentage of men may present with erectile dysfunction prior to surgery. This information can be collated by pre-operative counselling, completion of sexual function questionnaires (IIEF) and nocturnal tumescence study (NPT). [157]

Radical pelvic surgery and formation of a reconstructed bladder will invariably result in some degree of erectile dysfunction. Damage is caused to several structures including the sympathetic and parasympathetic nerve supply. [158] The percentage of men with erectile dysfunction after radical cystectomy is high regardless of the type of bladder reconstruction. [155]

New nerve graft techniques after complete removal of the cavernous nerve have been developed to potentially recover lost erectile function. [159] Even after nerve sparing of the neurovascular bundles approximately 50% of men are likely to complain of erectile dysfunction. Nerve sparing laparoscopic surgery has improved the percentage of preserved function to between 43% - 97%. [160] It is now recommended that early rehabilitation in the post-operative phase is commenced to prevent irretrievable loss of erectile function. [161] Combination therapy of phosphodiesterase type 5 inhibitor and vacuum therapy have also significantly increased sexual function. [160]

Ejaculation will be affected if there is damage to the urinary sphincter. In the case of surgery to the bladder, prostate or urethra this will be inevitable.

Orgasmic ability and desire often remain intact due to circulating testosterone levels. It is important that patients are encouraged to explore alternative methods of sexual expression. [162] Psychosexual therapy, if available, should be considered so that both partners have the opportunity to discuss concerns in a supportive environment. [163]

### *Sperm banking*

As a significant number of men survive cancer therapy, including chemotherapy, radiotherapy and surgery, cryopreservation of sperm should be considered in the pre-operative period. [164]

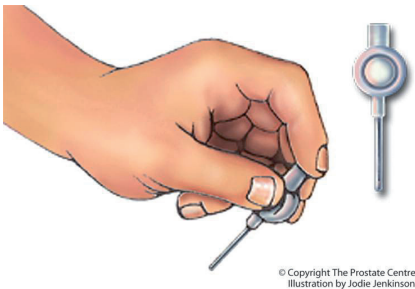
#### *8.3.1.1 Treatment of erectile dysfunction*

Treatments which may be suitable for men following reconstructive surgery include:

- Injection therapy
- Intra-urethral vasodilating medication (MUSE®)
- Oral medication
- Vacuum therapy
- Penile implants

*Injection therapy* – A vaso active drug (alprostadil) is injected into the corpus cavernosum with a fine gauge needle. The effect of the drug is to cause relaxation of the arterial and trabecular smooth muscle. The cavernous arteries dilate, the corpus cavernosum relaxes and is engorged with blood. [165] The erection should last approximately 1 hour. Priapism (prolonged erection) should be treated as a clinical emergency and medical advice sought. Gould et al (1992) [166] found that some patients suffered from persistent anxiety associated with self injection. Penile fibrosis may also become an issue. [167]

*MUSE®* – A small pellet containing alprostadil is inserted into the urethra using a disposable plastic applicator. Lubrication of the urethra can be achieved either by urination or by instillation of a water soluble gel prior to insertion of the pellet. The erection should occur 5 - 15 minutes after the insertion and can last between 30 - 60 minutes.



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Illustration by Jodie Jenkinson

*Fig. 13 MUSE® applicator*

*Oral medication* – The suitability of oral medication for patients with reconstructed bladders has been minimally investigated. [168, 169]) Oral agents are known to be more acceptable to both the patient and the partner. [170]

- Phosphodiesterase type 5 (PDE5) inhibitor. This medication is a facilitator rather than an initiator of erection. In the presence of sexual stimulation [171] this group of drugs promotes cavernosal muscle relaxation and inhibits the release of PDE5 (initiating chemical responsible for detumescence). Erections occur approximately 20 minutes after administration. Side effects have reduced and the duration of erection increased in recent years. This treatment is not suitable for men using nitrates or with a diagnosis of hypertension or recent myocardial infarction.

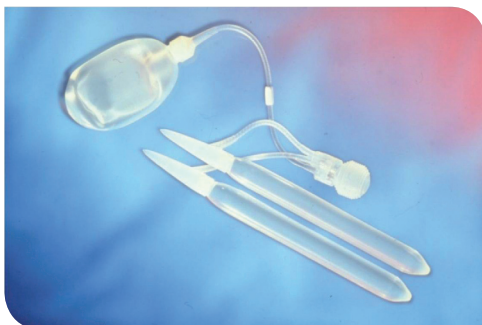
- Apomorphine hydrochloride – This sublingual medication stimulates the postsynaptic dopamine receptors in the hypothalamus. This enhances the natural erectile process. [172] However, this is only effective in those with intact sympathetic and parasympathetic nerve supply.

**Vacuum therapy** – External vacuum devices produce rigidity through vascular engorgement resulting in tumescence of the penis. [173] Vacuum devices are available both battery operated and as hand pumps. They consist of a plastic cylinder, constriction ring, lubrication and the pump. When the pump is activated, negative pressure (a vacuum) is created. Blood is drawn into the penis and an erection occurs. The constriction ring is rolled off onto the base of the penis and the cylinder removed. The erection can be maintained for up to half an hour. This system has been regarded as the most suitable for stoma patients as it is non-surgical and will not interfere with other treatments. Criticisms are the coldness of the penis and a lack of spontaneity.



