Evaluation of staging accuracy of dynamic MRI in urinary bladder cancer

Thesis

For Partial Fulfilment of Master Degree In Urology

by

Dr. Ahmed Mohsen Ibrahim Saif
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Supervised by

Prof. dr. Hany Mustafa Abdallah
Professor and head of Department of Urology

Dr. Mohamed Samir Sayed
Academic Position: Lecturer
Department: Urology

Faculty of medicine
Ain Shams University
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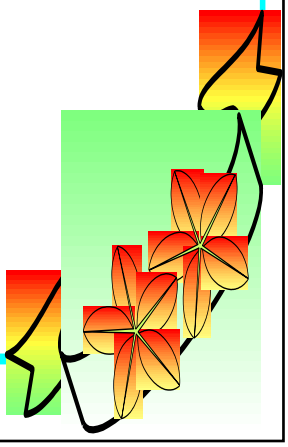

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Introduction

Urinary Bladder cancer is the second most common neoplasm of the urinary tract worldwide. It accounts for 6-8 % of malignancy in men and 2-3% in women with the highest incidence rates in North American and Europe as well as areas with endemic schistosomiasias in Africa and the middle East. **(Cowan and Crew, 2007)**

Conventional computed tomography (CT) and magnetic resonance (MR) imaging are only moderately accurate in the diagnosis and local staging of bladder cancer, with cystoscopy and pathologic staging remaining the standards of reference. However, the role of newer MR imaging sequences (eg,dynamic MRI) in the diagnosis and local staging of bladder cancer is still evolving and has a great participation to optimize treatment (**Hall et al., 2007)**

Dynamic MRI has the ability to differentiate between invasive from non invasive urinary bladder cancer, organ confined from non organ confined bladder cancer and to identify lymph node metastasis. **(Rholl and Lee, 2011)**

Staging of urinary bladder cancer using MRI has a great outcome in plans of management. It has high efficacy

in determination the extent of tumor, organ metastasis and lymph node metastasis **(Bellin and Roy, 2007)**

Aim of the work

The aim of this study is to assess the staging accuracy of Dynamic MRI in urinary bladder carcinoma.

Pathology and staging of Urinary Bladder Carcinoma

1)Pathology of Urinary bladder Carcinoma:

About 95% of primary bladder tumors originate in the epithelium, the remainder arise from connective tissue (angioma, myoma, fibroma and sarcoma) or are extraadrenal pheochromocytoma. Secondary tumors of the bladder are not rare and most commonly arise from a neighbouring organ, particularly the sigmoid and rectum , the prostate , the uterus or ovary , although bronchial neoplasm also may spread to the bladder. **(Bessette and Abell, 2008) Figure (1).**

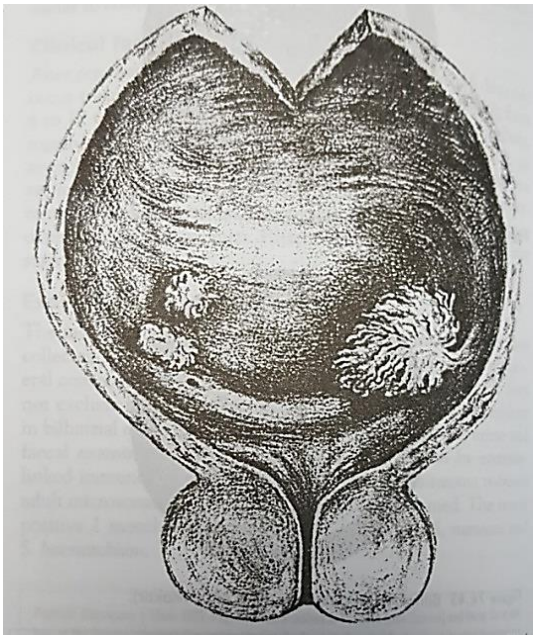

Figure (1): Urinary Bladder Cancer **(Heyns, 2010)**

Histopathology:

Types of bladder cancer include ; transitional , squamous and adenocarcinoma (or mixed owing to metaplasia in a transitional cell carcinoma).

Over 90% are transitional cells in origin. Pure squamous carcinoma is uncommon (about 5%) , apart from areas where bilharziasis is endemic.

Primary adenocarcinoma, which arises either from the urachal remnant or from areas of glandular metaplasia, accounts for 1-2% of cases. **(Heyns, 2010)**

Aetiology:

Cigarette smoking is the main aetiological factor and accounts for more than 40% of cancers. Occupational exposure to urothelial carcinogens remains common in developing as well as developed nations. Serial investigations demonstrated that many industrial compounds act as carcinogens like:

- 2-naphthylamine.
- 4-aminobiphenyl.
- Benzidine.
- Chlornaphazine.
- 4-chlorotoludine.
- Methylene dianiline.
- Benzidine-derived azo dyes.

