

Original Research Article

Effect of Clinical Application of Spiral CT Three Dimensional Imaging in Patients with Anterior Urethral Stricture

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Abstract

The purpose of this paper is to explore the clinical application of spiral CT three dimensional imaging in patients with anterior urethral stricture. 82 cases of male patients with urethral stricture treated in our hospital from January 2013 to September 2017 were selected. According to the random digital table method, the patients were randomly divided into the observation group and the control group, with 41 people in each group. The two groups of patients were treated with transurethral resection of the cold knife. The traditional X - ray urethra was performed in the control group before operation, and the observation group was performed with spiral CT urethra imaging. The measured length of urethral stricture, the operation condition, the postoperative recovery and the postoperative complications of the two groups of patients with urethral stricture were compared. The results are that the length of urethral stricture before operation and the length of urethral stricture during operation in the observation group were smaller than those in the control group, but the difference between the two groups was not statistically significant ($P > 0.05$). The time of operation and the time of hospitalization in the observation group were shorter than those in the control group, and the difference between the groups was statistically significant ($P < 0.05$). There was no statistically significant difference between the two groups in the postoperative Qmax and the recurrence at 6 months after operation ($P > 0.05$). The incidence of complications in the observation group was lower than that in the control group, and the difference between the groups was statistically significant ($P < 0.05$). The conclusion is that the patients with anterior urethral stricture can evaluate the condition of urethra stricture better by spiral CT three-dimensional imaging. It can also guide the surgical treatment, which has good clinical effect and application prospect.

Keywords: Anterior Urethral Stricture, Spiral CT, Clinical Effect

Efecto de la aplicación clínica de la imagen tridimensional con TC espiral en pacientes con estenosis uretral anterior

Resumen

El propósito de este trabajo es explorar la aplicación clínica de la imagen tridimensional con tomografía computarizada en espiral en pacientes con estenosis de uretra anterior. Se seleccionaron 82 casos de pacientes masculinos con estenosis uretral tratados en nuestro hospital desde enero de 2013 hasta septiembre de 2017. De acuerdo con el método de la tabla digital aleatoria, los pacientes se dividieron aleatoriamente en el grupo de observación y el grupo de control, con 41 personas en cada grupo. Los dos grupos de pacientes fueron tratados con resección transuretral del cuchillo frío. La uretra de rayos X tradicional se realizó en el grupo de control antes de la operación, y el grupo de observación se realizó con tomografía computarizada en espiral de imágenes de uretra. Se comparó la longitud medida de la estenosis uretral, el estado de la operación, la recuperación

postoperatoria y las complicaciones postoperatorias de los dos grupos de pacientes con estenosis uretral. Los resultados son que la duración de la estenosis uretral antes de la operación y la duración de la estenosis uretral en el grupo de observación fueron menores que las del grupo control, pero la diferencia entre los dos grupos no fue estadísticamente significativa ($P > 0.05$). El tiempo de operación y el tiempo de hospitalización en el grupo de observación fueron más cortos que los del grupo de control, y la diferencia entre los grupos fue estadísticamente significativa ($P < 0.05$). No hubo diferencias estadísticamente significativas entre los dos grupos en el Qmax postoperatorio y la recurrencia a los 6 meses después de la operación ($P > 0.05$). La incidencia de complicaciones en el grupo de observación fue menor que en el grupo control, y la diferencia entre los grupos fue estadísticamente significativa ($P < 0.05$). La conclusión es que los pacientes con estenosis uretral anterior pueden evaluar mejor el estado de la estenosis uretral mediante imágenes tridimensionales de TC en espiral. También puede guiar el tratamiento quirúrgico, que tiene un buen efecto clínico y una perspectiva de aplicación.

Palabras clave: Estenosis uretral anterior, TC espiral, efecto clínico

1. Introduction

Urethral stricture is a common obstructive disease of urinary tract in Department of urology. It is frequently occurring in male patients. Urethral stricture is relatively difficult and prone to stenosis and recurrence, as well as complications such as two strictures, which have a serious impact on the quality of life of the patients. According to the epidemiological statistics, the incidence of urethral stricture in middle and old age male patients is more than 1%, and the incidence of urethral stricture caused by iatrogenic factors has increased year by year, and the common causes of urethral stricture include traumatic urethral stricture and inflammatory urethral stricture.

The most common symptom of urethral stricture is dysuria. There are varying degrees of frequent micturition, urgency and voiding. If the condition is not effectively controlled, residual urine, urine retention and filling urinary incontinence will occur with the aggravation of the patient's condition. Recurrent urinary retention and inflammation can occur in patients with pyuria symptoms, and patients with severe stenosis can have symptoms of hematuria.

