UNIVERSITY OF ILORIN

THE ONE HUNDRED AND EIGHTIETH (180TH)
INAUGURAL LECTURE

"THE EXPERIENCE OF A UROLOGICAL SURGEON IN A TERTIARY INSTITUTION IN SUB-SAHARAN AFRICA"

By

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This 180th Inaugural Lecture was delivered under the Chairmanship of:

The Vice Chancellor

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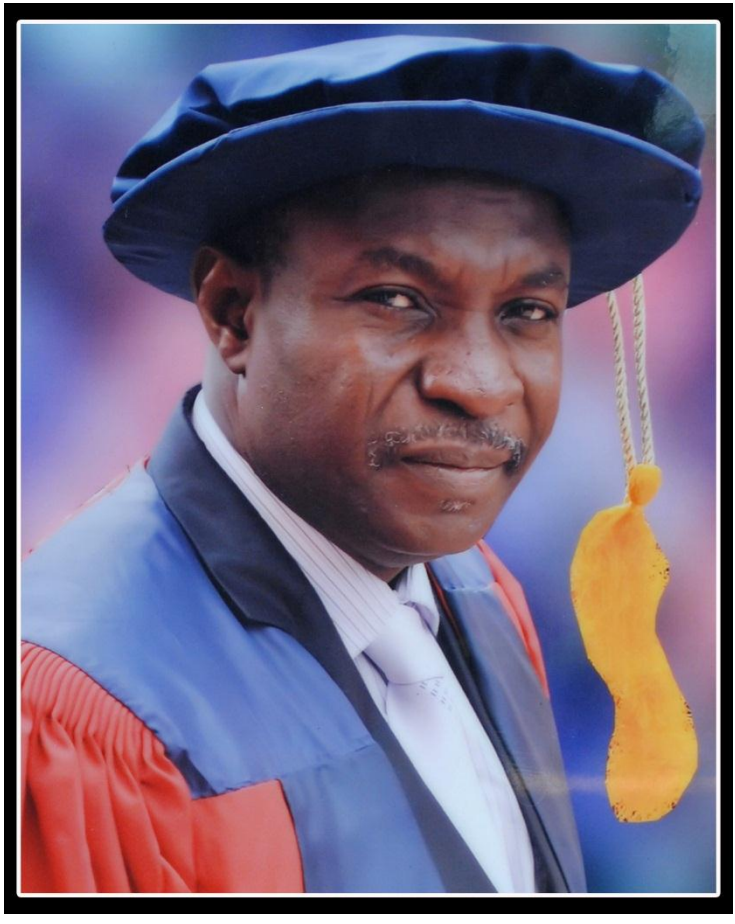

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Courtesies
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The Provost, College of Health Sciences and Chairman Committee of Provost and Deans,
All the Deans of the various Faculties here present particularly, the Dean of Clinical Sciences,
Members of Council and Senate here present,
All Professors here present,
All Heads of Departments here present,
The Chief Medical Director, Principal Officers and Staff of the University of Ilorin Teaching Hospital,
My Lords, Spiritual and Temporal,
Traditional Rulers here present,
Families (Nuclear and Extended), Relations and Friends,
My parents,
Gentlemen of the Print and Electronic Media,
Students of the Great University of Ilorin,
Distinguished Guests,
Ladies and Gentlemen.

In the name of Allah, the Beneficent, the Merciful. All praise is due to Allah, the Lord of the worlds.

Mr. Vice Chancellor, Sir, I stand before you this afternoon with humility and honour to deliver my Professorial inaugural lecture which I consider a fulfilment of my ambition in life. Going by the history of inaugural lectures in this University, it is the fifth from the Department of Surgery, and the first to be

delivered in the Urology Unit. I feel greatly honoured therefore, to present the 180th inaugural lecture titled –

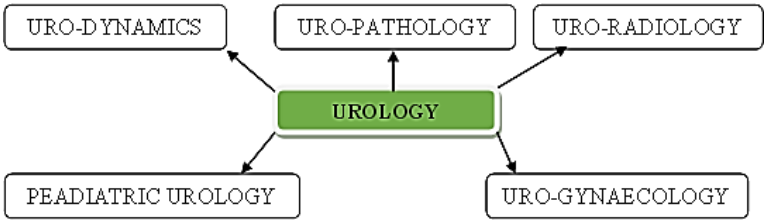
"The Experience of a Urological Surgeon in a Tertiary Institution in Sub-Saharan Africa"

Mr. Vice Chancellor, Sir, an inaugural lecture can be defined as a lecture that is expected to identify and filter a problematic issue at a level that the audience will understand and appreciate its enormity with little expression or emphasis on technicality and without losing the context and intensity of the problem in the discussion (Oloyede, 2012).

