

Diagnosis and Treatment of Urinary Incontinence after Orthotopic Ileal Neobladder in China

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INTRODUCTION

Radical cystectomy for bladder and urinary diversion is considered the gold standard for treatment of muscular invasive bladder cancer or high-risk nonmuscular invasive bladder cancer. Urinary diversion is usually classified into three types: orthotopic neobladder, ileal conduit or sigmoid conduit, and cutaneous ureterostomy.^[1] Orthotopic neobladder is a better choice for urinary diversion than the other types because of its nonurinary diversion and better quality of life when this method is feasible for patients. One of the complications after creating an orthotopic neobladder is urinary incontinence. With an increasing amount of orthotopic neobladder procedures, more patients are suffering from urinary incontinence. Therefore, an article is required for diagnosis and treatment of urinary incontinence after the orthotopic ileal neobladder procedure.

CURRENT SITUATION

The quality of life of patients is affected by urinary incontinence after creating an orthotopic neobladder. With an improvement of surgical techniques, the incidence of urinary incontinence has been reduced. However, the amount of patients with urinary incontinence has increased with an increasing number of orthotopic neobladders. The incidence of urinary incontinence at night is usually higher (14–81%) than that at day (1–79%).^[2,3] The incidence of urinary incontinence after the orthotopic neobladder procedure varies according to diagnostic criteria and the follow-up time. Currently, there are no uniform diagnostic criteria,

and no specified tools, methods, or specific questionnaires about evaluation of urinary incontinence after creating an orthotopic neobladder. Therefore, different medical centers report different incidences of urinary incontinence after orthotopic ileal neobladder surgery because of these above-mentioned factors. This is a viewpoint about diagnosis and treatment of urinary incontinence after orthotopic ileal neobladder in China.

FACTORS AFFECTING THE INCIDENCE OF URINARY INCONTINENCE AFTER ORTHOTOPIC NEOBLADDER SURGERY

The incidence of urinary incontinence after orthotopic neobladder is related to the postoperative evaluation time, age of patients, method of surgery, and whether there is intraoperative preservation of nerves.

Postoperative evaluation time

Evaluation of urinary incontinence after orthotopic neobladder should be delayed until there is stable bladder capacity. This process usually takes 6–12 months,^[4] and a satisfactory continence can meet the needs of most patients.^[5]

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The daytime incidence of continence at the 6th, 12th, 24th, 36th, and 48th months can reach 63%, 70%, 76%, 88%, and 92%, respectively.^[6] We suggest evaluating the status of urinary continence at 12–24 months after orthotopic neobladder.

Patient's age

The incidence of urinary incontinence after orthotopic neobladder is affected by the age of patients. A previous study showed that after 5 years, the nocturnal incidence of urinary incontinence in patients aged younger than 60 years was 19% while it was 35% in patients aged older than 70 years.^[7] Another study showed that men who were younger than 65 years had significantly higher controllability of continence than those who were older than 65 years.^[4] Therefore, when patients are aged older than 70 years, doctors should inform these patients of the high incidence of urinary incontinence after orthotopic neobladder and apply this type of urinary reconstruction prudently.

Method of the neobladder procedure

Orthotopic neobladder includes ileal cystoplasty (Studer bladder, M-shaped ileum bladder), sigmoid cystoplasty, cecal cystoplasty, and gastrocystoplasty. Orthotopic ileal cystoplasty accounts for 39–74% of orthotopic neobladder.^[8] The incidence of urinary incontinence after receiving an orthotopic neobladder by day is 8–10% while it is 20–30% at night.^[9] Continence is affected by the different types of surgeries. A clinical control study showed that the nocturnal incidence of continence after sigmoid cystoplasty was 51% lower than that after ileal cystoplasty.^[10] We suggest that surgeons should select their own familiar method to decrease the incidence of urinary incontinence.

Intraoperative nerve preservation

The incidence of controllability of continence has improved by 5% when preserving nerves intraoperatively.^[11] However, whether preservation of nerves intraoperatively is effective in female patients is controversial. The continence mechanism of female patients with total pelvic exenteration and pelvic autonomic nerve preservation after ileal cystoplasty functions well.^[4] We consider that preserving nerves intraoperatively might result in a slightly high urinary continence rate, but complete tumor resection is important for patients.

CATEGORIES OF URINARY INCONTINENCE

Urinary incontinence can be classified into three types based on fluid mechanics as follows.

(1) Urinary incontinence can occur from the bladder. Urinary incontinence is caused by high pressure of the bladder, a low-compliance bladder, and increased spontaneous bladder contractions. In an urodynamic test, there are different degrees of contraction, regardless of which intestines have been used. (2) Urinary incontinence can occur from the urethra. A reduced ability of continence is caused by surgery. (3) Urinary incontinence can occur from both bladder and urethra. Neobladder contractions together with a deficiency in control of urine can lead to urinary incontinence.