At present, surgical treatment is the main treatment for urethral stricture, and patients with urinary tract infection need symptomatic anti-infective treatment. The surgical treatment of urethral stricture needs to specify the location, length, severity and the scope of the scar tissue around the urethral stricture as detailed as possible before the operation. It is of great significance to clarify the severity of the patient's condition and to guide the surgical treatment. At present, the commonly used preoperative imaging examination of urethral stricture is X-ray urethra. It has many advantages, such as simple operation, low cost and rapid report. But X-ray examination cannot show the relationship between the stenosis and the surrounding tissue and the scope of the surrounding scar tissue. With the continuous progress of medical imaging technology, including ultrasound, spiral CT, and

MRI urethra examination, more examinations for patients with urethral stricture are evaluated before operation. The spiral CT three-dimensional imaging examination can observe the urethral structure from multiple angles, and the results are not disturbed by the pelvis and soft tissue and so on. It has good clinical effect. In order to further explore the clinical effect of spiral CT three-dimensional imaging examination for patients with anterior urethral stricture, 82 patients with anterior urethral stricture were treated with different pre imaging examinations, and the results of clinical application were discussed and satisfactory results were obtained. The following reports are as follows:

2. Data and Methods

2.1 General Information

82 cases of male patients with urethral stricture were selected from January 2013 to September 2017. According to the random digital table method, the patients were randomly divided into the observation group and the control group, with 41 people in each group. The age of the control group was 25-63 years old, with an average age of (45.39 + 13.12) years. The course of disease was 1 months -30 years, with an average of (3.52 + 1.65) years. There were 8 cases of severe anterior urethral stricture in 41 cases. The patients were treated with transurethral resection of the cold knife, of which 9 patients were operated on open surgery. The age of the patients in the observation group was 25-60 years old, with an average age of (46.01 + 12.43) years. The course of disease was 1 months -30 years, with an average of (3.49 + 1.50) years. There were 6 cases of severe anterior urethral stricture in 41 cases. The patients were treated with transurethral resection of the cold knife, of which 2 patients were operated on open surgery. There was no statistical difference in age, course of disease and operative way between the two groups, which was comparable ($P > 0.05$). All the patients and their families were informed of the treatment plan, and agreed to enter the group for

diagnosis and treatment and signed the informed consent. The test was approved by the ethics committee of our hospital.

2.2. Imaging Examination Scheme

(1) The control group: traditional X - ray urethra. The patients in the supine position were routinely sterilized and placed in the urethral catheter. The urethral catheter was placed in the urethra for about 3cm. The aseptic scissors are used to cut the wrist of the sterile glove in advance and bind the distal penis with the wrist to prevent the spillover of the compound diluent. Slowly inject the diluent of compound diumamine through the catheter. In the process of injection, we should pay attention to the spillover of compound meglumine from the urethral mouth, if there is a spillover, adjust the binding position, and dry the spillover. If there is no spillover, and insufferless bladder fistulae, the 20-30ml compound diluent is injected, if there is no spillover but the patient has suprapubic vesical fistula, then 60-80ml compound diluent is injected into the stoma, and the fistula is injected after completion. The patient was asked to perform urination and the catheter was slowly injected into the compound meglumine diamine diluent.

(2) Observation group: spiral CT urethra angiography three dimensional imaging. The patient's position and injection of contrast agent were the same as that of the control group. The patients were asked to make urination and the urethral catheter was slowly injected into the diluent of the compound diamamide, and the spiral CT scan was performed during the injection.

The concentrations of compound meglumine in two groups were 20%.

2.3. Observation Index

(1) Comparison of the length of urethral stricture in the two groups: measurement of urethral stricture length by imaging before operation and the actual measurement of the length of urethral stricture during operation in the two groups are compared.

(2) Comparison of the operation and postoperative recovery in the two groups: the operation time of the two groups, the maximum postoperative urinary flow rate (Qmax), the time of

hospitalization and the recurrence of urethral stricture in the 6 months after the operation are compared.

(3) Comparison of postoperative complications in the two groups of patients: The two groups of patients with urinary incontinence, cavernous injury, and urinary extravasation were compared.

2.4. Statistical Treatment

SPSS21.0 was used to carry out statistical treatment. The measurement data were expressed with mean \pm standard deviation ($\bar{x} \pm s$). The t test was used, counting data was expressed by percentage, and χ^2 test was used. $P < 0.05$, the difference was statistically significant.

