

Ultrasonographic Prediction of Prostatic Enlargement in Urualla Imo State, Nigeria

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Abstract

Background: The prostate is a reproductive gland found in males. It is responsible for the production of the fluid that carries sperm during ejaculation. The prostate gland usually enlarges with age and eventually gets to a size when it causes obstruction to urine flow which is the most common symptom. A small amount of prostate enlargement is present in many men over age 40. Two common identifiable causes of prostatic enlargement are benign prostatic enlargement and prostatic cancer. Ultrasonography is a non-invasive non ionizing imaging method that uses sound waves to evaluate internal organs of the body. **Aim:** The main objectives of this research were to determine the percentage of population with prostatic enlargement, to ascertain relationship of prostatic enlargement with age. **Method:** Prospective study design was used and data collected was focus on men from the age group of 50 years and above. **Results:** The average age of those screened was 63.11+/-7.85years. There was a higher age average of 64.28years for those with prostatic enlargement when compared with normal subjects with average age of 62.33 years. **Conclusion:** Ultrasonographic evaluation of prostatic volume is an important screening tool for both benign prostatic enlargement and prostate cancer.

Keywords: Prostatic enlargement, Ultrasonogragph.

Introduction

The prostate is a reproductive gland found in males. It is responsible for the production of the fluid that carries sperm during ejaculation. The prostate gland usually enlarges with age and eventually gets to a size when it causes obstruction to urine flow which is the most common symptom. A small amount of prostate enlargement is present in many men over age 40. Two common identifiable causes of prostatic enlargement are benign prostatic enlargement and prostatic cancer. Ultrasonography is a non invasive non ionizing imaging method that uses sound waves to evaluate internal organs of the body.

In our world today, many men are prompted to learn about prostate only because the way they urinate has changed. Or perhaps they have heard that older men over 50 are more likely to have “prostate trouble” than younger men.

The main objectives of this research is to determine the percentage of population with prostatic enlargement, to ascertain relationship of prostatic enlargement with age and also to shed light on a particular prostate disease: noncancerous enlargement of the prostate called benign prostatic hyperplasia (BPH), this disease often begins after age 50.

From literature review, after a man has passed the age of 40, especially after the age of 60, the prostate will become a source of problems.

Benign prostatic hyperplasia is called BPH and is a condition in men in which the prostate gland is enlarged and not cancerous. It is the most common prostate problem for men older than age 50. In 2010, 14 million men in the United States had lower urinary tract symptoms suggestive of benign prostatic hyperplasia (BPH). Although this disease, benign prostatic hyperplasia rarely causes symptoms before age 40 and the occurrence and symptoms increase with age. About 50 percent of men between the ages of 51 and 60 and up to 90 percent of men

older than 80 were affected by benign prostatic hyperplasia. (Wilt *et. al*, 2011)

The prostate is a walnut-shaped gland that is part of the male reproductive system, located just between the bladder and the base of the penis. The urethra which is the tube that carries urine from the bladder and semen out through the penis runs through the center of the prostate. The real function of the prostate is to produce a fluid that goes into semen. This prostate fluid is very essential for fertility in men. The gland surrounds the urethra at the neck of the bladder. The bladder neck is located where the urethra joins the bladder. The urethra and bladder are parts of the lower urinary tract. The prostate has median lobe or a section that is enclosed by an outer layer of tissue that is located in front of the rectum, just below the bladder. Because of urethra location, an enlarged prostate can squeeze the urethra, causing urinary problems. A prostate checkup is highly needed because abnormalities develop as a man gets older, mainly after the age 50. Signs of prostate problems may include difficulties urinating and sexual pain. If a man has symptoms that are bothersome, he should visit his doctor.

