Effect of modified suprapubic prostatectomy for benign prostatic hyperplasia on postoperative hemoglobin levels

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Objectives: Hemostasis during suprapubic prostatectomy for benign prostatic hyperplasia (BPH) is commonly affected by placing sutures at the 5 o'clock position and the 7 o'clock position of the bladder neck. However, the urethral arterial branches of the inferior vesical artery that supplies the prostate extend from the 1 o'clock to 5 o'clock position and from the 7 o'clock to 11 o'clock position of the bladder neck, with the largest branches located posteriorly. This study analyses the effect of a modified suprapubic prostatectomy technique, which covered the area from the 1 o'clock position to the 11 o'clock position, on postoperative blood hemoglobin levels, as a reflection of hemorrhage control. **Methods:** This was a single-center, retrospective study of 47 patients who underwent suprapubic prostatectomy for BPH. Hemostatic sutures included the main areas of anatomic distribution of the urethral arterial branches of the inferior vesical artery. Preoperative and postoperative blood hemoglobin levels and perioperative complications were recorded.

Results: The mean decrease in blood hemoglobin was 1.06 mg/dL. Only three patients had clot retention, and these clots were easily flushed out. None of the patients required a blood transfusion.

Conclusions: The modified suprapubic prostatectomy technique for BPH enhances hemostatic control and reduces the need for a blood transfusion.

Key Words: benign prostatic hyperplasia, hemostasis, modified bladder neck repair

Introduction

In most African countries, suprapubic prostatectomy remains the most common type of surgery for patients with benign prostatic hyperplasia (BPH).¹ This is mainly because the specialized equipment and skilled personnel needed to perform less invasive procedures,

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Address correspondence to Dr. Chukwudi O. Okorie, Banso Baptist Hospital, Box 9, Kumbo, NWP, Cameroon such as transurethral resection of the prostate (TURP), are not readily available. Many surgical procedures for BPH are performed by general surgeons or even general practitioners, and most of these physicians find the suprapubic approach easier to learn than the retropubic approach. The reported morbidity and mortality rates associated with suprapubic prostatectomy have declined over the years, but they are still significant.²⁻⁵

One of the leading causes of intraoperative and postoperative morbidity or mortality is hemorrhage. Over the years, ingenious approaches to improve hemostasis for suprapubic prostatectomy have been developed, and these range from tamponade of the prostatic fossa to different forms of suture application in the prostatic cavity.6 Results from these different approaches have been mixed, and they range from insufficient hemostatic control to episodes of postoperative bladder neck stenosis. Currently, the most widely recommended method of hemostatic control for suprapubic prostatectomy is the application of sutures to the 5 o'clock and 7 o'clock positions of the bladder neck.^{7,8} This method of hemostatic control is, however, frequently associated with significant hemorrhage and the need for a blood transfusion.⁸ Blood transfusions need to be avoided as much as possible, especially in Africa where there are frequent difficulties in obtaining blood supplies from blood banks. In addition, blood transfusions are linked with a high risk of transmissible infection, and the current high rate of HIV infection throughout Africa and in many other countries means that blood transfusions are an ongoing cause for concern.

The principal sources of blood supply into the prostate in patients with BPH are the urethral arterial branches of the inferior vesical artery, which approach the bladder neck in the 1 o'clock to 5 o'clock position and the 7 o'clock to 11 o'clock position.^{9,10}

The current study aimed to examine how a modified suprapubic prostatectomy procedure performed on patients with BPH would affect postoperative blood hemoglobin levels. The procedure maximizes hemostatic control around the bladder neck, as was described previously.¹¹

Materials and methods

We performed a retrospective study of 47 consecutive patients who were seen in our center and underwent suprapubic prostatectomy for BPH between June 2006 and May 2009. The main indication for suprapubic prostatectomy in our center is the presence of a large prostate deemed unsuitable for transurethral resection (TURP).

Preoperative evaluation included determining blood hemoglobin, creatinine, and prostate-specific antigen levels and performing a digital rectal examination; when needed, a prostate biopsy was also done to exclude possible prostate cancer.

Enucleation of the hyperplastic adenomatous tissue of the prostate was performed by the transvesical technique.¹² Preference was given to starting the enucleation with a finger in the urethra, separating the apex of the prostate from the urethra bluntly, and enucleating the adenoma back towards the bladder



Figure 1. Running suture from the 1 o'clock position to the 11 o'clock position, suturing the bladder neck edge to the prostatic capsule.¹¹ Reprinted with permission.

neck until there was complete separation; emphasis was placed on very gentle enucleation during this stage of the surgery. The bladder neck repair was performed as described previously.¹¹ The procedure usually included the use of a running 2-0 polyglactin hemostatic suture covering the 1 o'clock position to the 11 o'clock position of the bladder neck, Figure 1. Additional vertical sutures were also used, with the aim of narrowing the bladder neck to the diameter of an index finger, Figure 2.

