

Role of Advanced MDCT Images in the Diagnosis of Cancer Bladder

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Abstract: Background: The purpose of this study is the evaluation of the role of MDCT cystos-copy and virtual image in the detection of urinary bladder masses, and compared the findings to conventional cystoscopy. MDCT scanner enable acquisition of multiplanar reformatted (MPR) images and 3D renderings of outstanding quality as well as CT virtual cystoscopy has emerged as a promising diagnostic tool for the detection of bladder cancer. **Material and Methods:** sixty patients who presented with hematuria and suspected to have bladder carcinoma, or have history of cancer bladder underwent MDCT cystoscopy. Virtual images were obtained with volume-rendered technique. Transverse tomographic slices, multiplanar reformatted images, and virtual images were prospectively evaluated separately and in combination. Conventional cystoscopy was considered the standard of reference for assessing the efficacy of MDCT cystoscopy in the detection of urinary bladder tumors. **Results:** CC detect (79) lesion in 58 patient, (2) patient did not have CC one due to huge prostate and one refuse the CC. while (79) lesion could be demonstrated with VC in 59 patient, one patient was free, there is one false +ve result as a urinary bladder stone falsely diagnosed as small bladder polyp. And, all masses larger than 0.4 cm. only one lesion detected on CC but cannot be demonstrated by VC. **Conclusion:** MDCT urography and VC are a minimally invasive technique now has a large role in the evaluation of patients with known and suspected bladder cancer.

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Keywords: bladder cancer, CC: conventional cystoscopy. VC: virtual cystoscopy.

1. Introduction:

Cancer Bladder is the most common tumor of the urinary system. Most patients present with one or more of the following symptoms: hematuria, vesical irritability; dysuria; flank pain from obstruction, and or a pelvic mass. CT allows recognition of vesical, ureteral, and renal synchronous lesions, as well as local spread, lymphadenopathy, and metastatic disease. Some tumors are not easily detectable with CT. The introduction of multidetector C T (MDCT) scanners was the major technologic advance. MDCT scanner enable acquisition of multiplanar reformatted (MPR) images and 3D renderings of outstanding quality. CT virtual cystoscopy has emerged as a promising diagnostic tool for the detection of bladder cancer, The final diagnosis of bladder cancer is usually established with cystoscopy and biopsy of the lesion and is considered as standard diagnostic approach; however it has its drawbacks like high cost, possibility of urinary tract injury, sepsis and inability to detect extravesical disease.

Aim of the Work

The aim of the work is to evaluate the role of advanced MD CT images in the diagnosis of cancer bladder and to compare it with other standard techniques.

2. Inclusion criteria

The patient age range from twelve and eighty eight years and complaining of one or more of the following criteria. hematuria, dysuria, abdominal pain, fever and abdominal lump Exclusion criteria patients with only urinary tract calculi. or with history of trauma. All patients were subjected to Full history taking for each patient, General and local examinations and Laboratory studies.

3. Results

Sixty patients were recruited for the study. All patients were examined by 16 multidetector CT (MDCT) scan and virtual cystoscopy were elaborated from the helical CT raw data patients were subjected to conventional cystoscopy which was considered the standard of reference for assessing the efficacy of virtual cystoscopy in the detection of urinary tumors and were confirmed by histopathological analysis the 60 patients enrolled in the study there were 55 patients suggested to have new bladder masses by any radiological procedure (first group); and 5 patients with history of previous superficial bladder tumors removed through transurethral resection (TUR) during their follow up for recurrence (second group). 80 lesions were detected in both groups; 76 plus 4 lesions by VC respectively. There was a failure rate of 2/76 with 2 false negative lesion. 83 lesions detected in conventional cystoscopy. Conventional cystoscopy

considered as a standard reference for our study. Among 60 patients included in this study 53 were males (91.2%) and 7 were females (8.7%) with male to female ratio.

4. Discussion

In Egypt, bladder cancer has been the most common cancer during the past 50 years, CT is usually recommended as a useful radiologic approach for assessing hematuria, but previous reports have shown that CT has low sensitivity for detection of small bladder lesions. For evaluation of the urinary bladder tumors the gold-standard of current diagnosis, as well as follow-up involves direct visualization of the bladder mucosa with the use of a flexible/rigid cystoscopy. Recently, three-dimensional computer-rendering techniques with rapid image acquisition have led to the development of virtual-reality imaging. With commercially available software, virtual reality imaging allows interactive intraluminal navigation through any hollow viscous, simulating conventional cystoscopy, **In our study**, we tried to demonstrate the role of virtual cystoscopy in detection and diagnosis of new and recurrent bladder masses and to compare between it and conventional cystoscopy. Two techniques have been used to obtain the CT source data for reconstructed virtual cystoscopic images, scanning the bladder that has been filled with either air or contrast material. **In our work** to perform virtual cystoscopy both techniques were used.

On the basis of a 3D dataset, several possibilities for post-processing are available:

Multiplaner reformation (MPR), Surface shaded techniques (SSD and Volume rendering (VR):) **In our work**, the obtained results for the 60 patients demonstrate excellent sensitivity and specificity score of combined axial CT and virtual cystoscopy in localization and morphological description of bladder tumors in comparison to conventional cystoscopy.

However many drawbacks of VC were met during our study:

Still VC is unable to detect the mucosal color changes or the calcifications associated with masses or stones were seen only on the axial images virtual images alone cannot make sure of the nature, or the origin of the mass. Second limitation of virtual cystoscopy is that it lacks the ability to provide tissue for histologic evaluation.

Also, conventional cystoscopy has some limitations:

It is an invasive technique, as it is performed in general or local anesthesia, uncomfortable to the patient, painful, and time consuming and expensive. The results of **our study** suggest that CTVC cannot completely take the place of conventional cystoscopy. Nevertheless, CTVC is an effective method for

detection of the location and size of tumours in patients with suspected urinary bladder lesions.



Fig: Axial image showing polypoidal mass at the right lateral wall and trigone

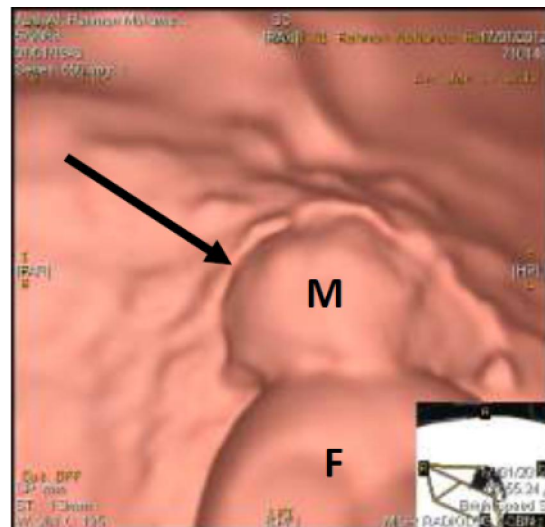


Fig: Virtual image showing polypoidal mass, M: mass and F: foley's catheter

Conclusion

CT virtual cystoscopy is a promising technique to use in bladder tumor detection and some other bladder lesions, such as diverticula. However, the detection rate for carcinoma in situ lesions is not adequate so it is unlikely to replace conventional cystoscopy. This minimally invasive method can be of value for screening, primary diagnosis and surveillance of bladder lesions. Virtual CT cystoscopy may be indicated as a clinical routine when conventional cystoscopy is contraindicated or restricted.

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