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Description of the Clinical Course of Cystoscopy

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Abstract: *Cystoscopy is a standard endoscopy. Doctors use a transurethral cystoscope to observe interior conditions of the urinary bladder and urethra. Diagnosis of specific urinary system disease can be made based on the acquired conditions. For instance, urethral stricture, diverticula, cystitis cystica and prostatic enlargement. Besides basic functions on inspection, cystoscopy can be used to operate some treatments as well, which includes cystodiathermy, removing bladder stones, hemostasis and lesions in other organs that associated with the bladder. Doctors can choose various types of cystoscopes to operate cystoscopy or treatment according to the diverse symptoms of the patients.*

Keywords: *Cystoscope, cystoscopy, Inspection Procedures*

Introduction

This article analyses the clinical process of cystoscopy in terms of targeted patients, preoperative preparation, inspection procedures, treatment procedures, postoperative treatments and cautions.

Main Body

1. Targeted Patients

It is unnecessary to perform cystoscopy on patients who manifest urinary systems related conditions. Cystoscopy is required when the patient has the following symptoms.

(1) Hematuria is manifested. The source (like interior urinary bladder or upper urinary tract) as well as the reason for the bleeding can be acquired through cystoscopy.

(2) The patients have urinary tract infections. This condition is special, for cystoscopy only applies to patients who perform futility after anti-infective treatments or show relapses after being cured.

(3) The patients have long-lasting urgent, frequent urination or dysuria. Cystoscopy can provide useful clues for diagnosis when medications are ineffective to the patients. (*What Is a Cystoscope?*, no date, under 'Cystoscopy indication')

(4) Provide some treatments for patients, such as removing small tumours or stones in the bladder, take a biopsy, treat urethral stricture and so on. (HCF, no date)

2. Preoperative Preparation

(1) Preparation for the Instruments

Sterilize cystoscope with the vapour of 40 percentages formalin (formaldehyde) solution for 20 minutes or soak it in 10 proportions formalin for 20 minutes. Boil cystoscope or utilize ethanol for disinfection is forbidden, otherwise, cystoscope can be damaged. After disinfection, use sterile saline to wash out the disinfection solution. Then check whether the eyepiece and objective lens are clear. Adjust the height of the lens light and use sterilized glycerin on the outside of the lens sheath for lubrication. The ureteral catheter should be inserted into the ureteral intubation scope in advance.

(2) Preparation for the Operators

Doctors, as well as nurses, should sterilize their hands; wear disinfection clothes and sterile gloves. This is to ensure sterility and reduce the complications of iatrogenic urinary system infection.

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(3) Preparation for the Patients

The patient should empty their bladder and lie down. Use sterile saline on the penis or vulva for disinfection, then place a sterile hole towel to expose the urethral opening. When taking cystoscopies with different sorts of cystoscopes, the positions that are taken by the patients are also varied. When performing a standard rigid cystoscopy, the patients should take lithotomy position which means lying on the back with the knees up and apart and the feet will in stirrups. This kind of cystoscopy is rather painful, thus spinal or general anaesthesia might be needed, especially for male patients. When performing a flexible cystoscopy, the patients can take a comfortable and proper position under the instructions from the doctors. For anaesthesia, male patients need an injection of five to ten millilitres of one per cent tetracaine into the urethra and keep for 10 minutes. Female patients require one percentage of dicaine in the urethra for 10 minutes by the cotton swabs which are immersed in the solution to achieve anaesthesia. For both kinds of cystoscopies, if the patients have suprapubic catheters implanted, the doctor may perform the cystoscopy through the suprapubic opening. In either cystoscopy, the duration of anaesthesia must not be beyond 30 minutes. (*What Is a Cystoscope?*, no date, under 'Preparation before cystoscopy')

(4) Preparation for Various Treatments

(4a) For Removing a Ureteric Stent

Confirm which ureteric stent should be removed. Preparations for operators and the patients are the same as the above.