As succinctly put by Prof. Albert Bankole Olayemi in one of his memos as Director of Academic Planning, Inaugural Lecture is "an intellectual challenge that no accomplished scholar, as the title suggests, should shy away from". Against this backdrop, I chose to share my experience as a Urological Surgeon practising for over two decades in a tertiary institution in Sub-Saharan Africa.

Mr. Vice Chancellor Sir, I profess urology in the Faculty of Clinical Sciences, College of Health Sciences. To many in this gathering, the word 'UROLOGY' may be strange. By definition, Urology is the specialty of Medicine that deals with the treatment of conditions relating to the urinary system and MEN's sexual organs (*Longman Dictionary*). Urology as a specialty covers all aspects of Medicine.

Chart 1: Various Aspects of Sub-specialties in Urology.



Introduction

Mr. Vice Chancellor, Sir, the experience which I am about to share with the audience today is derived from various sources. It is my cumulative experience as Assistant Lecturer (Processor Demonstrator in Human Anatomy, ABU Zaria); as a Resident Doctor; my experience over the years as a University Lecturer and Consultant Urological Surgeon in both the University of Ilorin and the University of Ilorin Teaching Hospital; my experience as Head of Department, Surgery; my experience as an administrator (Chief Medical Director) at the University of Ilorin Teaching Hospital; my experience as Director of the Academic Planning Unit of the University of Ilorin and others. My research works, which I have published in peer reviewed national and international journals of repute, covered many disciplines in Medicine such as Urology, General Surgery, Surgical Trauma, Obstetrics and Gynaecology, Paediatrics, Psychiatry, Radiology and Veterinary Medicine.

Mr. Vice Chancellor, Sir, I started and laid a solid ground for the Urological practice in the University of Ilorin Teaching Hospital (UITH). Now, the unit performs surgery cases that are otherwise referred out nationally and abroad. With my colleagues, Dr. Abdulateef Babaita, Dr. Popoola (Reader), Dr. Ajape (Reader) and Dr. J.O. Bello (Senior Consultant), we have handled effectively many cases that are common in the African sub-region.

As the Head of the Urology Unit, since its inception, which began in 1999 when I returned from the University College, London, and Kor-lebu Teaching Hospital, Accra, Ghana, under the tutelage of Prof. Quartte, Prof. Mundy, Peter Shah and Professor Yeboah respectively, where I had my clinical attachment in Urology, we have pioneered many new areas of technical urological operation in the University of Ilorin Teaching Hospital (UITH). Some of the new areas pioneered include:

1. Renal transplantation (first to be performed in UITH)
2. Radical prostatectomy (first to be performed in UITH)

3. Transurethral resection of the prostate gland (first to be performed in UITH)
4. Endo-urology

Since the inception of the Unit, Dr. D. Popoola, first to be trained in the University College Hospital (UCH), Ibadan, as a Urologist, joined the University of Ilorin Teaching Hospital (UITH) in 2005. He was followed by Dr. A. Ajape who joined in 2007 and Dr. Bello in 2012. Together we worked hard to secure FULL accreditation from both West African College of Surgeons and Nigerian Postgraduate Medical College in order to train Urologists in the UITH. Home grown and trained Urologists are now 5 in number.

Mr. Vice Chancellor, Sir, from my thirty-six years in medical practice, I have partaken in the training of medical graduates numbering over 3,732, and over 100 surgical residents. Some of them, now seated in this hall today, are presently occupying the positions of Associate Professor and Professor.

