



REVIEW ARTICLE

Role of imaging techniques in the diagnosis and follow-up of muscle-invasive bladder carcinoma[☆]

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KEYWORDS

Bladder cancer;
Diagnosis;
Staging;
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Positron emission tomography

Abstract

Introduction: Muscle-invasive bladder malignancies represent 20–30% of all bladder cancers. These patients require imaging tests to determine the regional and distant staging.

Objective: To describe the role of various imaging tests in the diagnosis, staging and follow-up of muscle-invasive bladder cancer. To assess recent developments in radiology aimed at improving the sensitivity and specificity of local staging and treatment response.

Acquisition of evidence: We conducted an updated literature review.

Synthesis of the evidence: Computed tomography and magnetic resonance imaging (MRI) are the tests of choice for performing proper staging prior to surgery. Computed tomography urography is currently the most widely used technique, although it has limitations in local staging. Ultrasonography still has a limited role.

Recent developments in MRI have improved its capacity for local staging. MRI has been suggested as the test of choice for the follow-up, with promising results in assessing treatment response.

Positron emission tomography could improve the detection of adenopathies and extrapelvic metastatic disease.

Conclusions: Imaging tests are essential for the diagnosis, staging and follow-up of muscle-invasive bladder cancer. Recent technical developments represent important improvements in local staging and have opened the possibility of assessing treatment response.

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PALABRAS CLAVE

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 emisión de positrones

Papel de las técnicas de imagen en el diagnóstico y seguimiento del carcinoma vesical músculo invasivo

Resumen

Introducción: Las neoplasias vesicales con invasión muscular suponen un 20-30% del total. En estos pacientes se requiere la realización de pruebas de imagen para determinar la estadificación local y a distancia.

Objetivo: Describir el papel de las diferentes pruebas de imagen en el diagnóstico, estadificación y seguimiento del cáncer vesical músculo-invasivo. Evaluar los últimos avances en radiología orientados a mejorar la sensibilidad y especificidad de la estadificación local y la respuesta al tratamiento.

Adquisición de la evidencia: Se ha realizado una revisión actualizada de la bibliografía.

Síntesis de la evidencia: La tomografía computarizada y la resonancia magnética son las pruebas de imagen de elección para realizar una adecuada estadificación previa a la cirugía. La tomografía computarizada con fase de urografía es la técnica más empleada actualmente, aunque presenta limitaciones en la estadificación local. La ecografía continúa teniendo un papel limitado.

Los últimos avances en resonancia magnética han mejorado su capacidad para la estadificación local y se postula como prueba de elección en el seguimiento, con resultados prometedores en la valoración de respuestas al tratamiento.

La tomografía por emisión de positrones podría mejorar la detección de adenopatías y de enfermedad metastásica extrapélvica.

Conclusiones: Las pruebas de imagen son fundamentales en el diagnóstico, estadificación y seguimiento del cáncer vesical músculo-invasivo. Los últimos avances técnicos han supuesto una importante mejora en la estadificación local y abren la posibilidad de valorar respuestas al tratamiento.

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Introduction

Bladder carcinoma is the ninth most diagnosed neoplasm in the world and the most frequent of the urinary tract. In Spain, with some regional variations, its incidence is high.¹ About 90% originates in the epithelium and its spectrum of presentation, with different biological behavior, prognosis, and treatment, it includes non-muscle-invasive (superficial), muscle-invasive lesions (20–30% of the total), and metastatic disease.

In high-grade muscle-invasive (MI) and non-muscle-invasive (non-MI) tumors, in order to establish the appropriate prognosis and treatment, pretreatment staging with imaging techniques that assess local invasion, bladder multifocality and also the upper urinary tract, lymph node involvement and distant metastasis is required.² Currently, computed tomography (CT) is the technique recommended by the different clinical guidelines in the staging of bladder carcinoma.^{3,4}

The important discrepancy between pre-surgical and histological staging, with the highest error rates concentrated in the diagnosis of T2–T3 (36%) and lymph node (25%), requires the development of diagnostic techniques. In recent years, there have been important technical advances that seem promising in the diagnosis and follow-up of bladder carcinoma, such as the development in magnetic resonance imaging (MRI) of new sequences that provide the morphological assessment with a functional and molecular study (multi-parametric MRI) and positron-emission tomography (PET).

The objective of this article is to carry out an updated review of the bibliography regarding the role of imaging tests in the study of high-risk muscle-invasive and non-muscle-invasive bladder carcinoma.

Evidence acquisition

A non-systematic bibliographic review was carried out in Medline/Pubmed of articles and clinical guidelines referring to the contribution of the different imaging tests in the diagnosis, staging and follow-up of high-risk MI or non-MI bladder cancer, with special emphasis on the most recent publications (Table 1).

Evidence synthesis

The treatment and prognosis of bladder carcinoma are determined by staging and histological grade.⁵ The reference standard in local diagnosis is cystoscopy with biopsy taking, although this presents a sub-staging of 10–20%.

In presumably invasive cancer, imaging tests are necessary for staging, prognosis, planning of treatment and follow-up. Staging is done according to the TNM of the American Joint Committee on Cancer. In patients with diagnosis or suspicion of high-risk MI or non-MI bladder cancer, the clinical guidelines recommend, as an initial imaging technique, the thoracic-abdominopelvic CT scan with a urographic phase for the evaluation of the upper urinary tract (URO-CT), because of its availability and reasonable safety

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