A Comparative Study of Post Operative Complications of Open Prostatectomy (Freyer’s) Versus Trans Urethral Resection of Prostate

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Abstract

Aims & objectives: To compare post-operative complications between open prostatectomy (FREYER’S) and T.U.R.P.

Material and Methods: Patients, who were candidates for prostate surgery & had been referred to urology outpatient clinic in our hospital between December 2011 to September 2013, were enrolled for the study. These patients were then divided in two groups – A and B randomly, by using the process of randomization. Group A comprised of patients for open prostatectomy and Group B of patients for T.U.R.P.

Conclusion: In expert hands and with proper monitoring facilities TURP is the best method of prostatectomy for small glands. However in a country like ours where all ideal facilities are not available freyer’s method will still be widely practiced for long periods.

Keywords: Open Prostatectomy (Freyer’s), TURP (Trans Urethral Resection of Prostate).

1. Introduction

Benign enlargement of the prostate occurs in the males over 45 years of age. Urinary retention due to prostatic disease is a major geriatric problem. Open transvesical prostatectomy i.e. freyer’s (OP) and transurethral resection of the prostate (TURP) are two old surgical procedures performed for patients with benign prostatic hyperplasia (BPH). Currently, TURP is considered as the reference or standard treatment for the prostate less than 70 to 80 g [1-3]. Nevertheless, OP is still being performed for operations of the prostates that are candidate for TURP in many developing and even developed countries, as the percent of OP in the late 1990’s and early 2000 in Sweden [4], France [5], Italy [6], and the Mediterranean coasts [7] ranged from 14% to 40%. In the 21st century, with advances in surgical methods and anaesthesia, the complications of OP have decreased relative to the reports of the old times. Besides, patients are satisfied with OP regarding its functional outcome and durability. Open transvesical prostatectomy is not currently recommended for moderate-sized prostates.

While, as mentioned above, a large percent of such operations are performed through the open approach. Some authors considered comparing OP with newer methods unethical [8] while there has not been good quality evidence for the comparison of OP with TURP.[3,9] We aimed to compare the post-operative and short-term complications of OP(freyer’s) and TURP.

2. Materials and methods

Patients, who were candidates for prostate surgery & had been referred to urology outpatient clinic in our hospital between December 2011 and September 2013, were enrolled for the study. These patients were then divided in two groups – A and B randomly, by using the process of randomization. Group A comprised of patients for open prostatectomy and Group B of patients for T.U.R.P.

Indications for the prostate surgery included lower urinary tract symptoms despite maximal medical therapy, frequent urinary tract infections, haematuria unresponsive to medical therapy, high serum creatinine that decreased with urethral catheter placement, and urinary retention despite medical therapy. Taking the history and physical examination, Laboratory
evaluations included serum level of creatinine, serum level of prostate-specific antigen (PSA), urine analysis, and urine culture. Ultrasonography of kidneys, the bladder, and the prostate were also performed. Thereafter, patients were referred for transrectal Ultrasonography of the prostate to assess the prostate size. Patients with high serum level of PSA underwent transrectal ultrasound guided biopsy of the prostate (5 cores from each lobe). Patients with a suspicious mass in digital rectal examination, history of the prostate operation, the prostate size outside the range of 30 to 80 g in transrectal Ultrasonography, and those with pathology report other than BPH in transrectal prostate biopsy were excluded from the study. Finally, 100 patients remained for the analysis.

Data were collected during the operation, postoperative hospitalization, and when patients referred to the clinic at 1 to 2 months postoperatively. In this immediate post operative complications included are bleeding, clot retention, re-exploration, turp syndrome, UTI, secondary haemorrhage, wound infection, epididymitis, supra-pubic leak, and delayed post operative complication included are retrograde ejaculation, retention, incontinence, decrease urinary stream, erectile dysfunction, stricture.

This study was approved by the human Ethical Committee. All the patients were informed about the study objectives and interventions. A written informed consent was obtained from each patient. Statistical analysis was done of this study.

