RESEARCH ARTICLE

ROLE OF CT SCAN IN STAGING OF CA URINARY BLADDER WITH HPE CORRELATION.

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Manuscript Info	*Abstract*

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Introduction: Of every 10,000 people every 2 to 3 person will develop urinary bladder cancer. Direct examination via endoscopy remains the investigation of choice for evaluation of superficial urinary bladder lesions and the evaluation of deeper structures requires USG, CT or MRI. The goal of imaging is to define extent of tumour spread, nodal and distant metastasis.

Objectives: To evaluate the role of computed tomography (CT) for staging of carcinoma urinary bladder.

Methodology: 55 patients were selected for the study for which they underwent computed tomography (CT) examination after explaining the entire procedure and the risks involved.

Results: In our study, urinary bladder cancer was most common in 51-60 years age with more common in males compared to females with ratio of 5.1:1. Most common HPE subtype is transitional cell carcinoma (82%) followed by squamous cell carcinoma (8%) and adenocarcinoma (6%). Most of urinary bladder carcinoma arises from lateral wall (51.4%) followed by base of urinary bladder (16.2%). On CT, 16 (29.09%) patient diagnosed as Stage II disease, 13 (23.64%) as Stage III disease and 26 (47.27%) patient diagnosed as Stage IV disease with sensitivity - 85.71%, specificity - 44.44%, PPV - 37.5% and NPV- 88.88% for stage II and Sensitivity - 83.33%, specificity - 83.33%, PPV - 38.46% and NPV- 93.75% for stage III disease respectively. HPE staging shows 12 (21.82%) as Stage I, 7(12.73%) as Stage II, 6(10.91%) as Stage III and 26 (47.27%) as Stage IV disease. Total 26 out of 55 patients showed metastatic spread from which nodal metastasis is most common (80.77%) followed by liver (26.92%), lung and bone metastasis (11.54%).

Conclusion: CT plays an important complementary role to clinical examination and endoscopic biopsy in detection, localization, characterization and pre therapeutic staging of urinary bladder masses as delayed scanning allows excellent depiction of the luminal anatomy of urinary bladder and is also very sensitive to assess associated nodal disease (N staging) and systemic metastases (M staging).

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Introduction:-

The urinary bladder is a hollow muscular, and distensible (or elastic) organ that sits on the pelvic floor, collects and stores urine from the kidneys before disposal by urination. Of every 10,000 people, about 2 to 3 persons will develop bladder cancer. More than 9 out of 10 people with bladder cancer have a type called transitional cell cancer. Endoscopy allows for easy visualization and accurate diagnosis of mucosal and superficial submucosal lesions. However, the evaluation of deeper structures requires evaluation through USG, CT and MRI.

Urinary bladder cancers invading superficial and deep muscle usually produce bladder wall thickening but distinction between T2a and T2b lesions is extremely difficult on CT.[1-6] Residual bladder wall thickening, following resection of Ta and T1 lesions, is also indistinguishable from muscle invasive disease.[1,2] The most important role of CT is to distinguish invasive tumors confined to the bladder wall from those that spread into the perivesical fat.[1]
An irregular ill-defined outer edge to the bladder wall with soft tissue stranding into the perivesical fat is highly suspicious of perivesical disease (Stage T3b).[2,5,9]

In advanced Stage T4b disease, direct tumor spread into anterior abdominal wall muscles and/or obturator internus is seen as an enhancing mass that invades, enlarges, and distorts the muscle contours.[10]

Lymph node metastases are rare in superficial tumors but common if deep muscle is involved and distinction between patients with nodal metastases and without nodal spread has important prognostic significance.[7,8]

The goals of imaging patients with bladder cancer are to define the extent of tumor spread within the bladder wall and into adjacent tissues, to detect pelvic and retroperitoneal nodal metastases and, in advanced disease, to identify distant metastases.

Materials And Methods:-

This study was conducted on 55 patients with suspected urinary bladder malignancy. All patients were scanned in the SIEMENS EMOTION 16, a sixteen slice CT scanner. The study was conducted in Department of Radiology of Gujarat Cancer Research Hospital and BJ medical college, Asarwa, Ahmedabad.