On account of the foregoing, Mr. Vice Chancellor, Sir, my inaugural lecture is titled ***"The Experience of a Urological Surgeon in a Tertiary Institution in Sub-Saharan Africa"***.

Scrotal and Testicular Urological Emergencies

Mr. Vice Chancellor, Sir, testicular torsion is still and will remain a problem worldwide and Nigeria is no exception. Kuranga and Rahaman (2002) carried out a study on Acute Spermatic Testicular Torsion (ASTT) in the middle belt of Nigeria. It was found that ASTT is a very common Urological problem in Nigeria similar to other Sub-regions and that it occurs in all ages.

Our experience in the middle belt of Nigeria shows that it is a urological emergency. Our study, the first to be reported in the middle belt of Nigeria, revealed that majority (63.2%) of patients numbered 55 were aged 21 years and above and 12 (13.8%) were older than 30 years. These findings were similar to

those found in other parts of the world. Torsion of the testicle in the neonate (extravaginal torsion) is uncommon and we found no case in our series as at the time of the report of this work. Testicular torsion was found to be the second most frequent urological emergency seen in our institution and characteristics and salvage rate compare favourably with findings in other research in the world.

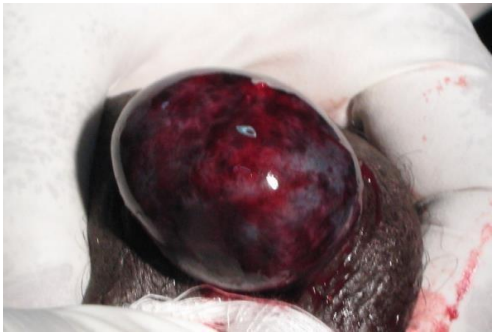


Figure 1: Testicular Torsion

Penile Amputation

Mr. Vice Chancellor, Sir, Traumatic loss of external genitalia is not commonly reported. In developed countries where such cases have been reported, electrocautery accidents during circumcision or injury by domestic animal are frequently indicated causal agents. Also the reported causes are victims of abuse and motor vehicle accidents. It is a common knowledge that in Nigeria, GRINDING MACHINES are commonly being used for domestic purposes. Adigun, Kuranga and Abdulrahman (2002) reported a case in which a twelve-year-old boy was presented to our hospital 18 hours after he sustained a severe injury to the perineum by a grinding machine.

He sustained the injury while attempting to switch off a grinding machine after being used by his mother for a commercial purpose. The fan belt cut his cloth and dragged the

patient towards the machine. His penis in the process was mangled. We could not trace the stump of the penis. Treating a child for complete traumatic loss of the penis is rare and challenging in any part of the world. This patient had a late repair of this injury because of the financial incapability of his parent and hospital logistic challenges on two occasions. He had phalloplasty with full thickness skin graft for the 8 weeks the injury was sustained. He recuperated very well and was discharged to return home two weeks after the surgery.

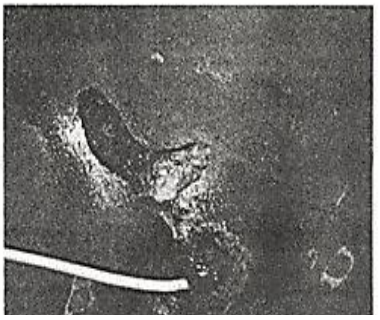


Figure 2: Showing amputation of the penis with the distal fragmented by skin tag

Figure 3b: Satutes passed through the distal end of carpeted stamps for traction

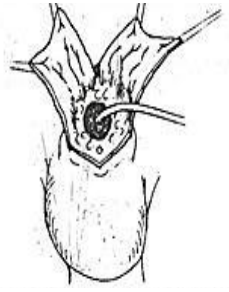


Fig. 3a: Showing a circular incision mode 2cm from the catheter to excise fibrous tissue

Fig. 4: Showing mobilized corpora and urethra wrapped with full thickness skin graft taken from the two sides of the grain

A 6-year-old boy presented to the accident and emergency unit after sustaining injury to the phallus. The patient was wearing a pair of Yoruba trousers while standing close to his mother's grinding machine. The string of the trousers was caught by the flywheel of the grinding machine, with subsequent involvement of the trousers and the phallus. The machine was switched off and the patient was disengaged from the machine.