3. Results and Discussion

Open transvesical prostatectomy is currently regarded as the only procedure that completely relieves prostatic obstruction. [2,9,56] It is usually used for large prostates or when another pathology necessitating open intervention such as multiple bladder stones coexists.[56] Previously, TURP was the most commonly used operation for obstruction relief and accounted for 60% to 97% of the prostate operations.[4-7,58] The use of OP is now mostly confined to less developed countries with little expertise or experience in endoscopy,[58] Currently, laser vaporization technology and Holmium laser enucleation of the prostate are revolutionary techniques with little morbidity and equivalent success to OP or TURP, and are promising to be the new gold standard treatments of BPH, irrespective of the prostate size.[60-62] But the main drawbacks for laser technology are its high cost and difficult learning curve[61,62] that make it unsuitable. Currently, few centres in the Middle East offer Holmium laser enucleation of the prostate. Transurethral resection of the prostate has been declared as the reference or standard treatment for the prostates less than 70 to 80 g[1-3,63]; however, it has been clearly stated that TURP has not passed the formal pathways of a new surgical method evaluation and its comparison with OP has been based on retrospective, open, and single centre series[3]. Since the indications for TURP and OP are different, best comparisons are possible only through randomized controlled trials (RCT).[54] In this study Out of the total 100 patients, 50 patients underwent freyer’s prostatectomy and 50 underwent TURP, by randomized control study.

In the present study patients undergoing prostatectomy, were from peak age group of 61-70 years. These figures are similar to those reported by Ahmed [64] East Africa 1979: 2: 12-14.). [65].

3.1 Per operative complications

There were not a single complication like severe bleeding, capsular perforation, bladder perforation, or rectum injury noted in this present study. There is 6. 3% rate of bladder perforation encountered Dr. D. K. Kiptoon[65].

3.2 Post operative complications

Post operative complications were divided into two groups Immediate and Late complication. In this immediate post operative complications included are bleeding, clot retention, re-exploration, turp syndrome, UTI, secondary haemorrhage, wound infection, epididymitis, supra-pubic leak , and delayed post operative complication included are retrograde ejaculation, retention, incontinence, decrease urinary stream, erectile dysfunction, stricture.

3.2.1 Immediate Post operative bleeding

In present study there were 8% of cases had post operative bleeding in freyer’s prostatectomy and 12% of cases had post operative bleeding in TURP. All patients were treated by giving blood transfusion. P value is non significant in present study. In the study of Lynch M et al[68] there were only 4% of cases had post operative bleeding in TURP.

The study of Oranusi CK et al [66] there were 18% of cases had post operative bleeding in freyer’s prostatectomy, so in present study there less complication in o.p. compare to other study.
Table 1: Immediate post operative complication

| Immediate (1 to 7 Days) | Freyer’s Percentage (%) | TURP Percentage (%) | Z value | P value |
|------------------------|-------------------------|---------------------|---------|---------|
| Bleeding               | 04                      | 08                  | 09      | 0.7     | NS      |
| Clot Retention         | 09                      | 12                  | 01      | 0.7     | NS      |
| Re-Exploration         | 02                      | 04                  | 00      | 1.4     | NS      |
| TURP Syndrome          | 00                      | 00                  | 05      | 10      | <0.01   |
| UTI                    | 08                      | 08                  | 17      | 34      | <0.01   |
| Secondary Haemorrhage  | 07                      | 14                  | 03      | 06      | NS      |
| Wound Infection        | 14                      | 28                  | 00      | 00      | 4       | <0.00001 |
| Epididymities          | 00                      | 00                  | 09      | 18      | 3.1     | <0.01   |
| Supra Pubic LEAK       | 08                      | 16                  | 00      | 00      | 2.9     | <0.01   |

Clot retention
In present study 12% cases noted of clot retention in freyer’s prostatectomy and 1.4 % post operative clot retention noted in freyer’s, in the study of Oranusi CK et al [66]. In present study 8% cases noted of clot retention in TURP and 0% in open prostatectomy in the study of Nasser Simforoosh et al [67], there were 12% of cases of clot retention. P value is non significant in present study.

Re-exploration
In present study 4% cases of freyer’s prostatectomy needed re exploration because of clot retention and 0% Cases noted in TURP. In the study of Nasser Simforoosh et al [67], there were 16% of cases of TURP needed reexploration and 0% of open prostatectomy. 1.4 % cases of freyer’s needed reexploration in the study of Oranusi CK et al [66] Department of Surgery, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria. P value is non significant in present.

TURP syndrome
In the present study 10% cases of TURP noted of TURP syndrome .P value <0.05 and z value is 2.3.

UTI
In the present study 16% cases of UTI noted in patient underwent freyer’s prostatectomy and 34% cases of UTI noted in TURP more incidence of UTI in TUR is due to instrumentation of urethra. Also eyepiece of resectoscope is potential source of infection.

In the study of Nasser Simforoosh et al [68], there were 4% cases of UTI noted in TURP, and 4% cases of UTI noted in open prostatectomy. All the patients of UTI were treated with antibiotic according to culture and sensitivity report of urine.