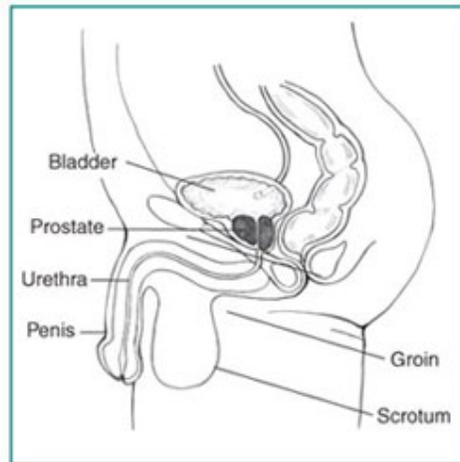


Fig 1: A male reproductive system showing a walnut-shaped gland of prostate.

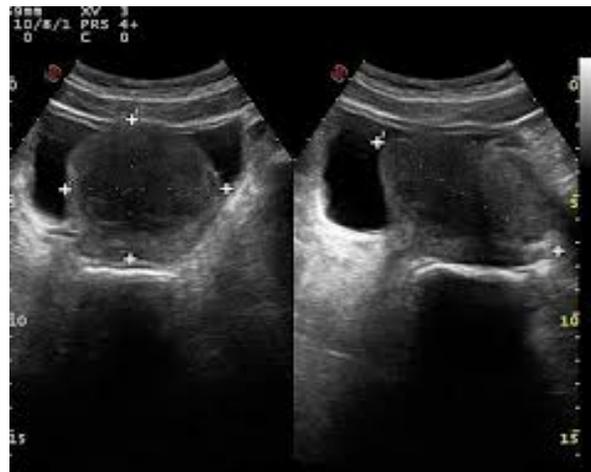


Fig 2: Ultrasonographic measurement of prostatic volume

Causes of benign prostatic hyperplasia

The cause of benign prostatic hyperplasia is not quite clear; however, it occurs mostly in older men. Before puberty, benign prostatic hyperplasia does not develop in men whose testicles were removed and for this reason; some researchers believe that factors causing this is related to aging and the testicles.

Studies have suggested that benign prostatic hyperplasia may occur due to the higher proportion of estrogen within the prostate increases the activity of substances that promote prostate cell growth. (NIDDK, 2014)

Another theory focuses on dihydrotestosterone (DHT), a male hormone that plays a role in prostate development and growth. Some other research has recently indicated that even with a drop in blood testosterone levels, older men will continue to produce and accumulate high levels of DHT in the prostate. This DHT accumulation encourages growth of prostate cells. Scientists have noted that most men who do not produce DHT develop benign prostatic hyperplasia and those who are likely to develop benign prostatic hyperplasia are men with these factors: age 40 years and older, family history of benign prostatic hyperplasia, medical conditions like obesity, heart and circulatory disease, lack of physical exercise and erectile dysfunction. (NIDDK, 2014)

Symptoms

Lower urinary tract symptoms suggestive of benign prostatic hyperplasia may include: urinary frequency, urinary urgency, trouble starting a urine stream, a weak or an interrupted urine stream, dribbling at the end of urination, nocturia, urinary retention, urinary incontinence, pain after ejaculation or during urination, urine which has an unusual color or odour. Most often, benign prostatic hyperplasia symptoms come from a blocked urethra and a bladder that is overworked from trying to pass urine through the blockage. The size of the prostate does not always determine the severity of the blockage or symptoms. In some case, men with greatly enlarged prostates may have little blockage and few symptoms, while other men with minimally enlarged prostates have greater blockage and more symptoms. Few men with benign prostatic hyperplasia have lower urinary tract symptoms. (Tacklind *et.al*, 2012)

Some men may not know they have a blockage until when they cannot urinate. This condition is called acute urinary retention which result from taking over-the-counter cold or allergy medications that contain decongestants like oxymetazoline and pseudoephedrine. The main side effect of these medications can prevent the bladder neck from relaxing and releasing urine. Most medications that contain antihistamines like diphenhydramine weaken the contraction of bladder muscles which result to urinary retention, difficulty in urinating and painful urination. Urinary retention can also occur in men that has partial urethra blockage which may be as a result of cold temperatures, alcohol consumption and a long period of inactivity. Symptoms of benign prostatic hyperplasia also signal more severe conditions like prostate cancer. (Tacklind *et.al*, 2012)

Complication

Sometime complications such as acute urinary retention, blood in urine, urinary tract infections (UTIs), bladder damage, kidney damage and bladder stones occur in benign prostatic hyperplasia.