Figure 5: Degloved Penis.

On examination there was almost complete de-gloving of the uncircumcised penis from its base, but the penile skin remained attached to the glans and the underlying fascia. Bleeding had reduced significantly at presentation. There was no injury to the scrotum nor other parts of the body. The patient passed urine freely, but had initial macroscopic haematuria.

Figure 6: Sutured Penile Laceration

A 17-year-old man working as a casual worker in a bakery presented a few hours after having his phallus injured by the electric rolling pin machine in the bakery. At the time of the injury the patient wore a vest and a pair of traditional Yoruba trousers. The draw-string of the trousers was caught by the roller and the trousers and the penis were drawn into the roller before the power supply to the roller was switched off by a fellow worker. The patient' trousers and the penis had to be disengaged from the roller. The patient bled per urethra and was in acute urinary retention.

Figure 7: Patient with Bladder Cancer that was Operated by a Quack

Prostate Cancer

Prostate cancer is generally believed to be rare in the sub-region, but in the last few years it has been shown, with our experience in the sub-region and Nigeria in particular, that prostate cancer is not only common but it is a notable killer of men. From experience, there is a weekly average of 4 to 5 cases of CAP seen in the UITH Urology clinic.

The unit is currently in collaboration with researchers of the University of Florida Medical School, USA, as part of the Prostate Cancer Transatlantic Consortium (CAPTC). The Consortium, headed by Prof. Folakemi Odedina of the University of Florida, is multinational and multidisciplinary and focuses on research about prostate cancer disparities between black and white men.

The Principal Investigator at the UITH is Dr. Ademola Popoola and the target is to screen 1000 men between the ages of 35 and 70 years for prostate cancer across the 16 local government areas of Kwara State. The screening is by assaying Prostate Specific Antigen (PSA), digital rectal examination, abdominopelvic ultrasound and uroflowmetry. The project is mainly financed by members of the Ilorin branch of the Prostatic Cancer Consortium group. So far over 500 men in different local government areas of Kwara State have been screened.

Figure 8: The Ilorin

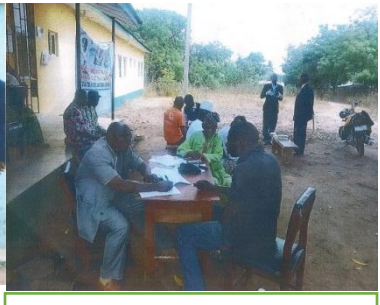


Figure 9: Screening

Prostate Gland

What is Prostate anyway?

Most people have heard the word ***prostate gland*** in peer group conversation or from their health care providers without knowing its location or its functions. This gland is important to life, particularly when it comes to procreation and diseases that may affect it.

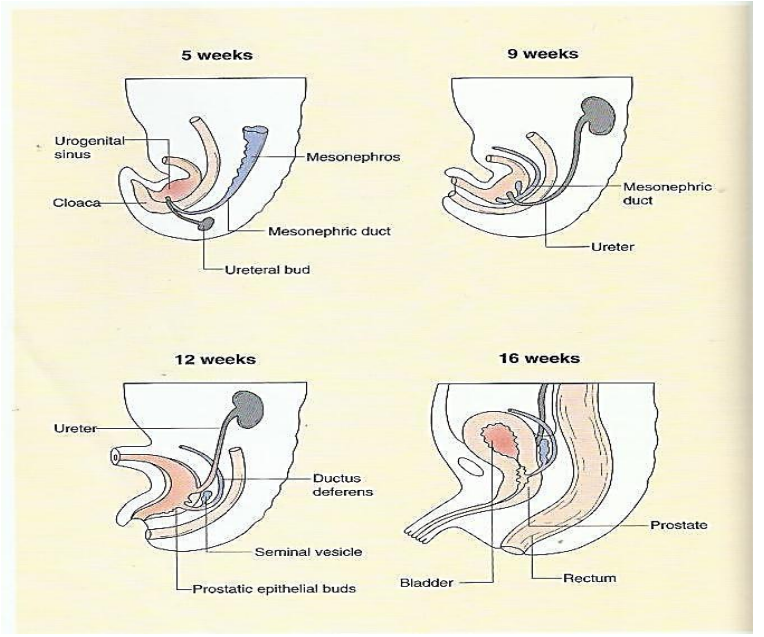


Figure 10a: Embryology of the Prostate; 5th to 16th Weeks of Gestation

The gland develops at the base of the bladder as outgrowths from the urethra and coalesce with the surrounding mesenchyme. This interaction forms the basis of the adult gland, which comprises a mixture of epithelium and stroma.

