Case Report

Late-onset Hem-o-Lok® migration into the bladder after robot-assisted radical prostatectomy

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Abstract:
Introduction: Hem-o-Lok® clips are widely used in robot-assisted radical prostatectomy because of their ease of application and secure clamping. Although there have been some reports of their migration into the urinary tract, this usually occurs a few months after robot-assisted radical prostatectomy. Late-onset cases of Hem-o-Lok® clip migration, that is, after more than 1 year, are rare.

Case presentations: We report three cases of delayed endourethral Hem-o-Lok® clip migration more than 2 years after robot-assisted radical prostatectomy. The Hem-o-Lok® clips were almost completely endoluminal, and were attached at one end to the vesicourethral anastomosis. We successfully removed them via transurethral surgery using a holmium laser.

Conclusion: This case series describes late-onset Hem-o-Lok® clip migration into the bladder more than 1 year after robot-assisted radical prostatectomy. Transurethral holmium laser surgery was very effective for Hem-o-Lok® clip removal. To avoid involvement of Hem-o-Lok® clips in the vesicourethral anastomosis, appropriate resection at the time of bladder neck transection is important.

Key words: Hem-o-Lok®, holmium laser, robot-assisted radical prostatectomy.

Key message
We report three cases of intravesical HOLC migration more than 1 year after RARP. Transurethral holmium laser surgery was very effective for HOLC removal.

Introduction
In recent years, RARP has become a widely accepted minimally invasive surgical alternative to open radical prostatectomy for localized prostate cancer.1 HOLCs (Weck Surgical Instruments, Teleflex Medical, Durham, NC, USA) are widely used to control lateral vascular pedicles of the prostate during RARP. However, HOLC migration into the urinary tract has been reported,2–14 presenting with spontaneous expulsion, urethral erosion, the formation of bladder stones, and even bladder neck contracture. In most reports, HOLC migration usually occurs within a few months after RARP; very few cases occur after more than 1 year. We report three cases of late-onset HOLC migration into the bladder, that is, more than 1 year after RARP.

Case presentations
The patient characteristics are summarized in Table. These were the 27th, 47th, and 69th RARP procedures performed at our institution. All three patients were diagnosed and treated based on the NCCN guidelines.15 The main steps involved in the radical prostatectomy were similar to those described originally by Menon,16 with some modifications. We do not routinely employ energy devices. The first and second cases featured right-side nerve-sparing, and the third case included bilateral nerve-sparing.

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The patients presented with complaints of urinary symptoms at 2 years and 8 months, 2 years and 11 months, and 5 years and 3 months after RARP, respectively. We diagnosed HOLC migration using computed tomography (Fig. 1a) and flexible cystoscopy (Fig. 1b). Regular urine tests revealed no pyuria or microhematuria. For removal of the migrated HOLCs, which were coated with stones, we performed transurethral surgery (Fig. 1c,d). First, the stone coating was removed using the holmium laser, with an output setting of 0.5 J. The tissue adhering to the HOLCs was carefully excised and the HOLCs were then removed using an output setting of 0.8–1.0 J at 5 Hz. There were no signs of bladder perforation and no recurrence after surgery.

**Discussion**

We report three cases of intravesical migration of an HOLC more than 2 years after RARP. Transurethral holmium laser surgery successfully removed the migrated HOLCs.

Several hemostatic surgical clips such as LAPRA-TY® absorbable suture clips (Ethicon, Somerville, NJ, USA), Lapro-clip® absorbable clips (Covidien, Mansfield, MA, USA) and HOLCs have been used during laparoscopic procedures. Among them, HOLCs are commonly used, and are safe and reliable for vascular control during laparoscopic procedures. During RARP, HOLCs have been used to ligate the lymph ducts, seminal vesicle arteries, and prostatic pedicles to prevent excessive electrocautery and possible injury to the neurovascular bundles. Blumenthal et al. reported the first case of HOLC migration into the vesicourethral anastomosis after RARP. There have been many subsequent reports, but they all describe the onset of symptoms in the early postoperative period.

