



DIGITAL RECTAL EXAMINATION AS A PREDICTOR OF PROSTATE VOLUME IN PATIENTS OF INGUINAL HERNIA

Manish Verma*	Professor, Department of Surgery, PGIMS, Rohtak, Haryana, India *Corresponding Author
Zaheen Khan	Junior Resident, Department of Surgery, PGIMS, Rohtak, Haryana, India
M G Vashist	Senior Professor, Department of Surgery, PGIMS, Rohtak, Haryana, India
Omparkash	Junior Resident, Department of Surgery, PGIMS, Rohtak, Haryana, India.

ABSTRACT **Objectives:** To determine the accuracy of DRE in determining prostate volume.
Methods: We studied 100 patients of inguinal hernia for the accuracy of digital rectal examination (DRE) to estimate prostate volume. DRE was carried out in each patient and subsequently findings of DRE were compared with prostate volume measurement by trans-abdominal ultrasound.
Results: Thirty eight (38%) patients were having enlarged prostate as determined by digital rectal examination. The positive predictive value, negative predictive value, sensitivity and specificity as calculated were 81.57%, 95.16%, 91.17%, and 86.76% respectively. The result came out to be significant at $p < 0.05$.
Conclusion: DRE remains an important, rapid, cost-effective tool in the examination of prostate in patients of inguinal hernia. It is useful for determining whether the prostate has a categorical volume greater than 30 ml.

KEYWORDS : Digital rectal examination, Prostate volume, Inguinal hernia
 Key words: Digital rectal examination, Prostate volume.

INTRODUCTION

Bladder Outlet Obstruction (BOO) is an important predisposing factor for development of inguinal hernia. Benign prostate enlargement (BPE) is the most common cause of bladder outlet obstruction (BOO) in men, with benign prostate hyperplasia (BPH) patients constituting the majority.¹ Although the risks and treatment for the enlarged prostate have been reported, there have not been many reports on evaluation of the prostate volume (PV). Currently, there is no convenient method to evaluate the PV other than by ultrasonography. Ultrasonography is simple, non-invasive method, but needs time and labor. Trans-rectal ultrasonography (TRUS) is more invasive and embarrassing to patients as compared to trans-abdominal ultrasonography. In most rural hospital centers in India, contemporary imaging modalities are unavailable so relying on it to estimate prostate volume limits the surgeon. In such situations, DRE becomes imperative. The issue becomes how reliable it is. A lot of measures have been undertaken to standardize DRE for estimation of PV.^{2,3} We therefore studied 100 patients of inguinal hernia to determine the reliability of DRE in estimating PV using the sliding scale.

METHODS:

The study was conducted in 100 patients, aged ≥ 40 yrs, of inguinal hernia attending the surgery outpatient department of our institute. Patients having previous inguinal hernia surgery, obstructed or strangulated inguinal hernia, previous prostatic or urethral surgery, patients on alpha blocker therapy and patients with neurogenic bladder dysfunction were excluded. For each patient, DRE was done by the same surgeon (having 10 years' experience) and the volume of the prostate was estimated; and categorized into not enlarged (Grade 0 and 1) or enlarged (Grade 2 or more) using the grading scale.³

The grade is as follows: (1) Normal gland (20g); about the size of a chest nut – Grade 0. (2) Enlarged prostate gland (about 25g); about the size of a plum and occupies a bit $< 1/4^{\text{th}}$ of the rectum lumen – Grade 1. (3) Enlarged prostate gland (about 50g); about the size of a lemon and fills somewhat $> 1/2$ of the rectum – Grade 2. (4) Enlarged prostate gland (about 75g); about the size of an orange and fills approximately three-fourth of the rectal diameter – Grade 3. (5) Enlarged prostate gland (about 100g); may attain the size of a grape fruit and fills so much of the rectal lumen that adequate examination is difficult – Grade 4.³

Subsequently, patients were sent for trans-abdominal ultrasound and patients were categorized as enlarged prostate (PV $> 30\text{cc}$) and normal prostate (PV $\leq 30\text{cc}$). The accuracy of the DRE was presented as positive and negative predictive values with 95% confidence intervals. P-value of < 0.05 was considered statistically significant. The results

obtained were tabulated, analyzed statistically using Chi square test and finally conclusion was drawn.

RESULTS:

Mean age of the patient was 56.91 years. Maximum patients were in the age group 50-69 years (62%). The age of patient varied between 40 to 80 years. In our study, thirty eight (38%) patients were having enlarged prostate as determined by digital rectal examination, sixty two (62%) patients had normal prostate size. In our study, sixty six (66%) patients had prostate volume in normal range ($< 30\text{cc}$), thirty two (32%) patients had prostate volume in the range of 31-50cc. Two (2%) patients had prostate volume greater than 50cc.

Chi square statistic was 61.82 and p value was < 0.00001 , hence the result was significant at $p < 0.05$. The positive predictive value, negative predictive value, sensitivity and specificity as calculated were 81.57%, 95.16%, 91.17%, and 86.76% respectively.