In Most men with benign prostatic hyperplasia, this complications may not occur rather develop kidney damage will result to a serious health threat when it occurs.

Those at risk

Men that have the following symptoms should seek immediate medical care: complete inability to urinate, painful, frequent, and urgent need to urinate, fever and chills, blood in the urine, severe discomfort or pain in the lower abdomen and urinary tract.

Diagnosis

Benign prostatic hyperplasia can be diagnose based on a personal and family medical history which is the first step to take, a physical examination done by the healthcare provider and medical tests which may include: urinalysis- involves testing a urine sample, a prostate-specific antigen (PSA) blood test, urodynamic tests which include a variety of procedures that look at how well the bladder and urethra store and release urine, also cystoscopy - a procedure

that uses a tube-like instrument, called a cystoscope which look inside the urethra and bladder., ultrasonography- a non invasive non ionizing imaging method that uses sound waves to evaluate internal organs of the body. Biopsy - a procedure that involves taking a small piece of prostate tissue for examination with a microscope. (Tacklind *et.al*, 2009).

Treatment

Change in lifestyle, medications, minimally invasive procedures and surgery are the treatment option for benign prostatic hyperplasia.

Prevention

Researchers have not found a way to prevent benign prostatic hyperplasia but however, regular prostate examination or check up, changes in eating, diet, or nutrition could help with treatment. Men can get early treatment and minimize benign prostatic hyperplasia effects by recognizing lower urinary tract symptoms and identifying an enlarged prostate.

Methods

Area of study

The primary area of focus for this study was the cities of Imo metropolis, urualla precisely, Idea to North Local Government Area of Imo State, Nigeria. It is the administrative headquarters. It has an area of 7 km and a population of 62102 at the 2006 census.

The study also focused on working populace who are adults above the age of fifty (50) years above in Idea to North Local Government Areas (LGA's).

Study design

Analytical evaluation ultrasound scan screening was carried on randomize 70 male patients who suspected to have BHP symptom.

Retrospective study design was used and data collected was focus on men from the age group of 50 years and above. The study was conducted from November to December 2014. A total of 70 out of 100 clients were eligible participants that agreed to be screened. Ethical approval to access the client was obtained from St.Michael Catholic Church Urualla, Imo State Ethical review board.

Data analysis

Data analysis was done with SPSS version 16.0. All analysis was done at P=.05. Calculation of correlation and Hypothesis testing carried.

Results

Table 1. Frequency distribution of prostatic enlargement.

Prostatic enlargement			
Prostatic volume		Frequency	Percent
Valid	no prostatic enlargement	42	60.0
	prostatic enlargement	28	40.0
Total		70	100.0

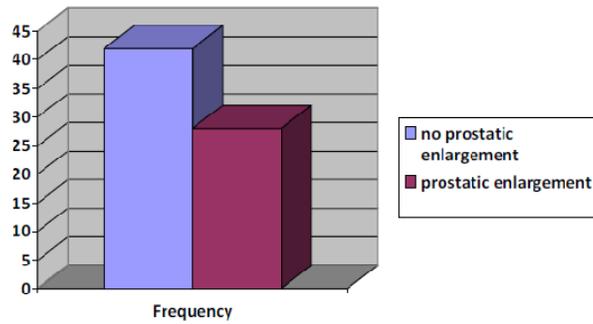


Fig 2: Bar chart showing prostatic enlargement.