Occupations which have been reported to be associated with a significantly increase the risk of bladder cancers are:

- Dye workers.
- Textile workers.

- Petrol workers.
- Leather workers.
- Shoe manufacturers and cleaners.
- Painters.

(Krishna and Barnetson, 2008)

Bladder cancer became an industrial disease in 1953, and ex-workers may be entitled to compensation. Certain genetic polymorphisms for N-acetyltransferase, glutathione transferase and some of the cytochrome P450s (e.g.CYP2D6) may increase the risk of occupationally acquired bladder cancer. In areas where S.haematobium is endemic, bladder cancer is more common , and this tends to be squamous in type.

Another genetic events also are implicated in cancer formation.Activation of dominantly acting oncogenes such as RAS and C-erb-2 has been reported in bladder cancer.Activation of other genes are responsible for the phenotypic changes seen in cancer cell. These include activation of enzymes that may dissolve basement membrane such as the metalloproteinases (stromelysin, collagenases and elastase), lysosomal enzymes such as the cathepsins and

others including urinary plasminogen activators and other peptide growth factors. **(Romero and Gimenez-Bachs,2009)**

2)Staging Of Urinary Bladder Carcinoma:

Study of the biological behaviour of transitional cell cancer of the bladder shows that they fall into the three following groups. Depth of invasion (T) from the TNM classification and grade (WHO 1, 2, 3) are important factors for planning treatment and for the prognosis in bladder cancer. **(Bostwick, 2008) figure(3)**

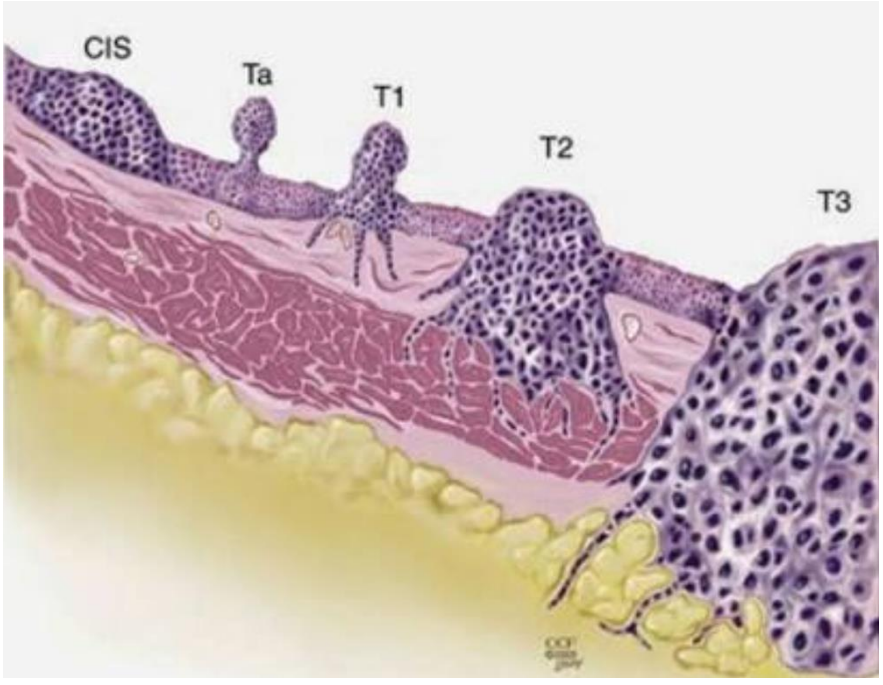

Figure (2): Stages of bladder cancer **(Bostwick, 2008)**

Table 1: 2002 TNM Classification of Bladder Cancer

T: Primary Tumor	
TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Ta	Noninvasive papillary carcinoma
Tis	Carcinoma in situ: *flat tumor*
T1	Tumor invades subepithelial tissue—the lamina propria
T2	Tumor invades muscle
	T2a: tumor invades superficial muscle (inner half
	T2b: tumor invades deep muscle (outer half)
T3	Tumor invades perivesical tissue
	T3a: microscopically
	T3b: macroscopically
T4	Tumor invades any of the following: prostate, uterus, vagina, pelvic wall, abdominal wall
	T4a: tumor invades prostate, uterus or vagina
	T4b: tumor invades pelvic wall or abdominal wa
N: Lymph Node	
NX	Regional lymph node cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in a single lymph node ≤2 cm in greatest dimension
N2	Metastasis in a single lymph node >2 cm but not >5 cm in greatest dimension or multiple lymph nodes, none >5 cm in greatest dimension
N3	Metastasis in a lymph node >5 cm in greatest dimension
M: Distant Metastasis	
MX	Distant metastasis cannot be assessed
M0	No distant metastasis
M1	Distant metastasis

Table (1): Stages of bladder cancer**(Bostwick, 2008)**