TABLE I
Concordance Between DRE And Transabdominal USg

DRE	TRANSABDOMINAL ULTRASOUND		
	ENLARGED ($> 30\text{CC}$)	NORMAL	TOTAL (N)
ENLARGED	31	7	38
NORMAL	3	59	62
TOTAL	34	66	100

DISCUSSION

Benign prostatic hyperplasia (BPH) is one of the most common diseases in ageing men, which can lead to BOO and is a risk factor for development of inguinal hernia. DRE is a commonly used technique for the assessment of a patient presenting with BPH; which is recommended by the latest guidelines from the American Urological Association (AUA) and European Association of Urology (EAU). DRE is also important in excluding malignancy and neurological disease.

In a report by Jacobsen et al. on the natural history of BPH, men with a PV of $> 30\text{mL}$ had a nine fold increase in the risk of requiring surgery for BPH.⁴ Crawford et al. reported that a prostate volume of $> 30\text{mL}$ was one of the important predictors for the risk of clinical progression of BPH, including progression of the International Prostate Symptoms Score, the occurrence of urinary retention and development to an invasive procedure.⁵

There is limited literature that addresses the accuracy of DRE for measurement of PV. Common criticisms of DRE include high inter-observer variability and accuracy depends upon the experience of clinician.⁶⁻⁸ Roehrborn et al found that DRE estimated volumes were significantly correlated with ultrasonographically measured volumes. This study was the first to suggest DRE with a specific cut-off as a potentially reliable test for high-risk PV, particularly with a cut-off at 30ml.⁹ The Krimpen study evaluated 1,688 men aged between 50 and 70 years with benign prostatic disease to compare the test performance of DRE in determining PVs against ultrasonographically measured volumes.¹⁰ A 30mL cut-off demonstrated the highest sensitivity (39.8%, 95% CI 36.2 to 43.4) and lowest specificity (81.6%, 95% CI 78.5 to 84.4). These results are in contrast to our findings of a higher sensitivity and low negative likelihood ratio for a 30mL threshold. Study by Streiche et al. showed that DRE, despite the high diagnostic value, is subjective and needs to be objectified by means of ultrasound examination.¹¹ Estimation of prostate volume by DRE appears bigger than evaluated by ultrasonography.¹² In our study also, 7 patients' prostate volumes were overestimated by DRE compared to ultrasound.

CONCLUSION:

DRE remains an important, rapid, cost-effective tool in the examination of prostate in patients of inguinal hernia. It is useful for determining whether the prostate has a categorical volume greater than 30ml. We therefore believe that DRE is a reliable tool to estimate PV.

REFERENCES:

- [1] Auffenberg GB, Helfand BT, McVary KT. Established medical therapy for benign prostatic hyperplasia. *Urol Clin North Am.* 2009; 36:443.
- [2] Yeboah ED. The prostate gland. In: Bodee EA, editor. *Principles and Practice of Surgery Including Pathology in the Tropics.* 3rd ed. Ghana: Ghana Publishing Corporation; 2000. pp. 850-7.
- [3] Grayhack JT, Mcvary KT, Kozlowski JM. Benign prostatic hyperplasia. In: Gillenwater JY, editor. 4th ed. USA: Lippincott Williams and Wilkins; 2002. pp. 1401-70
- [4] Jacobsen SJ, Jacobson DJ, Girman CJ. Treatment for benign prostatic hyperplasia among community dwelling men: the Olmsted County study of urinary symptoms and health status. *J Urol* 1999; 162:1301-6.
- [5] Crawford ED, Wilson SS, McConnell JD. Baseline factors as predictors of clinical progression of benign prostatic hyperplasia in men treated with placebo. *J Urol* 2006; 175:1422-6.
- [6] Roehrborn CG. Accurate determination of prostate size via digital rectal examination and transrectal ultrasound. *Urology* 1998;51:19-22.
- [7] Varenhorst E, Berglund K, Löfman O, Pedersen K. Inter-observer variation in assessment of the prostate by digital rectal examination. *Br J Urol* 1993; 72:173-6.
- [8] Kijviki K. Digital rectal examination, serum prostatic specific antigen or transrectal ultrasonography: the best tool to guide the treatment of men with benign prostatic hyperplasia. *Curr Opin Urol.* 2009; 19:44-8.
- [9] Roehrborn CG, Girman CJ, Rhodes T, Hanson KA, Collins GN, Sech SM, et al. Correlation between prostate size estimated by digital rectal examination and measured by transrectalultrasound. *Urology* 1997;49:548-57.
- [10] Bosch JL, Bohnen AM, Groeneveld FP. Validity of digital rectal examination and serum prostate specific antigen in the estimation of prostate volume in community-based men aged 50 to 78 years: the Krimpen Study. *Eur Urol* 2004;46:753-9.
- [11] Streich U, Rockstroh H, Anger G, Weck B, Millner R. Objective determination of prostate size with ultrasound. *J Urol Nephrol* 1980;73:577-81.
- [12] Smith HJ, Haveland H. Pre-operative and post-operative volumetry of the prostate by transabdominal ultrasonography. *Br J Urol* 1982;54:531-5.