Patient inclusion: Following patients were selected,
1. Those patients who were suspected to have urinary bladder masses based on clinical history and examination findings.
2. Those patient with suspected urinary bladder mass on ultrasound examination.
3. Patients scanned for some other suspected pelvic pathologies and incidentally detected to have urinary bladder mass.

Exclusion criteria:
Following patients were excluded from the study
1. Patients having allergy from contrast material used in CT.
2. Post-surgery patients were excluded.
3. Patients not willing to participate in the study.

Results:-

The present study included 55 cases of suspected urinary bladder malignancy which were carried out at Gujarat Cancer and research institute, Ahmedabad.
1. In our study the age of patients ranges from <30 to >80 years. Study has largest age group was 51-60 years consisting 17 patients, followed by 61-70 years comprising 13 patients and mean age was 57.7 years.
2. In our study, these were 46 male and 9 female patients out of total 55 patients with urinary bladder malignancy yielding a male to female ratio of 5.1:1
3. In our study out of 55 patients 28 patients had lesion arising from lateral wall followed by 9 patients had lesion involving base of urinary bladder.

Chart 1:-HPE distribution of urinary bladder carcinoma.
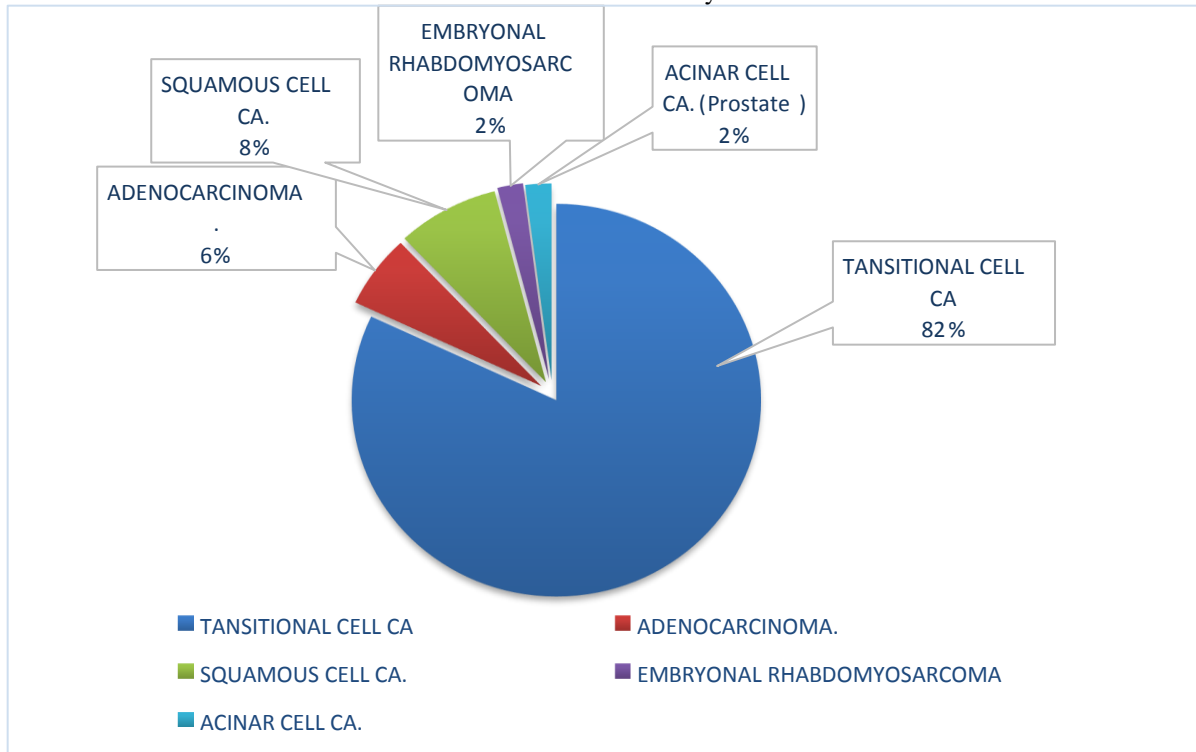
Table 1:-CT STAGE distribution of urinary bladder masses.

CT Stage	No. of Patients	Percentage
Stage I	0	0.00%
Stage II	16	29.09%
Stage III	13	23.64%
Stage IV	26	47.27%
Total	55	100.00%

Table 2:-HPE STAGE distribution of urinary bladder masses.

