

Management of Ureteral Strictures After Radiation Therapy in Pelvic Malignancy Survivors

William Foster*

Department of Urology, Northern Valley University Hospital, Auckland, New Zealand

DESCRIPTION

Ureteral strictures developing after radiation exposure for pelvic malignancies represent a late complication that can significantly compromise urinary drainage and renal function. The condition typically arises due to progressive fibrotic changes in the ureter and surrounding retroperitoneal tissues following therapeutic irradiation. These changes may continue to evolve long after completion of cancer treatment, making the presentation often delayed and clinically subtle in early stages [1].

Patients may initially remain asymptomatic, with detection occurring incidentally during follow-up imaging for oncological surveillance. As obstruction progresses, symptoms such as flank discomfort, recurrent urinary tract infections, and declining renal function may emerge. In bilateral cases, deterioration in renal performance may be more pronounced and clinically significant [2].

Diagnostic evaluation is centered on defining the location, length, and functional impact of the narrowing. Ultrasonography is commonly used as a screening tool, identifying hydronephrosis. Cross-sectional imaging with contrast-enhanced computed tomography provides detailed anatomical assessment, including the extent of periureteral fibrosis. Functional studies such as nuclear renography help determine differential renal function and guide treatment urgency [3].

Initial management often involves temporary urinary decompression. This may be achieved through ureteral stenting or percutaneous nephrostomy placement. These measures are primarily stabilizing interventions, allowing preservation of renal function while definitive planning is undertaken. Long-term reliance on stents is generally avoided due to encrustation, infection risk, and the need for frequent replacement [4].

Endoluminal techniques have limited effectiveness in radiation-associated strictures due to the dense and poorly vascularized nature of affected tissues. While balloon dilation or internal incision may be attempted in short, focal narrowing, recurrence is common. These approaches are typically reserved for patients who are not candidates for more definitive correction [5].

Definitive treatment often requires reconstructive intervention

tailored to the anatomical location and extent of ureteral involvement. Short proximal or mid-ureteral strictures may be managed by excising the diseased segment and reconnecting healthy ends of the ureter when feasible. However, radiation injury frequently extends beyond the visible narrowing, complicating this approach [6].

Distal ureteral involvement is commonly addressed by reimplanting the ureter into the bladder. When direct attachment is not possible due to tension, bladder mobilization techniques such as psoas hitch are employed. In cases with greater distance between ureter and bladder, bladder flap reconstruction may be required to bridge the defect using native bladder tissue [7].

Long-segment involvement poses greater challenges and may necessitate replacement of the affected ureteral segment. Intestinal interposition, most commonly using ileum, is an established option in such scenarios. This technique restores urinary continuity but introduces metabolic and infectious considerations that require long-term monitoring [8].

In severe cases where extensive radiation damage precludes reconstruction, urinary diversion may be indicated. Options such as ileal conduit diversion provide a reliable method of urinary drainage, particularly in patients with poor tissue quality or limited life expectancy. Selection of diversion type depends on patient condition, renal function, and prior treatment history [9].

The surgical field in irradiated tissue is characterized by fibrosis, reduced vascularity, and impaired healing capacity. These factors increase the complexity of dissection and anastomosis, requiring careful handling of tissues and removal of nonviable segments. Ensuring adequate blood supply at reconstruction sites is essential for long-term success [10].

CONCLUSION

Ureteral strictures following pelvic radiation represent a delayed and complex complication requiring individualized evaluation and treatment. Management strategies range from temporary decompression to advanced reconstructive techniques, with selection guided by extent of injury and patient factors. Patient counseling is an important component of management, as treatment often involves complex decision-making and potential

Correspondence to: William Foster, Department of Urology, Northern Valley University Hospital, Auckland, New Zealand, E-mail: william.foster@nvuh.ac.nz

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need for staged procedures or long-term urinary diversion. Clear communication regarding risks, benefits, and expected outcomes is essential.

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