(4b) For Cystodiathermy

Before starting the treatment, check whether the cystoscope and irrigation fluid diathermy are compatible (like sterile water or 1.5 percentages glycine). Make sure cystodiathermy generator is available and ensure the bleeding area or abnormality inside the bladder is appropriate for cystodiathermy. Diathermy plate should be correctly applied to clean dry skin on patients' thighs which means it cannot touch bony prominences, scar tissue, tattoos, implanted metal prosthesis or hairy surfaces. Foot pedals are accessible. Ensure the insulation coating of the diathermy wire is intact then connect the wire to diathermy lead.

The patients ought to remove jewellery. Use non-conductive tape for jewellery that cannot be removed. The patients should have zero contact with metal surfaces.

The preparation for operators is the same as the above.

(4c) For Taking Biopsy

The parathion for taking biopsy includes the parathion for cystodiathermy, in case cystodiathermy is required during the treatment. Besides that, check the abnormality inside the bladder is appropriate for taking a biopsy and select the proper kind of biopsy forceps.

The preparation for patients and operators is the same as the parathion in cystodiathermy. (The British Association Of Urological Surgeons, 2012, pp. 24-38)

3. Inspection Procedures

Procedures are varied between male and female patients. For the male patient, it is necessary to inspect whether the urethra is in normal condition or has stenosis. Then uses a speculum to push slowly along the anterior wall of the urethra to the urethral membrane. If resistance occurs, wait until the urethral sphincter relaxes so that the speculum can enter the bladder smoothly. It is important to note that violent insertion is not permitted, for it causes damage to the urethra and forms a false tract. It is rather easy to insert the endoscope for female patients, but excessive deep insertion will cause damage to the bladder. If the mirror sheath is concave, doctors need to rotate the endoscope 180 degrees.

After the intubation endoscope is in the bladder, withdraw the lens core to measure the amount of residual urine. If the urine is turbid, this indicates severe hematuria, pyuria, or chyluria. Doctors should wash with irrigation fluid repeatedly until the returned fluid is clear, then an inspection scope is inserted. Sterile saline fills the bladder and enlarges it. This step is applied with minimum discomfort to the patient, usually around 300 millilitres. Withdraw the speculum slowly until the edge of the bladder neck is seen. Push the endoscope into two to three centimetres at the two lower corners of the bladder neck edge and the ureteral intercondyle can be observed. At the ends of the ureters, two ureteral orifices

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can be found. They may manifest peristaltic urination, blood or chyle.

If ureteral intubation is required, use ureteral catheters to insert into the ureteral orifices until the renal pelvis. Distinguishment on the left or right can be made by marking at the back end of the ureters. If the ureteral orifices are in a state of inflammation or congestion, the indigo carmine solution can be injected intravenously. Intubation can be guided when the ureteral orifice discharges blue.

After intubation, the urethral catheters ought to be inserted into the bladder then withdraw from the endoscope. Utilize the adhesive tape to fix the ureteral catheters to the vulva, otherwise, prolapse may occur. The whole operation must be gentle so that minimum damage is done to the patients.

A lateral renal function test is required when the indigo carmine test is not performed during the cystoscopy. Inject phenol red or indigo carmine intravenously to observe the colour and concentration when the urine is discharged from the renal pelvis.

Routine urine inspection is done by collecting urine from the urethral catheters. Sometimes it is necessary to undergo bacterial inspection and culture. If the urine drips continuously from the urethral catheter quickly. For instance, the urine can be aspirated more than 10-20ml at a time with a syringe, then the patients may have hydronephrosis.

For better diagnosis, retrograde pyelography will be performed. Inject five to ten millilitres contrast agent (usually 12.5 percentages sodium iodide solution) into two ureteral catheters by a syringe. The violent injection is prohibited. Stop the injection and sustain pressure if the patients have back pain.

After the inspection, withdraw the cystoscope while keeping the urethral lumen at the centre of the screen with irrigation fluid running continuously. This helps examine the urethra while reducing the risk of trauma and causing minimum discomfort to the patients. (*What Is a Cystoscope?*, no date, under 'Cystoscopy steps')

4. Treatment Procedures

(1) Remove a Ureteric Stent

Insert the grasper through the cystoscope and identify the grasping forceps after they enter the bladder. Make sure the grasper does not touch the tip of the cystoscope. The cystoscope should be kept straight while performing this step. Place the grasping forceps above the ureteric stent and ensure the hinges of the grasping forceps are not inside the channel of the cystoscope. Open the forceps with the instrument handles and grasp the ureteric stent firmly. It is crucial not to clamp any bladder urothelium. Withdraw the cystoscope, ureteric stent and graspers together from the bladder and the urethra. The procedure should abort when encountering resistance. After removing the ureteric stent, check whether it is complete and take action if complications have occurred.

