

# Orthotopic neobladder for bladder cancer and neurogenic bladder dysfunction

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*Patients with neurogenic bladder (NGB) from spinal cord injury (SCI) are at increased risk for developing bladder cancer. The choice of urinary diversion in patients with NGB and bladder cancer remains controversial and is dependent on patient preference, manual dexterity,*

*social support, and renal function. We describe the outcome of a man with NGB from SCI who developed bladder cancer, underwent cystectomy with creation of an orthotopic neobladder, and now voids by Valsalva. To our knowledge, we report the first successful use of an orthotopic neobladder in a patient with NGB after radical cystectomy for bladder cancer.*

**Key Words:** bladder cancer, neurogenic bladder, orthotopic neobladder, urinary diversion

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## Introduction

The long term goal of management in patients with neurogenic bladder (NGB) is preservation of renal function with the least burden on patient quality of life. Given the greater incidence and worse prognosis of bladder cancer in spinal cord injury (SCI) patients with NGB managed with indwelling catheterization compared to the general population, clean-intermittent catheterization (CIC) has become the standard method of long term bladder management in these patients.<sup>1-3</sup> Although the incidence of bladder cancer in SCI patients managed with CIC is not as well-defined as with chronic indwelling catheterization, an accumulating body of evidence suggests that CIC also increases the risk of bladder cancer.<sup>4-8</sup> The development of urothelial malignancies in patients with SCI has a poor prognosis with a 5-year survival rate as low as 5% to 10%, suggesting that early cystectomy and urinary diversion may be beneficial compared to intravesical therapy or active surveillance.<sup>2,9</sup>

In patients undergoing cystectomy for bladder cancer without SCI or NGB, the orthotopic neobladder is now a preferred method of urinary diversion.<sup>10</sup> Orthotopic substitution cystoplasty has been described in patients with NGB dysfunction but has produced unsatisfactory results.<sup>11</sup> To our knowledge, we describe the first successful report of an orthotopic neobladder in a paraplegic patient after radical cystectomy for bladder cancer.

## Case report

Our patient is a 33-year-old man with a 15-year history of complete T11 paraplegia following traumatic SCI with a NGB managed by a combination of CIC and Valsalva voiding. He initially presented to an outside hospital with a 3-week history of gross hematuria. Cystoscopy identified a bladder mass that was resected to completion and pathologic examination revealed high-grade muscle-invasive urothelial carcinoma with squamous cell differentiation. After transurethral resection, he was unable to void by Valsalva and became dependent on CIC. A full evaluation for metastases was negative and the patient underwent nerve-sparing cystoprostatectomy and pelvic lymphadenectomy with creation of an orthotopic Studer neobladder. The patient tolerated the procedure well without

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complications. Final pathology on the surgical specimen showed carcinoma in-situ with negative margins and negative lymph nodes (pTisN0Mx). In 18 months of follow-up after cystectomy, the patient has remained continent, obtains erections with PDE5 inhibitors and empties his neobladder well with minimal postvoid residual, normal renal function, and upper tract imaging. He states that his neobladder has resulted in an improved quality of life compared to his bladder management before cystectomy.

## Comment

Orthotopic neobladder reconstruction has become the most popular method of urinary diversion in cystectomy patients, comprising 50%-90% of lower urinary tract reconstructions.<sup>12</sup> The neobladder has long term functional stability and approximates the normal bladder most closely in both structure and function compared to other forms of urinary diversion.<sup>13</sup> As a continent internal reservoir in continuity with the intact native urethra, it eliminates the need for a cutaneous stoma or a cutaneous collection device and thus preserves cosmesis. Orthotopic reconstruction has not yet gained acceptance in the population of patients with NGB due to a wide spectrum of functional impairments. We are the first to report successful orthotopic neobladder replacement in the context of NGB dysfunction. In our patient, a young, highly functional paraplegic man with bladder cancer, the neobladder actually improved his voiding compared to preoperative bladder management. Given the increased risk of bladder cancer in SCI patients, our findings suggest a promising alternative to continent or conduit diversion in highly selected patients.<sup>1</sup>

In one previous study, bladder substitution following subtotal cystectomy in patients with NGB yielded unfavorable results. Of patients with NGB who underwent substitution cystoplasty, 90% were continent, but only 21% were voiding spontaneously, compared to 69% with non-NGB.<sup>11</sup> The authors attributed the poor voiding rates to the high incidence of bladder outlet obstruction in patients with NGBs. This sphincteric obstruction, known as detrusor sphincter dyssynergia (DSD), is associated with high spinal cord lesions.<sup>14</sup> Given that the proportion of patients reliant on CIC following orthotopic reconstruction can vary from 0% to 70% in different case series, the success of a neobladder is most likely multifactorial.<sup>15</sup>

## Conclusion

In SCI patients with NGB, bladder cancer is not only more prevalent but also more aggressive than in the

general population. We describe the first case of an orthotopic neobladder in a highly functioning man after radical cystectomy for bladder cancer. After 18 months of follow-up, the patient is continent, empties his neobladder by Valsalva, has normal renal function and self-reported quality of life. We demonstrate that a highly functioning and motivated patient with NGB and SCI may be considered for orthotopic neobladder after radical cystectomy for bladder cancer. □

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