*Fig. 14a and 14b Vacuum therapy devices*

**Penile implants** – This treatment tends to be reserved for men who have not responded to non-surgical treatments. It involves insertion of prosthesis into the corpus cavernosum. Malleable prosthesis produces a permanently erect penis which can be bent to accommodate intercourse and is flexible enough to be moved into a position of concealment. [158] Inflatable prosthesis consist of two basic designs, an integral inflatable/deflatable unit or those which involve insertion of a scrotal pump and abdominal reservoir.



*Fig. 15 Inflatable penile prosthesis*

Recommendation	LE	GR
<ul style="list-style-type: none"> <li>Male patients with post-operative erectile dysfunction should be assessed for suitability for treatment if requested</li> </ul>	4	C

### 8.3.2 Sexual dysfunction in females

Surgical damage in the female may include:

- Vascular supply – Reduction of lubrication to the vagina;
- Reduction in vaginal length
- Reduction in vaginal elasticity [174, 175]

Some studies have shown that when cystectomy and neobladder construction have been carried out for benign conditions in females it does not appear to have a negative effect on sexual function. [155, 176] However, radical cystectomy may require the additional removal of the ovaries, fallopian tubes, uterus and cervix and appears to have a high risk of female sexual dysfunction. This includes decreased orgasm, decreased lubrication, lack of sexual desire and dyspareunia. [175]

#### 8.3.2.1 Vaginismus

Vaginismus (spasm) - This condition can be purely psychological and can often be attributed to an involuntary pelvic muscle contraction caused in anticipation and fear of pain. This may be helped by relaxation methods and counselling. [176]

#### 8.3.2.2 Dyspareunia

Dyspareunia - Is a condition where intercourse (penetration) becomes painful. The cause may be internal scarring or lack of lubrication. Increased lubrication in the form of a water based gel or experimenting with a change of position can be helpful.

### 8.3.3 Fertility and pregnancy

Surgery for bladder reconstruction is undertaken in women of all ages and therefore issues around conception, pregnancy and childbirth must be considered. [127]

Debilitation may lead to loss of ovulation and internal scarring to a decrease of tubal patency.

#### Fertility preservation

Recent advances in cancer therapy have resulted in an increase in long term cancer survivors. Techniques to preserve fertility in young women are evolving and include cryopreservation of ovarian tissue and oocytes. [177, 178] Current clinical guidelines for the collection, storage and use of tissue for use in fertility preservation varies internationally. [179, 180, 181]

Pregnancy testing in those with bladder reconstruction may lead to false results. Samples taken may have been subject to reabsorption of electrolytes and hormones and therefore the concentration of human chorionic gonadotrophin can be altered. Blood samples should be taken. [126, 127]

Urinary tract infections and pyelonephritis are the most commonly identified urological complication in pregnancy. [132, 182] Urinary tract infections should be treated seriously and are generally treated with antibiotics immediately as pyelonephritis can result in

premature labour. [183] Data suggests that cranberry may provide a protective effect against asymptomatic bacteriuria and symptomatic urinary tract infections in pregnancy. [184] This study was carried out on non cystectomised patients.

During the latter stages of pregnancy it may become more difficult to CISC and therefore an indwelling catheter may be required. [127, 185] For those who catheterise via a Mitrofanoff channel a longer length catheter may be required (standard length single use catheter is 40 cm) to reach the augmented bladder.

Women with augmentation cystoplasty should be allowed to deliver vaginally and a caesarian section should be avoided to protect the bladder and augmenting bowel. [110, 182] Advice of a urological specialist should be sought. Many centres advise booking an elective pre term caesarean for all other types of bladder reconstruction with joint care between the urological surgeon and the obstetrician. [185]

Recommendations	LE	GR
<ul style="list-style-type: none"> <li>• Radical pelvic surgery need not mean the end of an active sex life for either men or women. Restoration of sexual activity may, however, require further treatment, a certain degree of adaptability and specialist intervention</li> </ul>	4	C
<ul style="list-style-type: none"> <li>• Patients should be advised pre-operatively of potential alterations to their pre-surgical sexual function</li> </ul>	4	C
<ul style="list-style-type: none"> <li>• Post-operative counselling should include discussion of treatment options and their suitability for individual patients</li> </ul>	4	C



# 9. Abbreviations

ADL	activity of daily living
CISC	clean intermittent self catheterisation
E. coli	Escherichia coli
ET	enterostomal therapist
ICS	International Continence Society
IgE	Immunoglobulin E
IUGA	International Urogynecological Association
MBP	mechanical bowel preparation
MS	multiple sclerosis
MSSU	midstream urine sample
MUSE®	Medicated Urethral System for Erection
NS	nurse specialist
NSAID	non-steroidal anti-inflammatory drugs
PCEA	patient-controlled epidural analgesia
PCIA	patient-controlled intravenous analgesia
PDE5	phosphodiesterase type 5
POD1	post-operative day 1
PSH	parastomal hernia
PVR	post-void residual urine
RCT	randomised controlled trial
RN	Registered nurse
SP	spina bifida
TPN	total parenteral nutrition
TUU	transuretero ureterostomy
UTI	urinary tract infection
VAS	visual analogue scale
VIP bladder	vescica ileale Padovana
WOC	wound, ostomy and continence
WOCN	Wound, Ostomy and Continence Nurses Society

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## **12. Disclosure of conflicts of interest**

All members of the EAUN Guidelines working group that has written this guideline have provided disclosure statements on all relationships that they have and that might be perceived to be a potential source of conflict of interest. This information is kept on file in the European Association of Urology Central Office database.



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