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The Effect of Finasteride on Bleeding During Transurethral Resection of the Prostate

Firas S. Al-Qurayshe[1] *MBChB*, **Adib M. Alkazzaz**[1] *FICMS*, **Usama S. Al-Nasiry**[2] *FRCS*

[1]Dept. of Urology, Al-Imamain Al-Kadhimain Medical City, [2]Iraqi Commission for Medical Specialization, Baghdad, Iraq

Abstract

Background Finasteride is a selective 5-α reductase enzyme inhibitor that blocks the conversion of testosterone to dihydrotestosterone, down regulates prostatic angiogenesis and blood flow and promotes apoptosis of prostatic cells. It significantly decreases suburethral prostatic microvessel density in patients with benign prostatic hyperplasia, which may explain its efficacy for decreasing benign prostatic hyperplasia -associated bleeding. Transurtheral resection of the prostate is considered the gold standard operation for symptomatic benign prostatic hyperplasia. It is characterized by immediate treatment success with long-lasting improvement of symptoms.

Objective To study the effect of finasteride on bleeding during transurethral resection of the prostate.

Methods Thirty eight patients with benign prostatic hyperplasia underwent transurethral resection of the prostate. Patients were randomly assigned into two groups, the finasteride group (18 patients) and the control group (20 patients). The intra-operative bleeding was measured.

Results Statistically less significant bleeding during transurethral resection of the prostate in patients who were placed on 10 mg finasteride for 6 weeks prior to the surgery.

Conclusion Finasteride given daily for 6 weeks prior to transurethral resection of the prostate reduces time of surgery, bleeding, and irrigation fluid requirements.

Keywords Hematuria, Finasteride, Benign prostatic hyperalgesia.

List of Abbreviations: B.I.D = Twice daily, BPH = Benign prostatic hyperplasia, DRE = Digital rectal exam, 5-ARIs = Five-alpha reductase inhibitors, Hb = Hemoglobin, KUB = Plain x-ray of the kidney, ureter, bladder, MSU = Midstream urine, PSA = Prostate specific antigen, US = Ultrasonography, TURP = Transurethral resection

Introduction

For most of the 20th century from 1909, when Hugh Hampton Young performed his first cold-cut prostatic punch operation, until the late 1990s, when effective medical therapy, and newer less invasive technologies for prostatic obstruction were developed, transurethral resection of the prostate (TURP) remained the most common surgical option for benign prostatic hyperplasia worldwide. Despite the minimally invasive nature of TURP, bleeding remains the most common complication of the procedure [(1)]. Historically, transfusion rates during TURP were reported to be as high as 20% [(2)]. Improvements in resectoscopes, optics, anesthesia, and energy sources have caused the transfusion rate to fall, but hemorrhage remains a common complication. A recent multi-institutional study reported transfusion rates of up to 2.9% after TURP [(3)]. Other studies have shown the transfusion rate to be below 2% at major surgical centers [(4)].

Patients with large prostates, concurrent urinary tract infections, or indwelling urinary catheters have traditionally been at greater risk of TURP related bleeding [(5)].

Finasteride is a selective 5α-reductase inhibitor for type 2 isoenzyme. The aim of this study is to assess the effect of finasteride on bleeding during TUR-P.

Methods

The study was conducted between April 2010 to October 2011, in the department of urology, Al-Imamain Al-Kadhemain Medical City, Baghdad. Thirty eight patients with prostatic enlargement greater than 60 cm^3 were included in the current study. Patients with vesicle stone, bladder tumor, bleeding tendency, renal impairment, and uncontrolled hypertension were excluded from the study. Patients already taking finasteride, on anticoagulant drugs or elevated prostatic specific antigen (PSA) were also excluded from the study.

All of the included patients underwent full pre-operative work-up, including digital rectal exam (DRE), PSA, coagulation tests, plain x-ray of the kidney, ureter and urinary bladder (KUB), sonography of the abdomen and pelvis, urine analysis, and mid-stream urine for culture and sensitivity.

Eighteen patients were given 10 mg (5 mg BID) finasteride daily for 6 weeks prior to TUR-P (The Finasteride group), while 20 patients underwent TUR-P without taking finasteride (The control group).

