ROLE OF MULTIDETECTOR CT IN THE ASSESSMENT OF URINARY DIVERSION

Thesis
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Abstract

The principal methods of urinary diversion entail fashioning a segment of intestine into a conduit or reservoir to which the ureters are anastomosed. Methods of urinary diversion are commonly differentiated according to whether the functional result is urinary incontinence or continence: either incontinent cutaneous diversion or continent diversion may be performed, with the latter method involving either orthotopic bladder replacement with attachment to the intact native urethra or creation of a reservoir with cutaneous diversion.

Multiphasic CT examination is an accurate method for evaluating patients with cancer bladder that underwent radical cystectomy & urinary diversion. Multiplanar reformatting and three-dimensional volume rendering of multidetector CT image data are particularly useful for achieving an accurate and prompt diagnosis of complications and obtaining information that is essential or adequate surgical management..

Early complications (complications that occur less than 30 days after surgery) include alterations of bowel motility, small-bowel obstruction, urinary leaks, collections, infections, and fistulas. Late complications of urinary diversion (complications that occur 1 month or more after surgery) include urinary tract infection, ureteral stenosis, herniation, lithiasis, and tumor recurrence.

In our study, the aim was to evaluate those patients whether symptomatic or asymptomatic for early detection of post-operative complications.

KEY WORDS

Urinary diversion-multidetector CT-complications-bladder cancer-radical cystectomy.

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LIST OF ABBREVIATIONS

3D	*Three dimensional*
CT	*Computed Tomography*
CTU	*CT urography*
GFR	*glomerular filtration rate*
IVP	*Intravenous pyelography*
IVU	*Intravenous urography.*
MDCT	*Multi-detector computed tomography*
MRI	*Magnetic resonance imaging*
MIP	*Maximal intensity projection*
MPR	*Multi-planar reformat*
R	*Reservoir*
SIU	*Société Internationale d'Urologie.*
TCC	*Transitional cell carcinoma*
VR	*Volume rendering*
WHO	*World health organization*

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INTRODUCTION

INTRODUCTION

Urinary diversion is any one of several surgical procedures to reroute urine flow from its normal pathway. It may be necessary for diseased or defective ureters, bladder or urethra, either temporarily or permanently **(Hautmann, 2003).**

The frequency distribution of urinary diversions performed by the World Health Organization (WHO) and the Société Internationale d'Urologie (SIU) in >7000 patients with cystectomy reflects the current status of urinary diversion after cystectomy for bladder cancer: neobladder, 47%; conduit, 33%; anal diversion, 10%; continent cutaneous diversion, 8%; &incontinent cutaneous diversion, 2% **(Hautmann et al, 2007).**

Numerous surgical procedures have been developed for urinary diversion in patients who have undergone a radical cystectomy for bladder cancer. Because urinary diversion procedures are complex, early and late postsurgical complications frequently occur. Possible complications include alterations in bowel motility, anastomotic leaks, backpressure changes, fluid collections (abscess, urinoma, lymphocele, and hematoma), fistulas, peristomal herniation, ureteral strictures, calculi, and tumor recurrence **(Catala et al, 2009).**

The goals of urinary diversion after cystectomy have evolved from simple diversion and protection of the upper tracts to functional and anatomic restoration as close as possible to the natural preoperative state. This evolution of urinary diversion has developed along 3 distinct paths: incontinent ; cutaneous diversion (conduit) , continent ; cutaneous diversion (pouch); and, most recently, continent, urinary diversion to the intact native

urethra (neobladder, orthotopic reconstruction) **(Steinberg and Curti, 2010).**

Computed tomography (CT) is an accurate method for evaluating such events. Multiplanar reformatting and three-dimensional volume rendering of multidetector CT image data are particularly useful for achieving an accurate and prompt diagnosis of complications and obtaining information that is essential or adequate surgical management.The diversity of the surgical procedures and of the resultant postoperative anatomic changes makes image interpretation difficult. Familiarity with the normal postoperative anatomy and with optimal CT technique is essential to achieve correct diagnosis **(Kouba, 2007).**

Multidetector CT Urography is a relatively new imaging technique that allows more rapid evaluation of the urinary system. The image data can be transferred to a workstation, allowing multiplanar reformatting and three dimensional (3D) reconstruction. Advantages of multidetector CT Urography over intravenous Urography and fluoroscopic loopography include the ability to detect and characterize extraurinary findings (eg, common fluid collections, intestinal complications, tumor recurrence) and to better identify uroepithelial lesions. In addition, multidetector CT is not limited by the body habitus or the presence of abundant stool or intestinal gas, which may hinder evaluation with intravenous Urography **(Mattie et al, 2008).**

AIM OF WORK

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The purpose of this study is to evaluate the patients underwent urinary diversion whether symptomatic or asymptomatic for early detection of post operative complications using the different capabilities of Multidetector CT to evaluate the whole urinary system including renal parenchyma, ureters, reconstructed urinary bladder allowing multiplanar reformatting and three dimensional (3D) reconstruction.

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REVIEW OF LITERATURE

Anatomical changes induced by different surgical processes of urinary diversion.

The most frequent indication for radical cystectomy is a muscle-invasive (stage T2 or higher) bladder tumor or high-risk high-grade non invasive muscle disease with no evidence of distant metastasis. Less frequently, radical cystectomy may be performed to treat benign conditions such as bladder neuropathy, damage from irradiation, or interstitial cystitis. Numerous surgical procedures have been developed for urinary diversion after radical cystectomy. The type of surgical procedure to be used is decided after the patient is informed about the possible advantages and disadvantages of each surgical technique. Relevant criteria for selecting the most appropriate technique include the patient's age, overall physical condition, and intestinal, hepatic, and renal function; the tumor stage; and whether the patient previously underwent abdominal radiation therapy **(Kenney et al, 1990).**

More than 50 surgical procedures for urinary diversion have been described. Because these procedures are complex, early and late postsurgical complications are frequent. The diversity of the surgical procedures and of the resultant postoperative anatomic changes makes image interpretation difficult. Familiarity with the normal postoperative anatomy is essential to achieve correct diagnosis **(Chang et al, 2002).**

The principal methods of urinary diversion entail fashioning a segment of intestine into a conduit or reservoir to which the ureters are anastomosed. Methods of urinary diversion are commonly differentiated according to whether the functional result is urinary incontinence or