(2) Cystodiathermy

Insertion of the diathermy wire and checkpoints are the same as the insertion of the grasper. After inserting the diathermy wire, use the tip of it to gently touch the abnormal area. Press foot pedals in short bursts until the abnormality is destroyed or the bleeding is stopped. Withdraw the diathermy wire by following aseptic procedures. Withdraw the cystoscope after examining the bladder urothelium. Check whether the skin under the diathermy plate is burnt and make further treatments. At last, turn off the diathermy generator and put away the foot pedals and the diathermy lead.

(3) Taking Biopsy

The whole procedures are almost identical to the removal of a ureteric stent except the removal and treatment of biopsy. When sufficient tissue is grasped, pull the forceps sharply but carefully from the bladder urothelium. Place specimen into fixative and inspect it. All tissue should be removed from the forceps, the procedures may repeat if the specimen is not suitable for histopathological examination. Check for bleeding and perform cystodiathermy when necessary. Make sure the specimen is kept within a leak-proof container. (The British Association of Urological Surgeons, 2012)

5. Postoperative Treatments

After the withdrawal of the cystoscope, clean out the surplus lubricant. Let the patients try to empty their bladders before leaving the department to see whether they can empty them. Commonly, patients

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manifest hematuria after the inspection due to the damages to the membranes. It usually takes three to five days to recover. The patients may feel pain or burning sensations during urination, this can be alleviated by drinking water or taking painkillers. Recovery often occurs after one to two days. Antibiotics are necessary to be taken by the patients when iatrogenic infections occur due to mistakes during aseptic operations. The infections include urinary tract infection, fever or back pain. (*What Is a Cystoscope?* no date, under 'Postoperative cystoscopy')

6. Cautions

(1) For Inspection

It is crucial to verify whether the patients are allergic to medications and instruments used before and during operations. For instance, the patients may be allergic to anaesthesia. If the patients have artificial urinary sphincters implanted, ensure they are deactivated during the inspection. Patients with severe urinary tract or bladder infections cannot take cystoscopy, for it may cause the spread of infections and may cause confusion to diagnosis due to the congestion of the bladder. Patients with a bladder volume of 60 millilitres or under cannot tolerate the inspection and may cause the bladder to rupture. The cystoscope cannot be inserted into patients who manifest phimosis, urethral stricture or incarceration of stones in the urethra. Lithotomy positions cannot be taken by patients with bone and joint deformities. Cystoscopy cannot be performed on patients who are in menstrual period, pregnancy for over three months, severely reduced renal function, uremia, hypertension and poor cardiac function. (*What Is a Cystoscope?*, no date, under 'Cystoscopy contraindications')

(2) For Various Treatments

(2a) For Removing a Ureteric Stent

The same as inspection.

(4b) For Cystodiathermy

The same as inspection and patients with cardiac pacemakers or defibrillators as well as metal prosthetic implants cannot take this treatment.

(4c) For Taking Biopsy

The same as cystodiathermy.

7. Conclusion

As a standard endoscopy, cystoscopy can provide effective information for clinical diagnosis via transurethral observations of the urethra and the bladder. Consider the different conditions of the patients, various sorts of cystoscopes corresponding to the conditions are used. This further improves the feasibility and applicability of the inspection. Besides the aspect of the inspection, cystoscopy can also be performed together with other instruments to apply some treatments to the patients. Proper operations make minimum effects on the patients. It usually takes a week for the patients to recover and return to their normal lives. However, cystoscopy cannot be performed on specific patients, indicating spaces for improvements. To summarize, cystoscopy not only brings reliable evidence for clinical diagnosis but also contributes to the treatments of some urinary system diseases. Kinds of cystoscopes increase corresponding to the conditions of patients, making the cystoscopy more universal to apply. The impact of the inspection is also acceptable, but further improvements can be made so that specific patient may be examined.

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