Secondary haemorrhage
In the present study 14% cases of secondary haemorrhage noted in freyer’s prostatectomy and 6% cases of secondary haemorrhage noted in TURP. Secondary haemorrhage was due to urinary tract infection. P value of this study was non significant.

In study of Zameer Hussain Laghari (70) there were 12.5% cases noted in open prostatectomy. Wound infection
In the present study 28% cases of wound infection noted in freyer’s prostatectomy. Pre operative UTI, cathetorization, greater frequency of bladder wash and longer haematuria are commonly found to be associated. All the patients of wound infection were treated with appropriate antibiotic according to swab culture sensitivity report and daily dressing.

In the study of Oranusi CK et al [66], Department of Surgery, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria had 6.9% cases of wound infenction found in freyer’s prostatectomy and in study of Joeb Rampurwala 1987 had 30% cases of wound infection.

Epididymitis
In present study 18% cases of epididymitis noted in TURP and 0% cases of epididymitis noted in freyer’s prostatectomy. In study of Hamidreza Abdi et al [67], there were 8% cases of epididymitis freyer’s prostatectomy and 12% cases of epididymitis noted in TURP. 5% cases of epididymitis found in both cases and in study of Joeb Rampurwala 1987[66].

Supra pubic leak
In present study 16% cases of supra pubic leak noted in freyer’s prostatectomy. 30% cases of supra pubic leak found in freyer’s cases and in study of Joeb Rampurwala 1987[67].

In the study of Amir Nasser Simforoosh et al [67] there were 6% cases of supra pubic leak found in freyer’s prostatectomy.

3.2.2 Delayed post operative complication
Retention
In present study none of the patient developed post operative retention in both type of cases.0% cases of retention found in freyer’s cases and one patient of retention noted in case of TURP in study of Joeb Rampurwal[65].

Incontinence
In present study 8% cases of incontinence noted in freyer’s prostatectomy and 6% cases of
epididymitis noted in TURP. 5% cases of incontinence found in freyer’s cases and 10% cases of incontinence noted in case of turp in study of Joeb Rampurwala[65]. In the study of Nasser Simforoosh, et al [67] There were 2% cases of incontinence noted TURP and 0% cases noted in open prostatectomy.

Decrease Urinary Stream:
In present study 0% cases of decrease urinary stream noted in freyer’s prostatectomy and 20% cases of decrease urinary stream noted in TURP. P value is <0.05.

Erectile Dysfunction:
In present study 4% cases of erectile dysfunction noted in freyer’s prostatectomy and 0% cases of erectile dysfunction noted in TURP. In the study of Nasser Simforoosh et al[68] There were 6% cases of erectile dysfunction noted TURP and 2% cases of erectile dysfunction noted in open prostatectomy.

Retrograde Ejaculation
In present study 0% cases of retrograde ejaculation noted in freyer’s prostatectomy and 6% cases of retrograde ejaculation noted in TURP. In the study of Nasser Simforoosh et al [67], There were 39% cases of retrograde ejaculation noted TURP and 34% cases of retrograde ejaculation noted in open prostatectomy.

Stricture
In present study 4% cases of stricture noted in freyer’s prostatectomy and 18% cases of stricture noted in TURP. In the study of Mechior series 2.5% cases noted TURP. No cases of stricture noted in study of Joeb Rampurwala[66].

4. Conclusion
Hundred patients, who were candidates for prostate surgery & had been referred to urology outpatient clinic in our hospital between December 2011 to September 2013, were enrolled for the study. Following conclusions were drawn from the present study; Freyer’s and TURP are the two commonest surgeries performed for benign prostatic hyperplasia. Freyer’s is the open method and TURP is an endourological procedure; both of them having their own complications. Transurethral resection is more gentle method for patients, surgeons and hospitals. However it requires costly instruments, special training and skilled urologist. Hence TURP is better option for small glands. Transvesical prostatectomy should be used by general surgeons in the institutes where resectoscope is not available, with large gland and benign enlargement of prostate associated with bladder pathology. Open transvesical prostatectomy is a safe operation in 60 to 80 g prostates with few complications, because of complete removal of gland in safe hands. Disadvantages of freyer’s method is long post operative stay, chances of wound infection, need to put external incision. The principle of selecting proper individual patient is important in obtaining good results.

In expert hands and with proper monitoring facilities TURP is the best method of prostatectomy for small glands. However in a country like our’s where all ideal facilities are not available freyer’s method will still be widely practiced for long periods.