HPE Stage	No. of Patients	Percentage
Stage I	12	21.82%
Stage II	7	12.73%
Stage III	6	10.91%
Stage IV	26	47.27%
Total	55	100.00%

Table 3:-Comparison of CT and HPE stating of STAGE LEVEL II.

STAGE II	STAGE II(HPE)	ALL except STAGE II/IV	TOTAL
CT			
POSITIVE	6	10	16
CT			
NEGATIVE	1	8	9
TOTAL	7	18	25

From above findings, although CT 85.7% sensitive in diagnosing Stage II disease, only 44.4% specific for the Stage II disease and positive predictive value is very low 37.5% while negative predictive value is 88.9%.

Table 4:-Comparison of CT and HPE stating of STAGE LEVEL III.

STAGE III	STAGE III(HPE)	ALL except STAGE III/IV	TOTAL
CT			
POSITIVE	5	8	13
CT			
NEGATIVE	1	15	16
TOTAL	6	23	29

From above findings, although CT 83.3% sensitive and 83.3% specific for the Stage III disease and positive predictive value is very low 38.4% while negative predictive value is 93.7%.

Chart 2:-Incidence of metastasis.
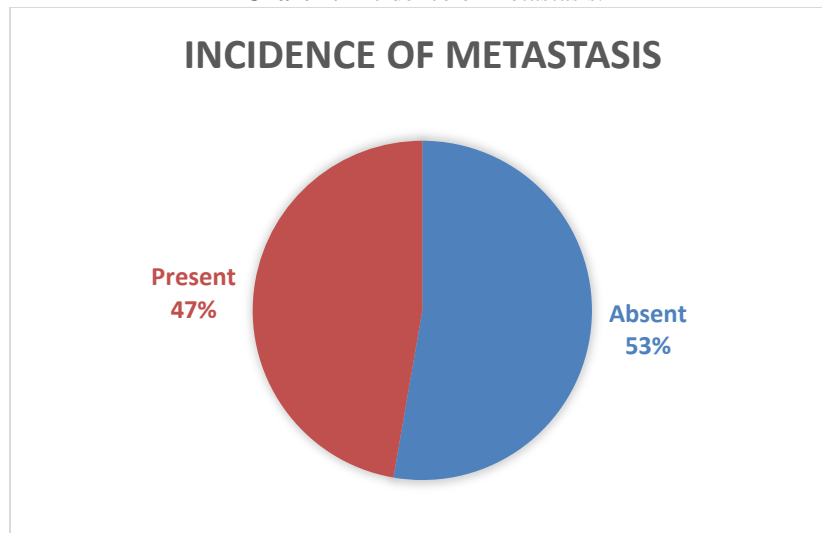
Table 5:-Incidence wise distribution of metastatic disease.

Distant metastasis	No. Of patients (out of 26)	Percentage incidence
Nodal	21	80.77%
Liver	7	26.92%
Bone	3	11.54%
Lung	3	11.54%

Table 6:-Nodal Distribution.

| Nodal status	No. of patients	Percent
Nodal metastases(N1)	8	14.5
Nodal metastases(N2)	10	18.2
Nodal metastases(N3)	3	5.5
No nodal metastases	34	61.8
Total	55	100

Case-1:-Locally advanced bladder cancer. There is a large enhancing soft tissue mass extending into the extravesical fat. Stage T3b.
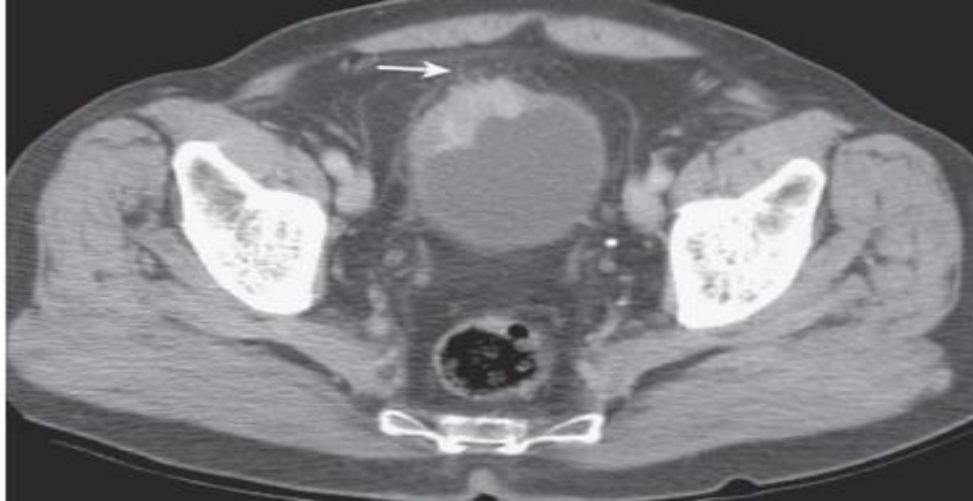