3. Results

3.1. Comparison of the Length of Urethral stricture in two Groups

The gap between the length of urethra stenosis before operation and the length of urethral stricture measured during operation in the observation group was smaller than that in the control group, but there was no significant difference between the two groups ($P > 0.05$). As shown in Table 1.

3.2. Comparison of the Operation and Postoperative Recovery in the two Groups of Patients

The operative time and hospitalization time in the observation group were shorter than those in the control group, and the difference between the two groups was statistically significant ($P < 0.05$). There was no significant difference in the recurrence of Qmax and 6 months after operation in the two groups ($P > 0.05$). As shown in Table 2.

3.3. Comparison of Postoperative Complications between Two Groups

After treatment, a total of 2 patients in the control group developed cavernous injuries, with a complication rate of 4.87%. No complication occurred in the observation group, the complication rate was 0%. The incidence of complications in the observation group was lower than that in the control group, and the difference between the two groups was statistically significant ($P < 0.05$).

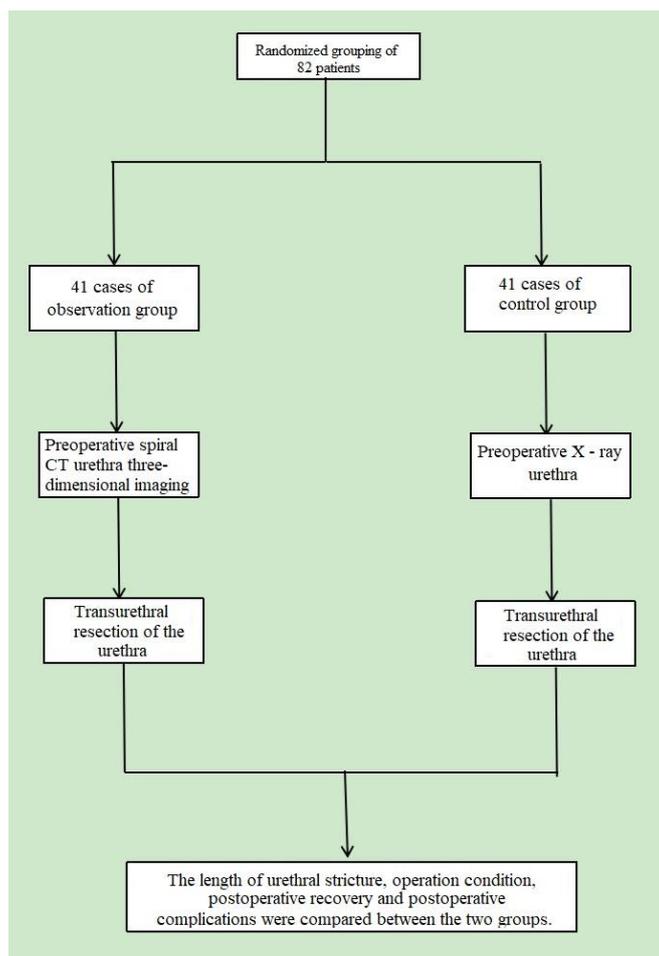


Figure 1. flow chart

Table 1. Comparison of urethral stricture length between two groups ($\bar{x} \pm s$)

Group	Case	The length of urethral stricture measured by preoperative imaging (cm)	Actual measurement of urethral stricture length during operation (cm)	P
Observation group	41	1.31±0.55	1.33±0.57	0.39
Control group	41	1.43±0.62	1.38±0.61	0.28

Note: compared with the control group, *P<0.05.

Table 2. Comparison of operation and postoperative recovery between two groups of patients

Group	Case	Operation time (min, $\bar{x} \pm s$)	Time of hospitalization (d, $\bar{x} \pm s$)	Qmax (ml/s, $\bar{x} \pm s$)	Recrudescence (n)
Observation group	41	41.31±19.15*	5.35±2.57*	12.18±1.12	6
Control group	41	60.68±33.52	8.62±4.11	11.58±1.21	8

Note: compared with the control group, *P<0.05.