References
[1] De la Rosette J, Alivizatos G, Madersbacher S, et al. Guidelines on Benign Prostatic Hyperplasia. European Urology Association. 2009, pp 35.
[2] Jepsen JV, Bruskewitz RC. Recent developments in the surgical management of benign prostatic hyperplasia. Urology. 1998; 51:23-31.
[3] Reich O, Gratzke C, Stief CG. Techniques and long term results of surgical procedures for BPH. Eur Urol. 2006; 49:970-8.
[4] Ahlstrand C, Carlsson P, Jonsson B. An estimate of the life-time cost of surgical treatment of patients with benign prostatic hyperplasia in Sweden. Scand J Urol Nephrol. 1996; 30:37-43.
[5] Lukacs B. Management of symptomatic BPH in France: who is treated and how? Eur Urol. 1999; 36 Suppl 3:14-20.
[6] Serretta V, Morgia G, Fondacaro L, et al. Open prostatectomy for benign prostatic enlargement in southern Europe in the late 1990s: a contemporary series of 1800 interventions. Urology. 2002; 60:623-7.
[7] Mozes B, Cohen YC, Olmer L, Shabtai E. Factors affecting change in quality of life after prostatectomy for benign prostatic hypertrophy: the impact of surgical techniques. J Urol. 1996; 155:191-6.
[8] Jenkins BJ, Sharma P, Badenoch DF, Fowler CG, Blandy JP. Ethics, logistics and a trial of transurethral versus open prostatectomy. Br J Urol. 1992; 69:372-4.
[9] Tubaro A, Carter S, Hind A, Vicentini C, Miano L. A prospective study of the safety and efficacy of suprapubic transvesical prostatectomy in patients with benign prostatic hyperplasia. J Urol. 2001; 166:172-6.
[10] Romer, Alfred Sherwood; Parsons, Thomas S. The Vertebrate Body. Philadelphia, PA: Holt-Saunders International 1977; 395.
[11] "Prostate Gland Development". ana.ed.ac.uk. Retrieved 2011-08-03.
[12] "Instant Anatomy – Abdomen – Vessels – Veins – Prostatic plexus". Retrieved 2007-11-23.
[13] Raychaudhuri, B.; Cahill, D. (2008). "Pelvic fasciae in urology". Annals of the Royal College of Surgeons of England 90 (8): 633–637. doi:10.1308/003588408X321611.
[14] Cohen RJ, Shannon BA, Phillips M, Moorin RE, Wheeler TM, Garrett KL (2008). “Central zone carcinoma of the prostate gland: a distinct tumor
type with poor prognostic features". The Journal of Urology 179 (5): 1762–7; discussion 1767. doi:10.1016/j.juro.2008.01.017. PMID 18343454.

[15] "Semen analysis". www.umc.sunysb.edu. Retrieved 2009-04-28.

[16] Moore, Keith L.; Persaud, T. V. N. and Torchia, Mark G. Before We Are Born, Essentials of Embryology and Birth Defects, 7th edition, Saunders Elsevier, 2008 ISBN 978-1-4160-3705-7

[17] Bostwick, D. G. (2002). "The Pathology of Benign Prostatic Hyperplasia". In Kirby, Peter; McConnell, John D.; Fitzpatrick, John M.; Roehrborn, Claus G.; Boyle, Peter. Textbook of Benign Prostatic Hyperplasia. London: Isis Medical Media.

[18] Barry MJ, Fowler FJ, O'Leary MP, et al. "The American Urological Association symptom index for benign prostatic hyperplasia. The Measurement Committee of the American Urological Association". The Journal of Urology 1992; 148 (5): 1549–57; discussion 1564.

[19] Feldman, Brian J.; Feldman, David. "The development of androgen-independent prostate cancer". Nature Reviews Cancer 2001; 1 (1): 34–45.

[20] Roberts, Rosebud O.; Jacobson, Debra J.; Rhodes, Thomas; Klee, George G.; Leiber, Michael M.; Jacobsen, Steven J. "Serum sex hormones and measures of benign prostatic hyperplasia". The Prostate 2004; 61 (2): 124–31.

[21] Niu, YJ; Ma, TX; Zhang, J; Xu, Y; Han, RF; Sun, G. "Androgen and prostatic stroma". Asian Journal of Andrology 2003; 5 (1): 19–26.

[22] Wasserman, Neil F. "Benign Prostatic Hyperplasia: A Review and Ultrasound Classification". Radiologic Clinics of North America 2006; 44 (5): 689–710.1016/j.rcl.2006.07.005.

