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Thermo-expandable intra-prostatic stent in the treatment of acute urinary retention in elderly patients with significant co-morbidities

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Abstract. We assess the use of thermo-expandable intra-prostatic stent (Memokath®, Engineers and Doctors A/S, Denmark) for the treatment of acute urinary retention (AUR) in men with significant co-morbidities for transurethral resection of prostate (TURP). We evaluate the pre- and post-operative complications, duration of stents *in-situ* and patients quality of life after the stent insertion. Patients with significant co-morbidities presenting with AUR were selected, who were unfit for TURP. The co-morbidities included ischaemic heart disease, congestive heart failure, and chronic obstructive pulmonary disease. The exclusion criteria were bladder tumour and atonic bladder. The Memokath stents were inserted using a flexible cystoscope under local anaesthesia. The patients were followed up at 3 and 6 months after the procedure and the ones who remained alive were asked to complete self-administered questionnaires and IPSS scores. Fifteen men with acute urinary retention were recruited for stent insertion with the mean age of 87 years. No peri-operative complications were recorded. Three patients died after the insertion with functional Memokath *in-situ*. Nine patients had good functioning stents post-operatively, and remain catheter free up to 30 months after the procedure. The mean duration of stent life was 18 months. Three long-term complications were detected, including stent migration and prostate overgrowth. The Memokath is a good option for frail elderly patients presenting with AUR. The procedure is safe and has minimal long term complications. The stent also provides a sustained good quality of life for patients and avoids the necessity of long term catheterisation.

Key words: Acute urinary retention, Benign prostatic hyperplasia Intra-prostatic stents

Introduction

The risk of Transurethral resection of prostate (TURP) in elderly men presenting with bladder outflow obstruction can be high, despite modern anaesthesia. In one study, the early complication rate of the procedure is as high as 41% and further late complication of 22% was also recorded [1]. The risk factors commonly include recent strokes, cardiac arrhythmia, severe ischaemic heart disease and chronic obstructive pulmonary disease. Many men with these risk factors who presented with acute urinary retention (AUR) are treated with long term urethral or suprapubic catheterization. They can suffer from the complications of catheterization including recurrent urinary tract infection, catheter blockage and penile meatal erosion. Most men also require regular community nursing care which may make long term catheterization a less cost effective method for the treatment of AUR.

Thermo-expandable intraprostatic stent in the management of bladder outflow obstruction is an attractive option for these patients since they can be inserted under local anaesthesia. An 8-year study of the use of the stents demonstrated its efficacy in improving the International Prostate Symptoms Score in the first 3 months and remains unchanged over 7 years [2]. The stents are also safe and have minimal side effects such as haematuria

and infection. These men are more likely to die of other causes than have their stents fail. In view of its safety and long term efficacy, intra-prostatic stents may represent a cost effective and good compromise for the treatment of patients with AUR and unable to undergo TURP.

The relief of prostatic obstruction using a metal stent was first described in 1980 [3]. The development of the stents has evolved extensively in the last two decades. The first generation stent were either 'epithelializing' or 'non-epithelializing'. Epithelializing stent (Urolume Wallstent, American Medical Systems, Minnetonka, MN) allows the urothelium to grow over it, which theoretically reduced risk of infection and encrustation. The long term results of these stents were poor. Encrustation and migration was seen and hence resulted in its removal under general anaesthesia [4]. Non-epithelializing stents (Prostakath, Engineers and Doctors A/S, Copenhagen, Denmark) are inert material and avoid epithelial reaction. Again, the long term data on these stents were discouraging, with approximately 50% removal rate in the first year [5, 6].

The second generation stent was first described in 1993. Memokath® (Engineers and Doctors A/s. Hornbaek, Denmark) composed of titanium nickel alloy with shape memory effect [7]. When flushed with hot water (45 °C or above), one section of the spiral stent expands in the prostatic apex and maintains the stent in position. When cooled with cold water (10 °C or below), the spiral becomes soft and allows easy removal. The largest series for the use of Memokath consisted of follow-up of 211 patients over 8 years [2]. The IPSS decreased from a mean of 20.3–8.2 after the stent insertion, and remained unchanged over seven year. The main complication documented was stent migration (13%), although not all of the displaced stents resulted in removal. Other complications include infection, incontinence and encrustation (6% each).

Other intraprostatic stents, such as biodegradable L-lactide-glycolic acid co-polymer, are also being developed (Spiroflow, Bionx Implant Ltd. Tampere, Finland) [8]. The stent is more resistant to encrustation *in-vitro*, and retains its compression strength up to 6 weeks. Although this temporary stent may not have a role in the treatment of high surgical risk patients with urinary retention, it may have a role in the development of the 'future stent' with minimal complications.