Case 2:-Mass in the right lateral bladder wall which extends through the bladder wall and is causing convexity of the outer border and stranding within the perivesical fat. Note also enlarged lymph nodes in the external iliac/obturator group (arrow). Stage T3b N2.

CASE-3 and 4:-CT of Stage T4b bladder cancer. (a) Tumor is arising from the entire bladder wall extending into the extra-vesical fat as far as the anterior abdominal wall (arrow). (b) In another patient tumor is seen extending into the left lateral wall (arrow).
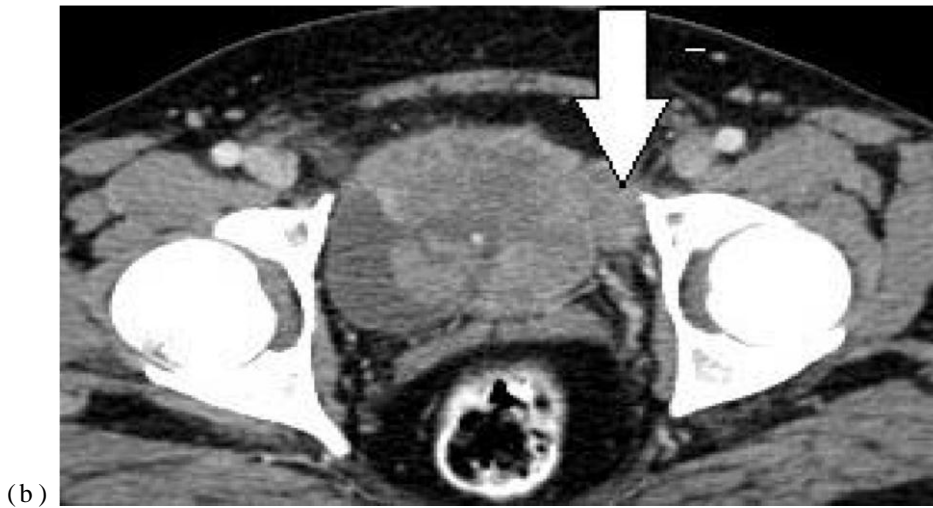
CASE-5: Heterogenously enhancing polypoidal soft tissue density nodule arising from anterior wall of urinary bladder. Which turns out to be transitional cell carcinoma on HPE correlation. (Stage II disease).
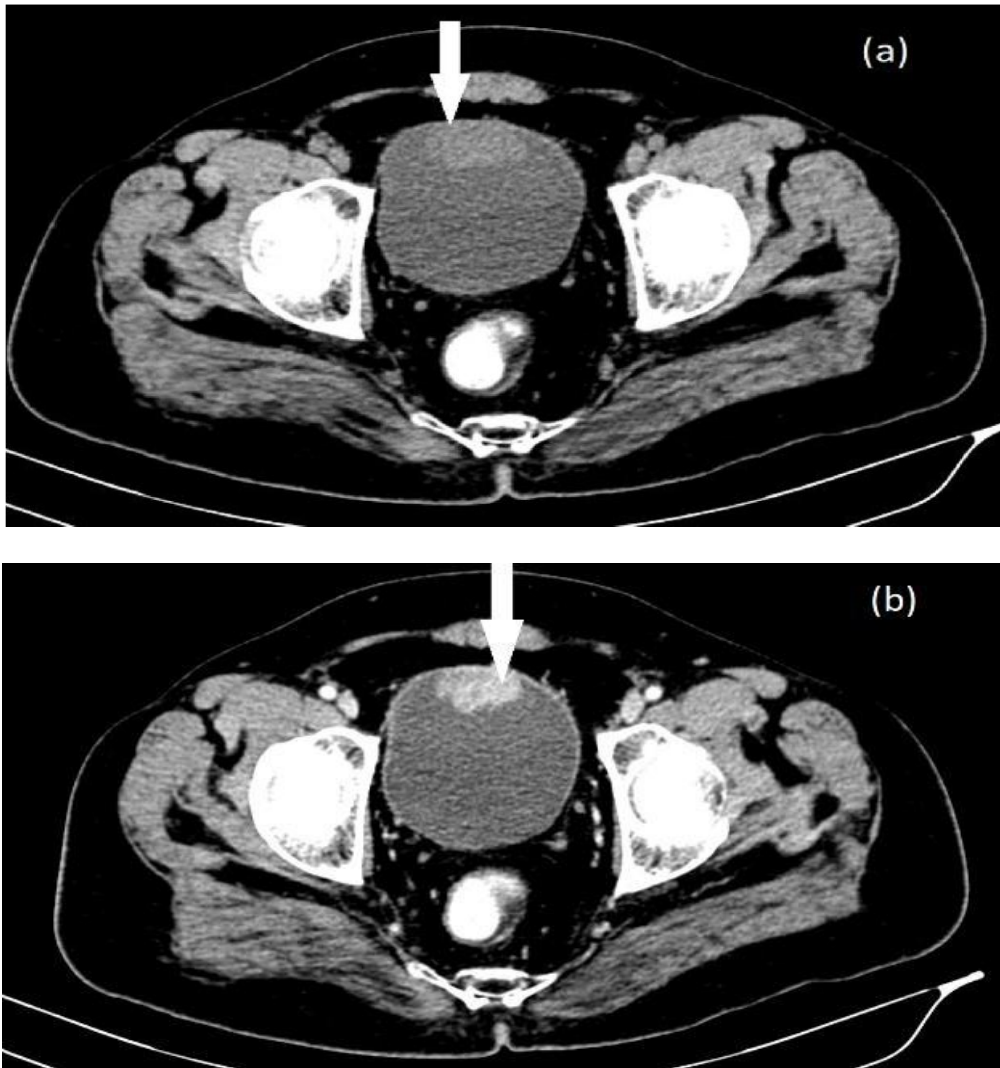
Discussion And Conclusion:-

