Non-muscle invasive bladder carcinoma

Non-muscle invasive bladder carcinoma (NMIBC) refers to bladder cancer that has not invaded the muscular layer of the bladder wall. It encompasses stages Ta, T1, and carcinoma in situ (CIS) according to the TNM classification. NMIBC is one of the most common forms of bladder cancer and is often detected early due to symptoms like hematuria (blood in the urine).

Types of NMIBC Stage Ta: Papillary tumors confined to the mucosa (inner lining). Stage T1: Tumor has invaded the lamina propria but not the muscle layer. Carcinoma in situ (CIS): A flat, high-grade lesion confined to the urothelium, often more aggressive. Diagnosis Urine cytology: Detects cancer cells in the urine. Cystoscopy: Visual inspection of the bladder using a camera. Transurethral resection of bladder tumor (TURBT): Both a diagnostic and therapeutic procedure used to remove visible tumors and assess tumor staging and grading. Imaging: CT or MRI to rule out upper tract or invasive disease. Risk Stratification Patients are classified into low-risk, intermediate-risk, or high-risk categories based on:

Tumor grade (low vs. high). Tumor stage (Ta vs. T1 vs. CIS). Tumor size, multifocality, and recurrence status. High-risk NMIBC includes:

High-grade Ta. T1 tumors. CIS. Management The goal of treatment is to reduce recurrence and progression to muscle-invasive disease.

1. Initial Treatment TURBT: Primary treatment to remove visible tumors. Intravesical chemotherapy (e.g., mitomycin C): Delivered shortly after TURBT to reduce recurrence. 2. Adjuvant Therapy For low-risk NMIBC: No additional therapy may be needed. For intermediate-risk NMIBC: Induction with intravesical chemotherapy or Bacillus Calmette-Guérin (BCG) immunotherapy. For high-risk NMIBC: BCG immunotherapy is the standard of care. Maintenance BCG therapy for up to 1–3 years. 3. Surveillance Regular follow-up is critical due to the high recurrence rate. Surveillance protocols include:

Cystoscopy: Every 3–6 months initially, then annually. Urine cytology: To monitor for recurrence. Imaging: As needed, particularly for high-risk cases. Challenges High recurrence rates (50–70% in 5 years). Risk of progression to muscle-invasive disease (~10–20% in high-risk cases). BCG shortages have posed challenges in treatment delivery. Emerging Therapies Immune checkpoint inhibitors: E.g., pembrolizumab for BCG-unresponsive NMIBC. Gene therapy and targeted therapies: Under investigation. Novel intravesical agents: Non-BCG options, including combination therapies. Early detection, appropriate risk stratification, and adherence to follow-up protocols are essential for optimal outcomes in NMIBC management.