When delayed HOLC migration was defined as migration occurring more than 1 year after RARP, we found four reports in the literature (Table 1). Most patients presented with painful urination and hematuria. Stone deposits were observed in almost all cases, and the HOLCs migrated into the bladder more often than into the anastomosis. Migration occurred in our three cases after an even longer interval.

The mechanism underlying surgical clip migration into the bladder remains unclear. In cases where HOLC migration occurred soon after surgery, the site of migration was often the vesicourethral anastomosis. Kadekawa et al. suggested that inflammation around the bladder and/or vesicourethral anastomosis could have been the main factor, but this remains to be confirmed.

We always make every effort to avoid direct entrapment of the HOLC in the vesicourethral anastomosis. However, upon review of the surgical videos, we found that, in our early cases, the HOLCs were placed rather distally with respect to the neurovascular bundles. Blumenthal et al. reported the first case of HOLC migration into the vesicourethral anastomosis after RARP. There have been many subsequent reports, but they all describe the onset of symptoms in the early postoperative period.

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We always make every effort to avoid direct entrapment of the HOLC in the vesicourethral anastomosis. However, upon review of the surgical videos, we found that, in our early cases, the HOLCs were placed rather distally with respect to the neurovascular bundles (Fig. 2). Also, the posterior bladder walls of earlier patients seemed to be thinner than those of our more recent cases; some HOLCs may have penetrated such thinner walls. We now meticulously measure bladder wall thickness during transection. Also, we use both the anterior and lateral approaches to check the shape of the bladder neck; this ensures reliable posterior bladder dissection. Although more than 1,000 RARPs have been performed in this manner at our institution, there have been no cases of HOLC migration.

Although sealing devices prevent clip migration to the bladder, the energy devices usually employed for nerve-
sparing are not readily applicable during all surgeries, given the high financial costs.

**Conclusion**

We report three cases of intravesical HOLC migration more than 1 year after RARP. Transurethral Holmium laser surgery was very effective for HOLC removal. To avoid involvement of HOLCs in the vesicourethral anastomosis, appropriate resection during bladder neck transection is important.

**Conflict of interest**

None declared.

**Approval of the research protocol by an institutional reviewer board**

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**Table 1** Eight cases of late-onset HOLC migration into the bladder after RARP

| Author       | Age | Year | Symptoms                          | Onset (month) | stone | Place          | N   | Therapy                  | Course after therapy |
|--------------|-----|------|-----------------------------------|---------------|-------|----------------|-----|-------------------------|----------------------|
| 1 Blumenthal KB⁴ | N/A | 2008 | Hematuria, pyuria                 | 12            | N/A   | Bladder        | Multiple | N/A                       | no recurrence         |
| 2 Bientinesi R¹¹ | 76  | 2014 | Dysuria-frequent urination-hematuria | 12            | +     | Anastomosis 1  | 1   | Removal (Holmium laser) | no recurrence         |
| 3 Yu-Chen C¹³   | 75  | 2018 | Intermittent gross hematuria      | 60            | +     | Bladder neck 1 | 1   | Transurethral resection | N/A                  |
| 4 Iemura Y¹⁴    | 71  | 2019 | Painful urination                 | 26            | N/A   | Anastomosis 1  | 1   | Removal (Holmium laser) | no recurrence         |
| 5 Iemura Y¹⁴    | 71  | 2019 | Obstructive Luts                  | 18            | N/A   | Anastomosis 1  | 1   | Follow up examination   | N/A                  |
| 6 Our case      | 74  | 2021 | Painful urination                 | 30            | +     | Bladder 2      | 2   | Removal (Holmium laser) | no recurrence         |
| 7 Our case      | 67  | 2021 | Painful urination                 | 33            | +     | Bladder 1      | 1   | Removal (Holmium laser) | no recurrence         |
| 8 Our case      | 60  | 2021 | Lower abdominal pain              | 63            | +     | Bladder 3      | 3   | Removal (Holmium laser) | no recurrence         |

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**Informed consent**

Not applicable.

**Registry and the registration no. of the study/trial**

Not applicable.

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