

# En Bloc Transurethral Resection for Bladder Leiomyoma with Hybrid-Knife

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## Abstract

**Objective:** The aim of this video is to show a new transurethral resection for bladder leiomyoma by endoscopic submucosal dissection (ESD) with hybrid-knife.

**Materials and Methods:** A 36-year-old woman was confirmed to be with bladder leiomyoma by pelvic magnetic resonance and cystoscopic examination. The operation was conducted smoothly without complications.

**Results:** Pathology proved that the bladder tumour was bladder leiomyoma and there was no recurrence by post-operative cystoscopic examination at 3 months and 1 year.

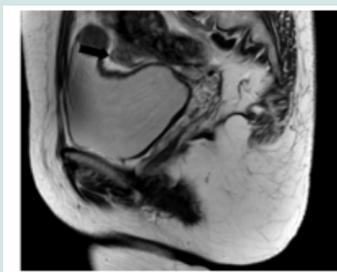
**Conclusion:** We documented a successful approach to the treatment of bladder leiomyoma with better integrity of specimen tissue, fewer complications, and low recurrence.

## Introduction

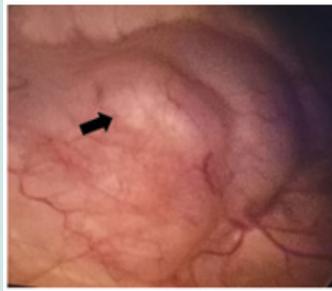
Bladder leiomyoma is a rare, benign tumor of the bladder that accounts for <5% of all bladder neoplasm which has a mesenchymal origin [1]. Surgical resection with transurethral, open, laparoscopic, and robotic approaches is the main treatment for this disease [2]. To avoid the stimulation of obturator nerve and get the en bloc resection, we present a case of bladder leiomyoma through the way of transurethral resection by endoscopic submucosal dissection (ESD) with Hybrid-knife.

## Clinical case

A 36-year-old woman presented with no symptom and was only found in physical examination. Pelvic magnetic resonance showed 2.7 x 2.1 x 2.2 cm mass over the right upper part of the urinary bladder without invading to the extravescical space (Figure 1a) Cystoscopy showed a 2.5cm papillary growth in bladder. (Figure 1b).



**Figure 1a:** Pelvic magnetic resonance showed an oval bladder tumor seen at the right side of bladder measuring about 2.7 x 2.1 x 2.2 cm (arrow).



**Figure 1b:** Cystoscopic examination showed a submucous protrusion without bleeding and mucosal damage.

## Materials and methods

The hybrid-knife is a multifunctional probe combining water-jet and electrosurgical technology. The water jet is applied through a stainless tube incorporating a microcapillary lumen with a diameter of 120  $\mu\text{m}$ , which can separate the bladder mucosa and submucosa by the fluid cushion. During the operation, the hybrid-knife is fixed into the sheath of the cystoscope, which allows the flexible movement to adjust the distance to tissue. The patient laid on lithotomy position. After epidural anesthesia, cystoscopic examination showed a 2.5cm papillary tumour located at the right lateral wall. There was no other mucosal lesion seen and bilateral ureteric openings were spared. Firstly, after setting the power of electro resection at 110 W and electrocoagulation at 40 W, the bladder mucosa on tumor surface was dissected longitudinally by

hybrid-knife. Then, to separate the tumor capsule from the bladder surrounding tissue, injecting saline colored with indigo carmine through the water-jet applicator of the hybrid-knife into interstitial space between tumor capsular and bladder tissue was necessary. Repeated injection of saline to elevate the tumor could make the resection more presentable and minimize the chance of bladder perforation. After the tumor was adequately elevated, incising and resecting the mucosa surrounding the tumor margin was achieved with the cutting mode of hybrid-knife and simultaneous Haemostasis was achieved with the electrosurgical function of hybrid-knife. Finally, after the Haemostasis was ensured, tumor was endoscopically extracted with a nylon retrieval bag, and a catheter was placed. The entire tumor was completely removed, and the capsule was clearly visible (Figure 1c).



**Figure 1c:** Gross specimen of the resected leiomyoma.

## Results

The total operative time was 30 minutes and there was no complication intra-operatively and post-operatively. The urinary catheter was removed on day 1 post-operation. Pathology proved that the bladder tumour was bladder leiomyoma. Immunohistochemistry showed Vimentin (-), SMA (+), Desmin (+), CD34 vascular (+), CD117(-), DOG-1(-), EMA (-) SDHB (-), S-100 (-), ki-67 index is about 3%. Local recurrence was not detected by follow-up cystoscopic examination at 3 months and 1 year after surgery.

## Discussion

Though bladder leiomyoma has a relatively good prognosis and there is no reported malignant transformation of bladder

leiomyoma, bladder leiomyomas mimic malignant lesions sometimes. Park et al reported two cases underwent repeated transurethral resection and enucleation because of incomplete resection for fear of sphincteric or ureteral orifice injury [3]. With the development of transurethral endoscopic technique, transurethral resection has been paid more attention for its advantages of less trauma and quick recovery. But for conventional transurethral resection of bladder tumor, the recurrence of the tumor may be related to the incomplete resection and tumor tissues destroyed of the primary tumor [4]. As an emerging new technology, ESD with the hybrid-knife has a safe and effective treatment in epithelial tumors [5,6]. Thus, we employed this approach for treating bladder leiomyoma. The major advantages of ESD with hybrid-knife over conventional transurethral resection of bladder tumor (TURBT) are

better integrity of specimen tissue, fewer complications, and low recurrence.

For most bladder leiomyoma, they relate to adjacent bladder wall with wide basement. ESD with hybrid-knife can significantly recognize the boundary of bladder leiomyoma and avoid touching the muscle layer of bladder, so the stimulation of obturator nerve during the dissection is greatly reduced because of the fluid cushion made by the waterjet of hybrid-knife. In addition, blood vessels are squeezed and even blocked by the fluid cushion. Thus, the risk of bleeding is also significantly reduced and clear excision area may avoid the postoperative perforation of bladder. Meanwhile, ESD with hybrid-knife is able to separate the mucosa and muscular layer during the operation which benefits the en bloc resection of tumor tissues, thereby reducing the implantation of tumor cells into the bladder wall.

### Conclusion

In conclusion, the ESD with hybrid-knife technique is feasible approach and appears to be safe and efficacious for bladder leiomyoma.

### Declaration of Competing Interest

None.

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