Patients and methods

From October 2001 until April 2004, 15 men who presented with AUR and were considered to be high risk for TURP, accepted the placement of Memokath stent as the long term treatment. All patients had post catheterization residual volume of over 1 litre and had at least one documented failed trail without catheter. The co-morbidities included ischaemic heart disease, cerebrovascular accident, congestive heart failure, and chronic obstructive pulmonary disease. The exclusion criteria were bladder tumour and residual volume of over 2.5 litres.

The insertion of the Memokath stent is carried out under local anaethesia (2% lignocaine gel) and intravenous prophylactic antibiotics. A flexible cystoscope is passed to the bladder neck and a marker is placed on the cystoscope sheath at the tip of the penis. The cystoscope is then withdrawn just below the apex of verumontanum and the further marker is placed. The distance between the markers indicates the length of the stent required. The desired stent is mounted to the flexible cystoscope and advanced until the tip enters the bladder. Fifty ml of hot water (45 °C) is flushed through the cystoscope. This expands the distal stent into cone shape (44F), to lock the stent into position, just proximal to the sphincter. The cystoscope is then withdrawn and inspection carried out on withdrawal.

The patients were followed up at 3 months after the procedure, when IPSS scores, flow rates and post-void residual volumes were documented. Patients were also asked to complete self-administered questionnaires and IPSS scores again between 7 and 30 months after the insertion of stent (mean 12 months).

Results

Fifteen men with acute urinary retention were recruited for stent insertion with the mean age of 86.6 years (Range 70–91). The ASA grades were assessed by the anaesthetists. Eight patients were ASA grade 3 and seven were ASA grade 4. Many patients had multiple risk factors and the main risk factors were ischaemic heart disease and cerebro vascular accident. The patients' profile is demonstrated on Table 1. The stents were all inserted

Table 1. Profile of patients recruited for the insertion of Thermo-expandable prostatic stents

Patients		
Number of patients	15	
Age	86.6	(70 to 90 years)
ASA III	8 patients	
ASA IV	7 patients	

under local anaesthesia. No peri-operative complications were recorded.

Three patients (20%) had died after the insertion with the Memokath stents *in-situ*. The causes of death were not stent related. The stents remained functional between 7 and 13 months until time of death (Mean duration 9.3 months). For the remaining 12 patients, nine patients (60%) have good functioning stents post-operatively, and remain catheter free one year after the procedure. The stents failed in 3 patients (20%). The reasons for failure were stent migration (13%) and outgrowing prostatic tissue (7%). The migrated stents were removed under general anaesthesia. These stents remained functional between 3 and 14 months (Mean period 9 months). These patients are now being managed with long term suprapubic catheterization. The overall outcome is demonstrated in Table 2.

Twelve patients attended the 3 month follow-up assessment. The remaining patients were too frail to attend the clinic. The mean IPSS score was 7 (Range 4–10) and the mean Q_{max} was 10.3 ml/s (8 ml/s–17 ml/s). Nine patients also had ultrasound record of mean post-void residual volume of 128.9 ml (68–238 ml) Table 3.

Patients were also asked to complete self-administered questionnaires and IPSS scores again between 7 and 30 months after the insertion of stent (mean 12 months). Eight patients responded to the request. The IPSS score remain unchanged during the second follow-up. All patients reported significant improvement in quality of life, and preferred the prostatic stent over long term catheterization. All patients reported outcome as good as or better than initial expectation. Three patients reported minor complications such as dysuria and mild perineal discomfort. Two major complications recorded were recurrent urinary tract infection and mild urge urinary incontinence (Table 4).

Discussion

The Memokath is a recognized option for the management of frail elderly patients with lower urinary tract symptoms, instead of transurethral resection of prostate [2]. The insertion of the stent is relatively easy and can be done under local anaesthesia as a day case. The procedure is safe and has minimal long term complications. The stent also provides a good quality of life for patients and avoids the necessity of long term costs of catheterization.