A 22 F or 24 F two-way Foley catheter was inserted and placed on mild traction by tying a piece of gauze to the catheter and pushing it mildly against the meatus for 2 to 3 hours. The catheter was additionally taped under



Figure 2. Bladder neck narrowed up to the diameter of the surgeon's index finger.¹¹ Reprinted with permission.

mild tension to the patient's thigh until the morning following the surgery. To assess the effectiveness of hemorrhage control, blood hemoglobin levels were measured before and after the surgery. Urethral catheters were usually maintained on mild traction until the morning following the surgery, and they were usually removed on the sixth postoperative day.

Results

The mean age of the patients was 70.4 years, Table 1. The weights of the enucleated prostate specimens, which were available for 38 patients, ranged from 65 g to 212 g (mean weight, 85.9 g). A total of 27 patients had indwelling urethral catheters, and 8 patients had suprapubic catheters that had been inserted prior to the surgery, due to urinary retention. Postoperative blood hemoglobin levels were determined when urine drainage from the catheter was visually clear, which usually occurred on the second or third postoperative day. The mean difference in blood hemoglobin was a decrease of 1.06 mg/dL, Table 1.

For many patients, postoperative bladder drainage was already clear when the patients were still in the operating room. Efflux of blood to the outside beside the urethral catheter through the meatus was noted to be much more common in this patient series than in previous series of cases where bladder neck suturing was done in the traditionally recommended manner. A total of three patients (6.4%) had episodes of catheter blockage secondary to clots. In these cases, catheter function was easily restored through aspiration and irrigation using a 60 cc syringe at the patient's bedside with no need to return any of these patients to the operating room. One of the patients did not urinate well after removal of the catheter, and the catheter was

TABLE 1. Patient age and perioperative hemoglobin levels*

Patient characteristic	Mean (range)
Age, years	70.4 (56 to 88)
Preoperative blood hemoglobin, mg/dL	12.561 (9.8 to 14.6)
Postoperative blood hemoglobin, $\rm mg/dL$	11.506 (9.0 to 13.7)
Difference (decrease) in blood hemoglobin, mg/dL	1.06 (0.3 to 2.1)
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*Study of 47 patients who underwent a modified suprapubic prostatectomy for benign prostatic hyperplasia

re-inserted for 1 more week, with a good outcome. Two patients had superficial wound infections that were successfully managed with dressing changes, and a third patient had a wound hematoma that required drainage. All of the patients survived the surgery, and no patient needed a blood transfusion. There was no noted increase in the risk of bladder neck stenosis over a mean follow up of 27.1 months.

Discussion

The main recommendation for hemostasis during suprapubic prostatectomy is application of sutures to the 5 o'clock and 7 o'clock positions at the bladder neck. This is explained by the entrance of the large urethral branches of the inferior vesical artery at these positions.¹³ The evolution of the modified suprapubic prostatectomy procedure¹¹ occurred in an attempt to maximize hemostatic control around the bladder neck. The work of Flocks^{9,10} provide an anatomic explanation of the hemostatic effect.

Our study demonstrates a measurable, good hemostatic effect with the use of the modified suprapubic prostatectomy technique¹¹ for patients with BPH. The procedure maximally covers the 1 o'clock to 11 o'clock areas of the bladder neck and hence effectively ligates all possible bleeding points at the bladder mucosa and prostatic capsular edges while at same time allowing ample bladder neck opening, which results in moderate intraoperative and postoperative blood loss. The noted increased efflux of blood to the outside beside the urethral catheter with this modification, contrary to that seen in an older series of patients who underwent repairs done with a traditional technique, indicates reduced backflow of blood into the bladder from the prostatic fossa. This reduction is also believed to have been aided by the additional moderate traction to the inflated Foley catheter, which helps improve hemostasis as well as further occlude off the bladder cavity from the prostatic fossa. A reduced presence of blood in the bladder should lead to lower incidences of clot formation, urinary retention, and episodes of catheter blockage.

Blood transfusion following suprapubic prostatectomy are still frequent.^{14,15} In many African countries, difficulties associated with blood transfusion can be enormous—ranging from inadequate blood bank supplies to a high risk of transmissible infection. To compound the problem, the current high rate of HIV infection across the continent has made any instance of blood transfusion risky. Therefore, in our hospital, we aim to avoid blood transfusion as much as possible. It is important to examine potential ways to exclude or significantly minimize the need for blood transfusions; this includes looking at ways to improve surgical procedures.