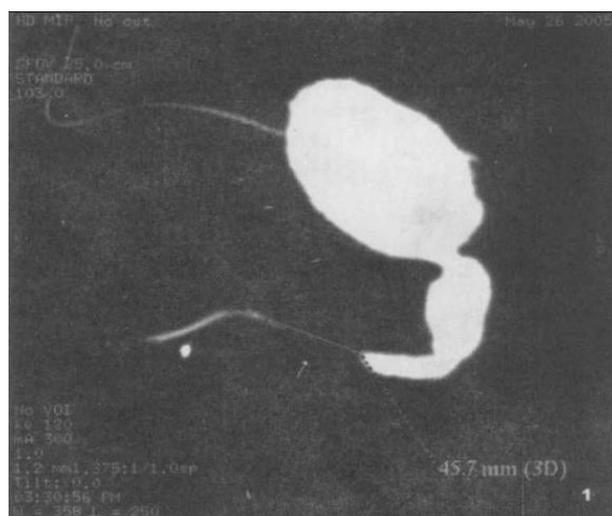


Figure 2. spiral CT urethra three-dimensional imaging

4. Discussion

Urethral stricture is caused by various reasons, such as scarring of urethral mucosa and surrounding sponge tissue, resulting in narrowing of the urethral section, which further leads to serious consequences such as obstructive dysuria and sexual dysfunction. With the development of social industrialization, traffic accidents and the increase of iatrogenic operation of urinary system, the incidence of urethral strictures has increased significantly. The incidence of urethral stricture is closely related to urethral injury. Epidemiological statistics show that 97% of urethral injuries are found in male patients, so urethral stricture is mostly found in male patients. The main clinical manifestations of urethral stricture include different levels of urine flow, urination, urine, dysuria, hematuria and pyuria. And some studies have shown that more than 90% of the patients with urethral stricture may have complications, including acute urinary retention or even renal failure. At present, the main treatment of urethral stricture is surgical treatment. The common surgical methods include urethral dilatation, urethra incision, scar resection, urethral end anastomosis and graft replacement. The operation plan should be based on the position of the urethral stricture, the length of the stenosis, the degree of stenosis and the related complications, and the choice of the surgical procedure is not the same, and the urethral resection is more suitable for the patients with anterior urethral stricture. The preoperative imaging examination is of great significance to clear the patient's urethral stricture, to formulate a detailed operation scheme and to guide the recovery of the patients after operation.

X-ray urethra is the golden standard for the diagnosis of urethral stricture. It has been used for urethral injury and urethral stricture for more than 100 years. It has many advantages, such as simple

examination, low examination cost, high sensitivity of urethral stricture, and it is easy to understand the results of the examination. But the X-ray urethra examination process needs the patient to cooperate closely. If the patient is incorrectly inclined, the pressure is too high and the penis traction is too large, the measurement of the urethral stricture length will be affected, and the error of the urethral stricture length is too large in the operation. In addition, the X-ray examination cannot fully display the scar tissue around the urethral stricture, and the patients with urethral trauma are affected by the tolerance and compliance. It is impossible to obtain high quality imaging, and then it will affect the patient's condition assessment and surgical treatment.

Spiral CT urethra imaging three dimensional imaging is more and more applied in the diagnosis of urethral stricture. Compared with the traditional X-ray urethra, the patient was always in the supine position during the examination. It has good inspection comfort and compliance, which is helpful for the patient to cooperate with the examination. The spiral CT urethra three-dimensional imaging scan is rapid and is less affected by the change of the body position. The three-dimensional image can display the whole urethral structure from multiple angles, and clearly show the position and length of urethral stricture, and the relationship with the pelvis position. Compared with X-ray examination, CT 3D reconstruction images can avoid the influence of the pelvis and the soft tissue around the urethra on the narrow site. The reconstructed image is similar to the true urethral structure. The spiral CT urethra three-dimensional imaging for the preoperative examination of urethral stricture can help the doctors to fully grasp the position of urethral stricture, the length of the stricture and so on, which is beneficial to the operation.

In this experiment, the difference in the length of urethra stenosis before operation and the length of urethral stricture measured during operation in the observation group was smaller than that in the control group, but there was no significant difference between the two groups ($P > 0.05$). The operative time and hospitalization time in the observation group were shorter than those in the control group, and the difference between the two groups was statistically significant ($P < 0.05$). There was no significant difference in the recurrence of Qmax and 6 months after operation in the two groups ($P > 0.05$). The incidence of complications in the observation group was lower than that in the control group, and the difference between the groups was statistically significant ($P < 0.05$). It is proved that spiral CT urethra 3D imaging has better imaging effect for preoperative diagnosis of urethral stricture, which can better guide operation and speed up postoperative recovery and reduce postoperative complication rate.

In conclusion, the spiral CT three-dimensional imaging examination of patients with anterior urethral stricture can better evaluate the condition of urethral stricture, guide the surgical treatment plan, and have good clinical application effect and application prospect.

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