A Hospital based Prospective study was carried out in department of Radiology, CT scan centre on 55 patients to study the role of CT scan in staging of urinary bladder masses.

Maximum cases (17, 30.9% patients) were found in 51-60 years age groups. With mean age of study patients were 57.7 years.

In our study, according to HPE type, 82% of cases were of transitional cell carcinoma, 8% of cases were of squamous cell carcinoma, 6% cases of adenocarcinoma, 2% cases of embryonal rhabdomyosarcoma and acinar cell carcinoma.

According to CT, Out of 55 patients 16 (29.09%) patient diagnosed as Stage II disease, 13 (23.64%) as Stage III disease and 26 (47.27%) patient diagnosed as Stage IV disease with Sensitivity - 85.71%, specificity - 44.44%, PPV - 37.5% and NPV- 88.88% for stage II and Sensitivity - 83.33%, specificity - 83.33%, PPV - 38.46% and NPV- 93.75% for stage III disease.

CT staging was compared with HPE staging as 12 (21.82%) as Stage I, 7(12.73%) as Stage II, 6(10.91%) as Stage III and 26 (47.27%) as Stage IV disease.
Out of 55 patients 26 patients had showed metastatic spread of the disease out of that nodal metastasis was being most common (80.77%), liver being 2nd most common (26.92%) and third being lung and bone metastasis (11.54%).

Out of 55 patients 21 (38.2%) patients showed nodal metastases out of 55 patients 8 (14.5%) patients show level N1 metastases, 10 (18.2%) patients show level N2 metastases and 3 (5.5%) patients show level N3 metastases.

Cross-sectional imaging with CT scan and delayed scanning allows excellent depiction of the luminal anatomy of Urinary bladder with high spatial resolution images giving exquisite anatomical depiction; however, carcinoma urinary bladder stage T1, T2 and T3a cases cannot be accurately differentiated with CT scan.

Additionally, CT scan is also very sensitive to assess associated nodal disease (N staging) and systemic metastases (M staging).

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