INTRODUCTION: Haematuria indicates significant underlying urinary tract pathologies and requires diagnostic workup. MDCT urography is an imaging modality of choice for evaluation of urinary tract pathologies because of its faster speed and multiplanar capabilities.

OBJECTIVES: This study was done to evaluate the role of MDCT Urography in detecting urinary tract pathologies causing haematuria.

METHODS: Study of 50 patients presenting with haematuria to the department Radio-diagnosis, MGM Hospital, Kamothe, Navi Mumbai was done using CECT scan during July 2016 TO DECEMBER 2016.

RESULTS: Out of the 50 cases abnormal findings were present in 46 patients. Among the 46 patients, Major causes of haematuria in our study were urolithiasis, benign prostatic hyperplasia, bladder neoplasm, renal infection, carcinoma of prostate, trauma and renal neoplasm.

CONCLUSION: MDCT Urography is the first line imaging modality for evaluation of haematuria and has potential to provide accurate evaluation of these patients.

KEYWORDS: MDCT Urography, Haematuria
depiiction of tumor hypervasculariy.
- This is followed by nephrographic phase, after delay of 90-100 seconds following contrast administration to evaluate the renal parenchyma.
- Last phase is pyelographic phase which will be taken 8-10 minutes following administration, to evaluate the urothelium from the pelvicaliceal system to the bladder.
- This will be performed with a Multidetector row CT scanner (64 slice Toshiba Aquilion CT machine).
- CT scans will be obtained from the diaphragm to the bladder with the following technique: a collimator of 5 mm, a pitch of 1.5/2, and with 150-200 mA, KV 120. Images will be reconstructed at a thickness of 0.5 mm. The axial as well as reformatted coronal and sagittal images were viewed on a workstation for evaluation.
- The follow up diagnosis will be established on the basis of histopathologic findings or the findings at a urologic procedure (cystoscopy, ureteroscopy and retrograde pyelography) wherever possible.

OBSERVATIONS AND RESULTS
In our study out of 50 patients 38(76%) patients were male and 12(24%) were female.

MDCT urography findings were reported as normal in 4(3male and 1female) cases (8%) and abnormal findings were seen in 46(35 male and 11 female) cases (92%). Among the 46 patients included in the study the various pathologies causing haematuria are tabulated below:

Table 1: gender wise distribution of pathologies among 46 patients on MDCT urography

<table>
<thead>
<tr>
<th>PATHOLOGIES ON MDCTU</th>
<th>MALE</th>
<th>FEMALE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Urolithiasis</td>
<td>12</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>Benign prostatic hyperplasia</td>
<td>7</td>
<td>-</td>
<td>7(14%)</td>
</tr>
<tr>
<td>Carcinoma of bladder</td>
<td>5</td>
<td>1</td>
<td>6(12%)</td>
</tr>
<tr>
<td>Renal infection</td>
<td>4</td>
<td>2</td>
<td>6(12%)</td>
</tr>
<tr>
<td>CA prostate</td>
<td>3</td>
<td>-</td>
<td>3(6%)</td>
</tr>
<tr>
<td>Renal neoplasm</td>
<td>2</td>
<td>-</td>
<td>2(4%)</td>
</tr>
<tr>
<td>Trauma</td>
<td>1</td>
<td>-</td>
<td>2(4%)</td>
</tr>
</tbody>
</table>

ILLUSTRATIVE CASES

FIGURE 1: Left Ureteric Calculus, causing Upstream Obstructive Hydronephroureterosis along with left renal calculus at lower pole.

FIGURE 2: multiple Nodular Hypodense Lesions at the posterior and left lateral wall of Bladder. Multifocal Papillary TCC(Transitional cell carcinoma)

FIGURE 3: Emphysematous pyelonephritis affecting left kidney

FIGURE 4: Renal cell carcinoma affecting right kidney with extension into renal vein and IVC

DISCUSSION
Haematuria, symptomatic and incidental, that involves more than three red blood cells per high-power field on two of three properly collected urinalysis specimens warrants some type of imaging to evaluate the urinary tracts. It can originate from any site along the urinary tract.

Causes of haematuria are:

Renal: stone, tumor (benign & malignant), trauma, infections, infarctions, structural kidney disease, vascular malformations, glomerulonephritis

Ureteric: trauma, tuberculosis, stone, neoplasm

Bladder: trauma, tuberculosis, stone, neoplasm, cystitis, recent instrumentation, radiation

Urethra: trauma, stone, foreign body, urethritis

Prostate: prostatitis, neoplasm (benign & malignant)

Early and accurate diagnosis of etiological factor helps in early and effective management. Conventional diagnostic test like IVU is complicated, long and less sensitive and specific compared to MDCT urography for detection of small tumor and calculi. Although ultrasound is very effective in detecting renal cystic lesions, this modality also has poor sensitivity for detecting solid renal lesions less than 3 cm. MRI has been recently used to evaluate the urinary system. However, the inability of MRI to pick up calcification is an inherent drawback of this modality in its utility in diagnosing urinary pathologies. Also the cost and lack of easy availability restricts its use. At present the use of MR urography is limited to children, pregnant women, in renal insufficiency and in patients with contrast allergy.

The ability of CT urography to evaluate the renal parenchyma as well as the urothelium in a single investigation has prompted many authors to moot it as a potential one stop investigation for the spectrum of urinary tract disorder with haematuria.

Journal of Radiology, 5, 20-27 it was found that MDCTU established the correct cause of microscopic haematuria in (44; 88%) of participants. In (6; 12%) of participants, no cause of haematuria was identified. The cause of haematuria in (41; 82%) participants were diseases in the upper urinary tract as inflammatory kidney lesions (2; 4%); renal neoplasms (16; 32%); calculous disease (12; 24%); renal lesions with abnormal vascular patterns (6; 12%); miscellaneous renal diseases (4; 8%) and ureteral lesions (1;2%). Urinary bladder neoplasms (2; 4%) and diverticulum (1; 2%) were the causes of hematuria (3; 6%) in the lower urinary tract.

Another study by A. Moreno1, C. Pozuelo Segura2, L. Monés Jiménez1, M. Romero Barrio1, X. Mallol Badelino1, J. Alvarez Fernandez1, D. Mullattieri Suarez1; 1Badalona/ES, 2Barcelona/ES concluded that MDCT urography is a technique that allows a full assessment of the urinary tract with high spatial and temporal resolution. One advantage to the IVU and ultrasound is three-dimensional nature of MDCT urography that allows reconstructions in all planes of space.

It also provides morphological and functional urinary system. It is very sensitive for the detection of calcifications (stones) and is the technique of choice in the diagnosis and monitoring of tumors of the urinary system. We can optimize protocols according to the clinical suspicion to reduce radiation exposure in selected cases.

In our study out of the 50 patients referred for MDCT Urography, 46 were found to have positive findings on MDCT urography concerning the high percentage of identifying pathological findings (Sensitivity 92%, positive predictive value 100%) among the patients with haematuria. Male: female ratio was found to be almost 3:1. Most common cause of haematuria found in both male and female was urolithiasis(20;40%) followed by Benign prostatic hyperplasia(7;14%),tumor of bladder(6;12%), renal infection(6;12%), carcinoma prostate(3;6%), renal neoplasm(2;4%) and trauma(2;4%).

CONCLUSION
• Multidetector CT urography detects the entire spectrum of urinary tract pathologies causing haematuria with high accuracy.
• Multidetector CT urography has the potential to become a one stop shop for evaluation of urinary tract, especially in cases of haematuria.

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