DIAGNOSIS OF URINARY INCONTINENCE

The International Continence Society defines urinary incontinence as urine outflow without self-determination. Diagnosis of urinary incontinence after neobladder surgery is related to the followings: previous radical cystectomy for the bladder and orthotopic neobladder; the complaint of urine outflow without self-determination (by day and at night); urine outflow as shown by a physical examination; and a potential pathophysiological mechanism of urinary incontinence as shown by a clinical examination or urodynamic study.

EVALUATION OF URINARY INCONTINENCE

Treatment of urinary incontinence after the orthotopic ileal neobladder procedure is guided by basic evaluations, including the medical history, a physical examination, and a laboratory test. First, the medical history includes complaints, previous medical history, trauma history, and metabolic disease history. A questionnaire and voiding diary are used for determining the time, distribution, and accompanying symptoms and distressful index of urinary incontinence. Second, a physical examination includes examining the sellar region, a digital rectal examination, pelvic palpation, and a neurological examination. The neurological examination includes lower limb muscle strength, perineal sensation, anal sphincter tension, and pathological signs.^[12] The pad test can be used to evaluate the range of severity of disease. Third, basic laboratory tests, such as urinalysis, abdominal ultrasonography, and residual urinary volume (RUV) measurement, are used to evaluate complications and the degree of upper urinary tract lesions. Repeated flow rate measurements two to three times before an invasive examination are also recommended.^[13] A suitable urinary dynamics test is optional and should include measurement of bladder pressure volume, abdominal pressure leak point pressure, and pressure flow, as well as using a urethral pressure gauge.^[14] We suggest that a lower urinary tract and pelvic nerve electrophysiological examination can be performed when necessary.

TREATMENT OF URINARY INCONTINENCE AFTER ORTHOTOPIC NEOBLADDER SURGERY

Conservative treatment

Pelvic floor muscle training

Pelvic floor muscle training (PFMT) is used to enhance the function of the pelvic floor, improve stability of the urethra, and inhibit unstable contractions.^[15] PFMT is usually taught to patients preoperatively to prevent occurrence of urinary incontinence after the neobladder operation. We suggest that training should continue for 8–12 months after the operation. Clinicians should evaluate the strength and endurance of pelvic floor muscles. The contraction ability of pelvic floor muscles when abdominal pressure increases also should be evaluated. PFMT should be performed at least once a day, even if continence is present. The effect of PFMT can

be improved when carrying on biofeedback together.^[16] Clinicians should evaluate whether patients can have PFMT correctly and the possibility of recovery of continence.

Bladder training

Bladder training is considered as the first treatment for all types of urinary incontinence.^[15] Patients are suggested to void at regular times.^[16] We suggest that patients with nocturnal urinary incontinence should restrict water intake for 3 h before sleeping, usually for sensory loss of the neobladder.

Medical treatment

Anticholinergic agents

Anticholinergic drugs work well in patients who suffer from new unstable bladder contractions.^[11,17] Clinical trials have shown that the effect of oxybutynin (5 mg/tid) can be up to 70%.^[17] Glaucoma, gastrointestinal obstruction, reflux esophagitis, and myasthenia gravis are contraindications for anticholinergic drugs. Downie *et al.*^[18] showed that gastrointestinal inhibitors, such as Bentyl, can be an effective option, but this is not supported by prospective studies. We consider that anticholinergic drugs are an option for patients who suffer from an unstable neobladder.

Antidiuretics

Arginine vasopressin can be taken orally in older patients who have nocturia. However, arginine vasopressin should be used with caution in cases of cardiac dysfunction or hypertension and renal insufficiency. In addition, arginine vasopressin can cause the occurrence of hyponatremia.^[11] We consider that arginine vasopressin can be prudently taken in patients with neobladder who suffer from nocturia.

Imipramine

Imipramine is a type of antidepressive. Pressor agents are strictly prohibited while taking imipramine. Patients with hypertension, arteriosclerosis, or glaucoma should exercise caution when taking imipramine. Contraindications of this drug include epilepsy and pregnancy.^[11] Although the type of application is still controversial, we consider that imipramine is also an option for patients who have nocturnal urinary incontinence after receiving orthotopic ileal neobladder.

Surgery management

Surgery should be performed in patients who have low urethral closure pressure or abdominal leak point pressure when medication is ineffective.