This wonder gland has various descriptions such as quaver shape, walnut size and kola nut shape gland. At developmental level, it belongs to both sexes but later ends in females as Skene's urethral gland. During pre-pubertal period in male and eunuchs, it is rudimentary but begins to develop in puberty in normal males under the control of male hormone (androgen) from the testis which grows throughout life.

This gland is placed just underneath the bladder surrounding the urethra. The urethra is a pipe (tube) that conveys urine from the bladder and also semen (ejaculate) from the testis and prostate to the tip of the penis. The prostate by necessity needs hormone from the testis to function.

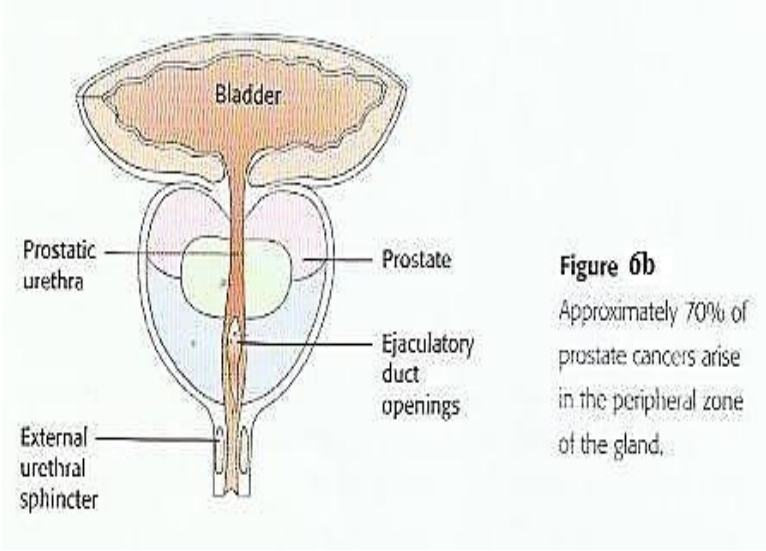


Figure 10b the Sagittal Section of Prostate Gland Location at the Base of the Bladder

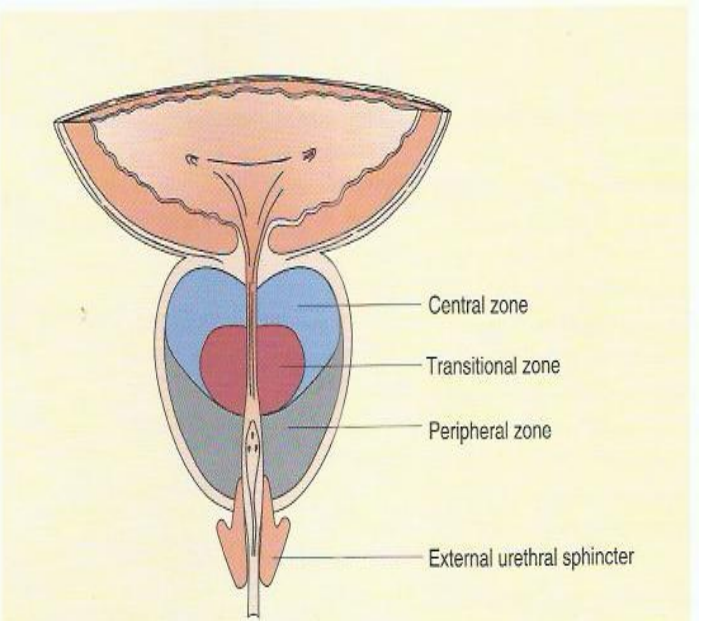


Figure 10c: Components of the Prostate Gland as in Three Distinct Zones: the peripheral zone (PZ); the transitional zone (TZ); and the central zone (CZ) (anteroposterior view). Prostate cancer most commonly originates in the PZ.