[23] Robbins S.L. and Cotran R.S. Pathologic Basis Of Disease, 2nd Edi., W. B. Saunders Company1981.

[24] Wein: Campbell-Walsh Urology, 9th ed. Crawford et al., 1999. Crawford ED, Leeuwsantong S, Goktas S, et al: Efficiency of prostate-specific antigen and digital rectal examination in screening, using 4.0 ng/mL as a cutoff for abnormal values. Prostate 1999; 38:296.

[25] Meng MV, et al. Urologic Disorders. In: McPhee SJ, et al. Current Medical Diagnosis & Treatment 2012. 51st ed. New York, N.Y.: The McGraw-Hill Companies; 2012. http://www.accessmedicine.com/content.aspx?aID=11857. Accessed Oct. 11, 2011.

[26] Cunningham GR, et al. Clinical manifestations and diagnosis of benign prostatic hyperplasia. http://www.uptodate.com/home/index.html. Accessed Oct. 11, 2011.

[27] Balk SP, Ko YJ, Bubley GJ. "Biology of prostate-specific antigen". J. Clin. Oncol. 2003; 21 (2): 383–91.

[28] Catalona, W. J.; Richie, J. P.; Ahmann, F. R.; Hudson, M. A.; Scardino, P. T.; Flanigan, R. C.; Dekernion, J. B.; Ratliff, T. L.; Kavoussi, L. R.; Dalkin, B. L. "Comparison of digital rectal examination and serum prostate specific antigen in the early detection of prostate cancer: Results of a multicenter clinical trial of 6,630 men". The Journal of urology 1994; 151 (5): 1283–1290.

[29] Gomez LA, Liu XS, Trabulsi EJ, Kelly WK, Myers R, Showalter T, Dicker A, Wender R. "Screening for prostate cancer: the current evidence and guidelines controversy". Can J Urol 2011; 18 (5): 5875–83.

[30] Hochmeister M., Rudin O., Borer U.V., Kratzler A., Gehrig Ch. and Dirnhofe R. (1997). Evaluation of Prostate-Specific Antigen (PSA) Membrane Tests for the Forensic Identification of Semen. Eighth International Symposium on Human Identification. Retrieved 2008-05-11.

[31] Rao AR, Motiwala HG, Karim OM. "The discovery of prostate-specific antigen". BJU Int. 2008; 101 (1): 5–10.

[32] Hori S, Sengupta A, Joannides A, et al. Changing antibiotic prophylaxis for transrectal ultrasound-guided prostate biopsies: are we putting our patients at risk? BJU Int 2010; 106:1298.

[33] Loeb S, Carter HB, Berndt SI, et al. Complications after prostate biopsy: data from SEER-Medicare. J Urol 2011; 186:1830.

[34] Giannarini G, Mogorovich A, Valent F, et al. continuing or discontinuing low-dose aspirin before transrectal prostate biopsy: results of a prospective randomized trial. Urology 2007; 70:501.

[35] Kubo Y, Kawakami S, Numao N, et al. Simple and effective local anesthesia for transperineal extended prostate biopsy: application to three-dimensional 26-core biopsy. Int J Urol 2009; 16:420.

[36] Hodge KK, McNeal JE, Terris MK, Stamey TA. Random systematic versus directed ultrasound guided transrectal core biopsies of the prostate. J Urol 1989; 142:71.

[37] Ghani KR, Dandis D, Patel U. Bleeding after transrectal ultrasonography-guided prostate biopsy: a study of 7-day morbidity after a six-, eight- and 12-core biopsy protocol. BJU Int 2004; 94:1014.

[38] Djavan B, Ravery V, Zlotta A, et al. Prospective evaluation of prostate cancer detected on biopsies 1, 2, 3 and 4: when should we stop? J Urol 2001; 166:1679.

[39] Wein: Campbell-Walsh Urology, 9th ed. Chapter 89.

[40] Primary Surgery: Volume One: Non-trauma.
[41] Management of benign prostatic hyperplasia (BPH). American Urological Association. http://www.auanet.org/content/guidelines-and-quality-care/clinical-guidelines.cfm. Accessed April 12, 2013.

[42] Wein AJ, et al. Campbell-Walsh Urology. 10th ed. Philadelphia, Pa.: Saunders Elsevier; 2012.

[43] Thiel DD, et al. Electroresection and open surgery. Urologic Clinics of North America. 2009; 36:461. Graham SD, et al. Glenn’s Urologic Surgery. 7th ed. Philadelphia, Pa.: Wolters Kluwer Health Lippincott Williams & Wilkins; 2010:166.