The operation was done by the same surgeon, using unipolar Storz resectoscope, and distilled water as the irrigate fluid. In each TUR-P operation the following parameters were evaluated, actual duration of resection, amount of irrigation fluid used, hemoglobin (Hb) in a sample of the irrigation fluid, and Hb of the patient.

To calculate the amount of intra-operative blood loss, we use the following formula:

$$\text{Blood loss (ml)} = \frac{\text{Hb level in irrigate fluid (gm/dl)} \times \text{total volume of irrigate fluid (ml)}}{\text{Hb of the patient (gm/dl)}}$$ [6]

Statistically, the T-test is used to measure the P value of the evaluated parameters.

Results

A total of 38 patients with prostatic enlargement underwent TUR-P. They were assigned into two groups.

The mean age of Finasteride group was 70.5 years (range 62 to 80), the mean prostate size was 77.1 cm^3 (range 64 to 89), the mean duration of resection was 44.1 minutes (range 33 to 58), the mean irrigation fluid used was 11.4 liter (range 9 to 14), and the mean intra-operative blood loss was 261.5 ml (range 210 to 352).

On the other hand, for the 20 patients of the control group, the mean age was 68.2 years (range 58 to 79), the mean prostate size 76.6 cm^3 (range 67 to 85cm^3), the mean duration of resection was 65.7 minute (range 55 to 72min.), the mean intra-operative blood loss was 461.8 ml (range 343.3 to 612.4ml), and the mean irrigation fluid used was 16.1 liter (range 12 to 19 L).

These results showed a difference in the mean duration of resection between both groups which was 21.6 minutes. In addition, the difference in the mean intra-operative blood loss was 200 ml and the difference in the intra-operative irrigation fluid used was 4.7 liter (Table 1).

Using the T-test to measure the P value, comparative statistical analysis of these results showed a significant difference in the duration of resection, the intra-operative blood loss and the intra-operative irrigation fluid used, between the two groups of the study ($P < 0.0005$) as seen in table 1.

Discussion

Hematuria associated with BPH is probably related to increased vascularity in the prostate,

which is associated with friable prostatic tissue (either primary or regrowth after prostatectomy). Marshall and Narayan first reported the beneficial effects of hormonal therapy on prostatic bleeding, which they proposed a result of suppressed angiogenesis secondary to androgen deprivation [7].

Table 1. Differences in the comparative parameters between TURP+Finastride and control groups

Parameter	Control group	TURP + Finastride
Resection duration (min)	65.7	44.1*
IO blood loss (ml)	461.8	261.8*
IO irrigate fluid (L)	16.1	11.4*

IO = intraoperative, * *P* = <0.0005

While this initial observation was made to patients with prostate cancer, Puncher and Miller subsequently described a similar association of finasteride with BPH associated gross hematuria [8]. Hochberg et al provided one of the first histological proofs for decreased suburethral microvessel density in finasteride treated prostates. Given that BPH associated hematuria has been correlated with suburethral prostatic microvessel density, so it can be postulated that the efficacy of finasteride for decreasing BPH associated prostatic bleeding is mediated through suppression of microvessel density [9]. Donohue et al has also shown in his trial that finasteride reduces prostatic vascularity rapidly within 2 weeks [10].

The results of the current study show that the finasteride group patients showed less bleeding, during TUR-P, than the control group. This finding is in agreement with the studies conducted by Hagerty et al [11], Donohue et al [12] and Ozdal et al [13]. As bleeding is reduced, visibility during resection improves, thus speed of resection accelerates, and the amount of fluid irrigate used for surgery is reduced.

In conclusion, finasteride given prior to TURP as a combination therapy is found to reduce time of surgery, intraoperative blood loss and irrigation fluid requirement.

Limitations

This study is unique in Iraq; however, the relatively small number of patients is one limitation. The conclusions reached herein have to be checked with the American Urological Association and European Association of Urology guidelines.

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Author contributions

Professor Usama Al-Nasiry planned the study design and setting, Dr. Adib did the operative work and the writing of the manuscript and Dr. Firas collected the clinical data and assisted in the operative work.

Declaration of interest

None of the authors has conflict of interest of any kind and with whomever.

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Correspondence to Dr. Adib M. Alkazzaz
E-mail: alkazzaztrd@hotmail.com
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