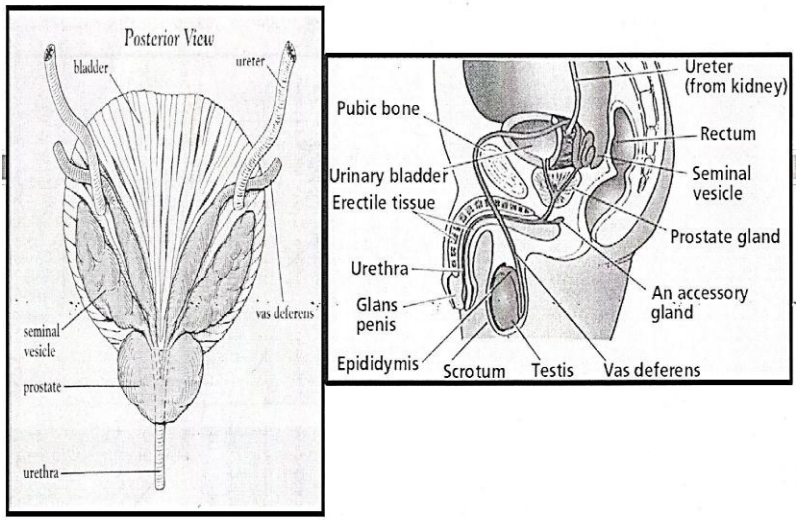


Figure 10d: Central Role of the Prostate Gland in Man's Sexual and Urinary Function

Growth and development of the prostate is under endocrine control. The luteinising hormone-releasing hormone (LH – RH) is secreted by the hypothalamus, and it passes down the stalk to stimulate the pituitary gland itself to release luteinising hormone (LH). LH in turn acts on the leydig cells of the testis to induce secretion of testosterone (T), which stimulates prostatic growth in addition to adrenocorticotrophic hormone from the adrenal cortex. These adrenal androgens provide approximately 5% of the androgen drive to the prostate in the healthy subject, but may acquire greater importance after orchiectomy or administration of LH-RH analogues.

The prostate is composed of three distinct zones: the peripheral zone (PZ): the transitional zone (TZ): and central zone (CZ) (anteroposterior view). Prostate cancer most commonly originates in the PZ in contrast; PBH almost exclusively affects the TZ and periurethral tissues.

Functions of the Prostate Gland

Prostate gland plays an important role in ejaculation and has evidence-based significant anti-bacterial action. It secretes the following with relevant functions: zinc (Antibacterial function): citrate (Sperm odour); spermine (Cell proliferation and sperm odour); cholesterol/lipids (Semen liquefaction); and servimin (Semen liquefaction).

In addition to the above listed functions, prostate gland serves as an internal male sexual organ contributing to the quality (15 – 30%) and quantity of semen.

The prostate gland plays a central role in man's sexual and urinary functions.

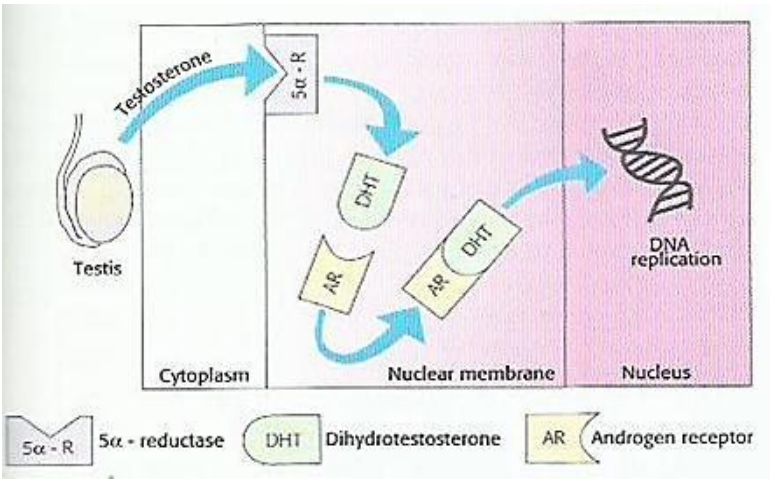


Figure 10e: Testosterone stimulates prostate cell function

What is Cancer?