[44] Prostate enlargement: Benign prostatic hyperplasia. National Institute of Diabetes and Digestive and Kidney Diseases.

[45] Ask Mayo Expert. Benign prostatic hyperplasia. Rochester, Minn.: Mayo Foundation for Medical Education and Research; 2012.

[46] Cunningham GR, et al. Surgical and other invasive therapies of benign prostatic hyperplasia.

[47] Preparing for your operation and recovery. American College of Surgeons. Accessed April 11, 2013.

[48] Update on AUA guideline on the management of benign prostatic hyperplasia. Journal of Urology 2011; 185:1793.

[49] Alschibaja U.A. 2005 Alschibaja, M.; May, F.; Treiber, U.; Paul, R.; Hartung, R.: [Transurethral resection for benign prostatic hyperplasia current developments]. In: Urologe A 44 (2005), Nr. 5, S. 499–504.

[50] Mauermayr 1985 Mauermayr, W.: [Operative complications in transurethral operations: causes and prevention]. In: Urologe A 24 (1985), Nr. 4, S. 180–3.

[51] Nesbit 1951 NESBIT, R. M.: Transurethral prostatic resection: a discussion of some principles and problems. In: J Urol 66 (1951), Nr. 3, S. 362–72.

[52] Presti JC. Neoplasms of the prostate gland. In: Tanagho EA, McAninch JW, editors. Smith’s general Urology. International ed. McGraw-Hill: 2000. pp. 399–42.

[53] Mearini E, Marzi M, Mearini L, Zucchi A, Porena M. Open prostatectomy in benign prostatic hyperplasia: 10-Year experience in Italy. Eur Urol. 1998; 34:480–5.

[54] International Prostate Symptom Score (IPSS) at Urological Sciences Research Foundation. Retrieved November 2011.

[55] Varkarakis I, Kyriakakis Z, Delis A, Protegorou V, Deliveliotis C. Long-term results of open transvesical prostatectomy from a contemporary series of patients. Urology. 2004; 64:306-10.

[56] McConnell JD, Barry MJ, Bruskewitz RC. Benign prostatic hyperplasia: diagnosis and treatment. Agency for Health Care Policy and Research. Clin Pract Guidel Quick Ref Guide Clin. 1994; 1-17. Open Prostatectomy Versus TURP—Simforoosh.

[57] Servadio C. Is open prostatectomy really obsolete? Urology, 1992; 40:419-21.

[58] Bruskewitz R. Management of symptomatic BPH in the US: who is treated and how? Eur Urol. 1999; 36 Suppl 3:7-13.

[59] Meier DE, Tarpley JL, Imediegwu OO, et al. The outcome of suprapubic prostatectomy: a contemporary series in the developing world. Urology 1995; 46:40-4.

[60] Fried NM. New laser treatment approaches for benign prostatic hyperplasia. Curr Urol Rep. 2007; 8:47-52.

[61] Kuntz RM. Current role of lasers in the treatment of benign prostatic hyperplasia (BPH). Eur Urol. 2006; 49:961-9.

[62] Kuntz RM. Laser treatment of benign prostatic hyperplasia. World J Urol. 2007; 25:241-7.

[63] Fitzpatrick JM. Millin retropubic prostatectomy. BJU Int. 2008; 102:906-16.

[64] Ahmed A. A. Transvesical prostatectomy in Tikur Anbessa Hospital, Addis Ababa. East Afr. Med. J. 1992; 69: 378 - 380.

[65] Dr. D. K. Kiptoon, G. A. O. Magoha and F. A. Owillah East African Medical Journal Vol. 84 No. 9 (Supplement) September 2007.

[66] Joeb Rampurwala benign enlargement of prostate a comparative study between TURP and freygers Gujarat Uni. April 1987.

[67] Oranusi CK, Nwofor A, Oranusi IO. Department of Surgery, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria.

[68] Nasser Simforoosh, Hamidreza Abdi, Amir Hossein Kashi, Samad Zare, Ali Tabibi, Abdolkarim Danesh, Abbas Basiri, Seyed Amir Mohsen Ziaee Urology Journal Vol 7 No 4 Autumn 2010.

[69] Lynch M, Sriprasad S, Subramonian K, Thompson P. Department of Urology, King’s College Hospital, London, UK.

[70] Zameer Hussain Laghari MC Vol.17-No.2-2011 (46-49) Laghari H.M