The second generation stent has now been available for more than 12 years, despite that, it still has no major role in the management of the high surgical risk patients with lower urinary tract symptoms. One of the limiting factors in the widespread utilisation of the stent may be its financial costs. In the United Kingdom, the cost of stent alone is nearly £800. This may prevent the local health authorities from approving the widespread use of the prostatic stent in all frail and elderly patients with lower urinary tract symptoms. In our institution, we do not offer all elderly

Table 2. Overall outcome after the stent insertion

Outcome			
Good functioning stents	(Catheter free)	9 Patients	(60%)
Mean duration stent *in-situ*		12 months	(7 to 30 months)
Deceased	(Unrelated to stents)	3 Patients	(20%)
Mean duration stent *in-situ*		9.3 months	(7 to 13 months)
Stent removal	(Stent migration)	2 Patients	(13%)
Mean duration stent *in-situ*		8.5 months	(3 to 10 months)
Stent failure	(Prostate outgrowth)	1 Patient	(7%)
Duration of stent *in-situ*		14 months	

Table 3. Three-month follow-up parameters

Parameters at 3 months (n = 12)		
IPSS Scores	7	(4 to 10)
Q_{max}	10.3 ml/s	(8 ml/s to 17 ml/s)
Post void residual	128.9 ml	(68 ml to 238 ml)

Table 4. Complications

Complication	
Migration	2 Patients
Dysuria and haematuria	2 Patients
Prostate overgrowth	1 Patient
Recurrent UTI's	1 Patient
Mild urge incontinence	1 Patient

and frail patients with lower urinary tract symptoms with Memokath. We selected a small subgroup of elderly patients who presented with acute urinary retention, and were not suitable to undergo TURP. The alternative management for these patients is mainly long term catheterization. Long term catheterization is associated with recurrent UTI, blockage, stone formation and meatal erosion [9, 10]. In addition, the catheters require long term community nursing care which significantly increases the costs of managing these patients. The cost of care for a patient with an indwelling catheter is estimated around £700/year [11].

Although our study involves a small number of elderly patients who presented with acute urinary retention, we demonstrated the efficacy of Memokath stent in the management of these patients. Eighty percent had functional stents and remained catheter free up to 30 months after the insertion. The IPSS score remained stable during the follow-up. Although 20% of these patients deceased after the stent insertion, the stents remained functional and the patients catheter free at the time of death. Our study also demonstrates a failure rate of 20%, in whom the stents were removed due to migration. This is consistent with other published data [2]. The Memokaths are also safe in these patients who presented with acute urinary retention. There was no peri-operative complications recorded. The minor complications such as dysuria and mild perineal discomfort were treated conservatively. Major complications recorded were recurrent urinary tract infection and mild urge urinary incontinence, treated successfully with long term oral antibiotics and anti-cholinergic, respectively.

In view of its safety and efficacy, Memokath can be a valuable treatment option for patients with acute urinary retention, who are unsuitable for TURP. The stent is also cost effective for the treatment of such patients, instead of long term catheterization.

References

1. Brierley R, Mustafid A, Kontothanasis D, Thomas P, Fletcher M, Harrison NW. Is transurethral resection of prostate safe and effective in over 80 year old?. Ann R Coll Surg Engl 2001; 83: 50–53.
2. Perry MJA, Roodhouse AJ, Gidlow AB, Spicer TG, Ellis BW. Thermo-expandable intraprostatic stents in the bladder outlet obstruction: an 8-year study. BJU Int 2002; 90: 216–223.
3. Fabian KM. Interprostatic 'partial catheter'(urologic spirals). Urologie A 1980; 19: 236–238.
4. Anjum MI, Palmer JH. A technique for removal of the Urolome endourethral wallstent prosthesis. Br J Urol 1992; 70: 655–656.
5. Thomas PJ, Britton JP, Harrison NW. The Prostakath stent: four years experience. Br J Urol 1993; 71: 430–432.
6. Nordling J, Ovesen H, Poulsen AL. The intraprostatic spiral: clinical results in 150 consecutive patients. J Urol 1992; 147: 645–647.
7. Poulsen AL, Schou J, Ovesen H, Nordling J. Memokath: a second generation of intraprostatic spirals. Br J Urol 1993; 72: 331–334.
8. Laaksovirta S, Valimaa T, Isotalo T, Tormala P, Talja M, Tammela TL. Encrustation and strength retention properties of self expandable, biodegradable, self-reinforced L-lactide-glycolic acid co-polymer 80:20 spiral urethral stent in vitro. J Urol 2003; 170: 468–471.
9. Donnell O JA, Hofmann MT. Urinary tract infections. How to manage nursing home patients with or without chronic catheterization. Geriatrics. 2002; 57: 49–52.
10. Ord J, Lunn D, Raynard J. Bladder management and risk of bladder stone formation in spinal cord injured patients. J Urol 2003; 170: 1734–1737.
11. Booth CM, Chaudry AA, Lyth DR. Alternative prostate treatments, stent or catheter for the frail?. J Managed Care 1997; 1: 24–26.

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