Urethral bulking agents

Urethral injections in women are effective.^[19,20] A urethral injection is an optimal indication for patients who cannot tolerate anesthesia and open surgery or for those with severe complications. In patients with mild to moderate urinary incontinence, the cure rate is up to 66%.^[19] A urethral injection is the most minimally invasive surgical procedure for treatment of female urinary incontinence. The purpose of the operation is to achieve the effect of controlling urine by increasing closure of the internal orifice of the urethra.^[21] The persistent curative effect of the operation is limited, but this

procedure can be repeated several times. The most serious complication of urethral injections is urethral vagina fistula. Other complications include infection, urinary retention, hematuria, and implant allergies.^[21]

Artificial urethral sphincter implantation

Male patients with moderate to severe stress urinary incontinence after orthotopic ileal neobladder surgery might be considered for artificial urethral sphincter (AUS) implantation.^[22-25] The overall postoperative continence rate of this procedure is 70–95%. The repair rate of the AUS device is 16–60%, and the removal rate of this device is 19–41%.^[26] Major long-term complications of AUS implantation include infection, urethral erosion, urethral atrophy, and mechanical failure.^[27]

Pubovaginal sling

To avoid injury of the neobladder, the polypropylene sling should be fixed to the pubic tubercle by nonabsorbable sutures. The long-term cure rate of female stress urinary incontinence after the sling operation is >90%.^[28] Perforation of the neobladder, bleeding, and difficulty in urination are likely to occur after the sling operation. Other complications include foreign body reactions, a delay in wound healing, and erosion and infection of the sling.^[29] Once urinary retention occurs, intermittent catheterization is required in the long term. Patients who do not accept intermittent catheterization can consider bladder neck closure and urinary diversion.^[30] The most serious complication is injury to the iliac vessels.^[29] More clinical studies are needed to confirm the efficacy of the pubovaginal sling procedure for treatment of urinary incontinence after orthotopic ileal neobladder surgery.

In China, few patients have been treated with urethral bulking agent injections and AUS. Therefore, we suggest that urethral injections and AUS implantation should only be applied to patients when the surgeon has sufficient training.

FOLLOW-UP

To ascertain and treat complications that might occur or those that have occurred, continence should be monitored after the orthotopic ileal neobladder procedure for improving quality of life of patients. According to the characteristics of bladder tumor recurrence and recovery of urinary continence, we suggest the followings for follow-up.

Time required for follow-up

Currently, there is no standard time for the follow-up period. Olsen and Genster^[31] showed that after radical resection of the tumor, the rates of local recurrence and progression of the tumor and distant metastasis are highest in the first 24 months after surgery. These rates gradually decrease by 24–36 months, and 36 months later, these rates are relatively low. As mentioned above, evaluation of urinary incontinence after orthotopic neobladder should be delayed until a stable bladder capacity can be achieved. This process usually takes 6–12 months, and satisfactory continence can meet the needs of most patients. We recommend that the frequency of follow-up for patients

after the orthotopic neobladder procedure should be at 3, 6, and 12 months. This period can be prolonged to every 6 months the following year. Follow-up should then be considered only once a year.

Content of the follow-up

Follow-up should comprise the followings. First, a medical history is required. Second, the International Advisory Committee on urinary incontinence, urinary incontinence questionnaire, simple form, which includes the number of times and volume of incontinence and the quality of life index score, is usually recommended. Third, abdominal ultrasonography plus RUV are recommended to examine the upper urinary tract, and the location and shape of the neobladder. An urodynamic test is also recommended to examine the pressure of the urethra and neobladder and the stability and compliance of the neobladder when necessary. Abdominal and pelvic computed tomography is optional. A voiding diary is optional. Other options include routine urine and blood examinations, a renal function test, and measurement of electrolytes.

PERSPECTIVE

An increasing amount of patients are choosing a neobladder operation. Some patients will inevitably suffer from urinary incontinence. The postoperative evaluation time, age of patients, method of surgery, and whether there is preservation of nerves intraoperatively are related to the occurrence of urinary incontinence. The panel's expert opinion is that individual treatment options should be made based on different causes and types of patients. We recommended that doctors should adequately communicate with patients. We suggest that surgeons should select their own familiar method to decrease the incidence of urinary incontinence. We consider that preserving nerves intraoperatively might result in a slightly high urinary continence rate, but complete tumor resection is important for patients. A therapeutic regimen can be attempted using conservative treatment, medical treatment, or surgical treatment. Postoperative follow-up is important for the diagnosis and treatment of urinary incontinence after the orthotopic ileal neobladder procedure. Incontinence can seriously affect the quality of life of patients. Therefore, we suggest that more attention should be paid to incontinence. Further multicenter, clinical studies should be performed to minimize the possibility of incontinence and achieve the most satisfactory curative effect in the future.

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Conflicts of interest

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