Using the modified technique of haemostatic control described in this study, none of the patients needed a blood transfusion.

There are some study limitations. This was a retrospective, single-center, consecutive case series with most surgeries done by a single surgeon. However, the authors assisted surgical residents with different sizes of index fingers in the repair of the bladder necks. To date, however, there have been no noticeable differences in patient outcome related to different index finger size in the surgical residents. Our preliminary conclusion is that any surgeon can safely use his or her index finger diameter to determine when to stop narrowing the bladder neck.

The mean difference in preoperative and postoperative blood hemoglobin was a decrease of 1.06 mg/dL, which is significantly less than the mean blood hemoglobin decrease of 3.5 mg/dL in the study by Adam et al¹⁶ in which a more limited bladder neck repair was done. This suggests that a better hemostatic effect was achieved with the modified suprapubic prostatectomy technique.

We believe this modified technique of hemostasis is easy to learn, as was confirmed from working with surgical residents, and it could be a very useful way to make hemorrhagic complications associated with suprapubic prostatectomy less common. This is especially important as the number of patients with large prostates not amenable to TURP is increasing, especially in the Western world were many patients with BPH are initially treated medically over long periods of time only to present later with large prostate glands.¹⁷

Conclusions

The modified suprapubic prostatectomy technique for BPH enhances hemostatic control and reduces the need for blood transfusion. $\hfill \Box$

References

- 4. Zargooshi J. Open prostatectomy for benign prostate hyperplasia: short-term outcome in 3000 consecutive patients. *Prostate Cancer and Prostatic Dis* 2007;10:374-377.
- 5. Helfand B, Mouli S, Dedhia R, McVary KT. Management of lower urinary symptoms secondary to benign prostatic hyperplasia with open prostatectomy: Results of a contemporary series. *J Urol* 2006;176(6 Pt 1):2557-2561.
- Jasinski Z, Wolski Z. A new technique of haemostasis following transvesical prostatectomy. *Int Urol Nephrol* 1985;17(2):165-169.
- 7. Han M, Partin AW. Retrograde and suprapubic open prostatectomy. In: Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA, editors. Campbell – Walsh Urology, ed. 9, Philadelphia, Saunders Elsevier, 2007. pp. 2845-2853.
- 8. Stutzman RE. In James F. Glenn, editor. Urologic Surgery, ed. 4, J.B. Lippincott, Philadelphia, 1991. pp 585-602.
- Flocks RH. The arterial distribution within the prostate gland: its role in transurethral prostatic resection, J Urol 1937;37:524.
- 10. Brooks JD. Anatomy of the lower urinary tract and male genitalia. In: Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA, editors. Campbell – Walsh Urology, ed. 9, Philadelphia, Saunders Elsevier, 2007. pp. 38-77.
- 11. Okorie CO, Salia M, Liu P, Pisters LL. Modified suprapubic prostatectomy without irrigation is safe. *Urology* 2010;75(3): 701-706.
- 12. Freyer PL. A new method of performing prostatectomy. *Lancet* 1900;1:774-775.
- 13. Mebust WK. Surgery for benign disease of the prostate. In: Droller MJ, editor. Surgical management of urologic disease an anatomic approach, Mosby year book, Missouri, 1992. pp. 657-666.
- 14. Meier DE, Tarpley JL, Imediegwu OO et al. The outcome of suprapubic prostatectomy: A contemporary series in the developing world. *Urology* 1995;46(1):40-44.
- 15. Serretta V, Morgia G, Fondacuro L et al. Open prostatectomy for benign prostatic enlargement in southern Europe in the late 1990s: A contemporary series of 1800 interventions. *Urology* 2002; 60(4):623-627.
- 16. Adam C, Hofstetter A, Deubner J et al. Retropubic transvesical prostatectomy for significant prostatic enlargement must remain a standard part of urology training. *Scand J Urol Nephrol* 2004; 38(6):472-476.
- 17. Takeuchi M, Masumori N, Tsukamoto T. Contemporary patients with LUTS/BPH requiring prostatectomy have long-term history of treatment with alpha 1-blockers and large prostates compared with past cases. *Urology* 2009;74(3):606-609.

^{1.} Evans CM. UROLINK in sub-Saharan Africa. *BJU Int* 2002; 89(suppl.1):6-10.

Varkarakis I, Kyriakakis Z, Delis A, Protogerou V, Deliveliotis C. Long-term results of open transvesical prostatectomy from a contemporary series of patients. *Urology* 2004;64(2):306-310.

Condie JD Jr, Cutherell L, Mian A. Suprapubic prostatectomy for benign prostatic hyperplasia in rural Asia: 200 consecutive cases. Urology 1999;54(6):1012-1016.