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Communication

Beware of Bipolar Transurethral Resection of Prostate in Patients with Previously Inserted Metallic Prostate Stapling Devices

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Abstract: Metallic prostate stapling (e.g., UroLift) is a minimally invasive treatment option for men with bladder outlet obstruction from benign prostatic hyperplasia (BPH). While it provides rapid relief and preserves sexual function, unexpected interactions with other medical devices can compromise surgical procedures. In this letter, we highlight five cases where stapled metallic implants resulted in damage to bipolar energy device during transurethral resection of the prostate (TURP) and stimulation of obturator nerve. Laser may also reflect off metallic prostate implants which can result in laser equipment malfunction. Monopolar TURP should be considered in patients with existing metallic prostate implants who need further transurethral surgery for obstructive BPH to prevent bipolar instrument damage and obturator kick.

Keywords: bladder outlet obstruction; benign prostatic hyperplasia; urinary tract disease; minimal invasive surgical procedures; male urologic surgical procedures; lower urinary tract symptoms

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Benign prostatic hyperplasia (BPH) is the most common aetiology resulting in bothersome lower urinary tract symptoms (LUTS). Transurethral resection of the prostate (TURP) is a common surgical technique used for treating BPH. However, it is moderately invasive, has some side effects such as retrograde ejaculation that men would prefer to avoid, and requires at least an overnight hospital stay. This has led to the increased interest in minimally invasive options, which include prostatic stapling devices such as UroLift device (Neotract Inc., Pleasanton, CA, USA). Such implants are made up of three main components, a nitinol capsular tab which is first deployed deep within the prostate, a stainless steel urethral end piece, and a polyester mono filament that holds both metal pieces together.

In carefully selected patients, the UroLift device may provide significant improvement in LUTS and quality of life, whilst preserving sexual function. However, in studies, up to 13.6% need surgical retreatment of LUTS within five years (either repeat stapling or TURP) [1]. Up to 2% of implants develop encrustation, especially if the urethral end piece is deployed near the bladder neck [2]. Fibrosis and epithelialisation of the urethral end piece can result in an irregularly shaped prostatic fossa. Caution is need when performing Holmium Laser Enucleation of the Prostate (HOLEP) in these patients, as the metallic component of the implant can damage the blades of the morcellator [3].

Bipolar TURP is performed in our centre with saline irrigation using the PLASMA+ system (Olympus Corporation, Tokyo, Japan). To date, our centre has experienced five independent cases in which the metallic implant short-circuited and broke the bipolar loop upon contact (Figure 1). In four of these five cases, this was accompanied by a clinically significant stimulation of the obturator nerve resulting in a "kick"—potentially endangering the patient. Fortunately, no significant adverse events were reported. In all these cases, the broken loop was recognised, and the TURP was continued using conventional monopolar device with glycine irrigation. The monofilament was easily cut through by the bipolar loop, and even being careful to go behind the staple with a buffer of tissue was not always successful in averting damage to the loop. In one case, the metallic part of the stapling

device embedded itself into the bipolar loop. It was only after consultation at an audit meeting that it was realised the five events had occurred with different surgeons over only a four-month period.

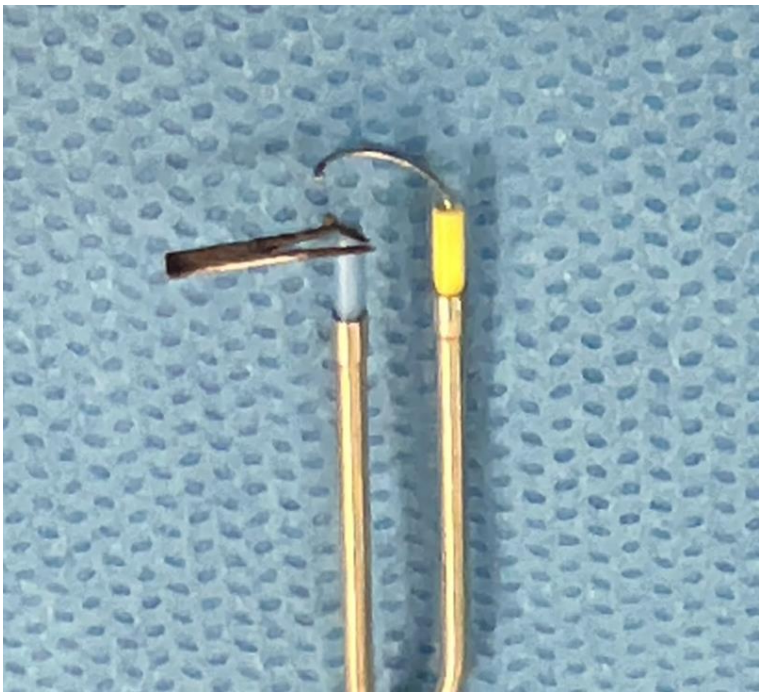

Figure 1. Example of broken bipolar loop in vitro.

With bipolar energy devices, the electrical current flows directly between the two active electrodes within the instrument. However, as stainless steel has a higher conductivity than prostatic tissue, the aberrant conduction of electrical energy transmitted to the urethral endpiece resulted in direct coupling, which most likely overheated and broke the thin bipolar loop but also stimulated the nearby obturator nerve [4]. There was no return electrode on the patient as occurs with monopolar resection, so there was no pathway of least resistance for the current to pass. Interestingly, the conduction of a cautery device was also observed in robotic-assisted radical prostatectomy (RARP) for patients with these implants, and this can potentially result in thermal damage to surrounding structures [5]. Prostatic staples can also result in fibrosis, which makes anatomical landmarks less discernible and therefore makes the RARP more challenging. In another anecdotal experience in our centre, during a GreenLight laser therapy (Boston Scientific Corporation, Marlborough, MA, USA), the reflection of laser off the staple initiated a safety stoppage without incident. In the process of medical advancement, we need to be wary of uncommon complications, and unexpected interactions between medical devices and equipment. Documentation of these events is important for awareness, prevention, and feedback to manufacturers. When these rare occurrences are encountered, an appropriate response will be to stop, ensure the patient is safe, reassess the situation, switch to traditionally proven techniques, and reflect. In the future, based on our experience, we will be performing only monopolar TURP in patients who have metal stapling device implants. As more patients are implanted with stapling devices, it is likely more patients will fail and require further endoscopic treatment for their BPH. If that is the case, then monopolar rather than bipolar energy devices should be recommended. Finally, there is no consensus that all of the previous stapling devices should be removed; indeed, it may be unsafe to pursue complete removal of all staples as long as no metal component is left exposed to encrust and cause potential infection.

Conflicts of Interest: The authors declare no conflict of interest.

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