Table 2. Frequency table showing prominence of median lobe

MEDIAN LOBE coded			
		Frequency	Percent
Valid	Normal	54	77.1
	Prominent	16	22.9
	Total	70	100.0

Table 3. Showing bladder wall thickness distribution

BLADDER WALL THICKNESS code			
		Frequency	Percent
Valid	normal	64	91.4
	thickened	6	8.6
	Total	70	100.0

Table 4. Correlation between age and prostatic volume

Correlations			
		AGE	PROSTATIC VOLUME
AGE	Pearson Correlation	1	.147
	Sig. (2-tailed)	.400	
	N	70	70
PROSTATIC VOLUME	Pearson Correlation	.147	1
	Sig. (2-tailed)	.400	
	N	70	70

Table 5 Analysis between age and prostatic volume

Group Statistics					
	Prostatic enlargement	N	Mean	Std. Deviation	Std. Error Mean
AGE	no prostatic enlargement	42	62.3333	8.58681	1.87380
	prostatic enlargement	28	64.2857	6.74170	1.80180
P value=0.479					

Table 6. Analysis between prostatic volume and bladder wall thickness

Group Statistics					
	BLADDER WALL THICKNESS code	N	Mean	Std. Deviation	Std. Error Mean
PROSTATIC VOLUME	Normal	32	23.8369	16.76596	2.96383
	Thickened	3	40.9533	12.85502	7.42185
p value=.096					

Table 7 Analysis between prostatic volume and median lobe

Group Statistics					
	MEDIAN LOBE coded	N	Mean	Std. Deviation	Std. Error Mean
PROSTATIC VOLUME	Normal	54	19.7819	14.58930	2.80771
	prominent	16	43.9413	10.08497	3.56557
	p value=0.0001				

A total of 70 persons were screened by ultrasonography for prostatic enlargement at Urualla Imo State, South East, and Nigeria.

Statistic shows that the mean age of subjects was 63.11+/-7.85years. The age range was 30.

The population was predominantly elderly.

Table 1 and 2 shows that out of the 70 persons screened, 28 i.e. 40 % had enlarged prostate with 22.95% having prominent median lobe.

6% had associated thickening of the urinary bladder wall as shown in table 3.

There is weak positive correlation between age of subjects and prostatic volume (Table 4). The mean age for those with prostatic enlargement (64.28years) was higher than those with normal prostatic volume (62.33years)

The relationship between prostatic volume and age/bladder wall thickness was not statistically significant as shown in table 5 and 6.

It was observed that subjects with prostatic enlargement with average volume of 40.95cm³ had thickened urinary bladder wall whereas those without

Prostatic enlargement with average volume of 23.84cm³ had normal bladder wall thickness.

However the relationship between prostatic volume and prominence of median lobe was statistically significant (p value =0.0001)

The median lobe was found to be prominent in subjects with prostatic enlargement with average volume of 43.94cm³ whereas those with normal prostatic volume with average of 19.78cm³ had normal median lobe.

Discussion

This study carried out retrospectively from data collected in Orualla, Imo State. The average age of those screened was 63.11+/-7.85years. This range is narrow and may explain why there was no significant correlation between age and prostatic enlargement even though a higher age average of 64.28years had prostatic enlargement when compared with normal subjects with average age of 62.33 years. This agrees with previous literature that indicates that prostatic enlargement is associated with advancing age. Therefore age is a major factor in predicting the probability of prostatic enlargement which serves as a screening test for benign prostatic enlargement and prostatic cancer.

Urinary obstruction is a very common consequence of prostatic enlargement and when long standing manifest as bladder wall thickening. This is illustrated by the fact that urinary bladder wall was thickened only in participants with enlarged prostate. Median lobe prominence is another factor that was seen in cases with prostatic enlargement which agrees with other studies where it was seen in benign prostatic enlargement.

Conclusion

Ultrasonographic evaluation of prostatic volume is an important screening tool for both benign prostatic enlargement and prostate cancer. It is non invasive and non ionizing with the option of repeated scan as well as follow up. Ultrasound is also able to detect complication of urinary obstruction. Age is the single most important factor in predicting prostatic enlargement.

It is recommended that subjects above 40years should have a pelvic ultrasound to evaluate the prostatic volume. Early prostate cancer can only be detected by a regular prostate checkup

and is highly advised.

Acknowledgement

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