The human body is made up of billions of cells. Normally, cells function for a while then die, and are replaced in an orderly fashion. This results in an appropriate number of cells organised properly to perform specific functions.

Occasionally, however, cells are replaced in an uncontrolled way and they may lack the organisation needed for normal function. An abnormal growth of cells is called a tumour. There are two kinds of tumours: malignant tumours (cancers) and benign tumour (non-cancerous growths).

Because of their enlarging size, tumours squeeze surrounding parts of the body and expand into nearby areas. This can cause pain and interfere with normal function, but it is seldom life threatening.

Cancerous tumours can invade nearby groups of cells or tissues, crowding out and destroying normal cells. Cancer cells may also break away from tumours and enter the body fluids, which allows cells to spread to other parts of the body. This process is called metastasis. Cancerous tumours that spread to other parts of the body (metastatic cancers) may threaten a person's life.

Epidemiology, Etiology & Pathophysiology of Prostate Cancer

Globally, prostate cancer is the most commonly diagnosed malignancy affecting men above middle age and second to lung cancer as a cause of cancer death. It is estimated that in most western countries, the life-time risk of developing microscopic prostate cancer is approximately 30%. However, as many of these cancer cases grow so slowly, the risk of developing clinical disease is about 10%; the life time risk of actually developing prostate cancer is 3%. It was estimated that a new diagnosis of prostate cancer was made every three minutes, and that a man dies from the disease every 15 minutes. The situation in Sub-Saharan Africa may be different because of late presentation, poor diagnostic tools, and inadequate man power.

There has been a steady increase in the incidence of clinically significant prostate cancer all over the world, Nigeria not an exception.

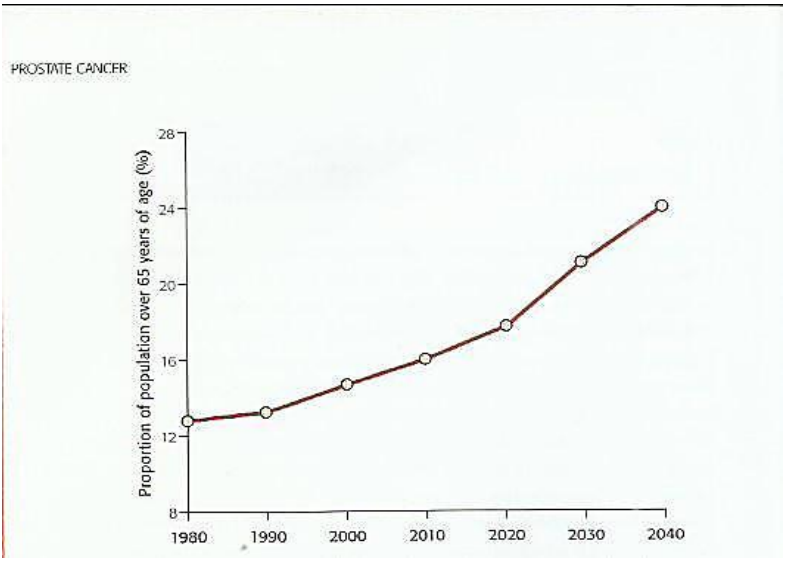


Figure 11: As a result of the worldwide trend towards the aged population, the incidence of prostate cancer will continue to increase.

Mr. Vice Chancellor, Sir, from the foregoing evidence-based facts, prostate cancer can be considered as EPIDEMIC IN WAITING. It is therefore imperatively necessary to view the anticipated problem as an emergency that needs urgent attention by those in authority. Prostate cancer poses an important problem to men's general and reproductive health in both developed and developing countries. It must be emphasised that it also places a significant burden on our health care system, the society, knowledge awareness and health care practices.

The implications for the health system are many. This could be considered as being critical in Africa because of limited resources, universal late presentation of patients and confirmed

evidence of the possibility of the disease being more aggressive in native Black African men.

Areas that need to be underscored are the cost of the treatment, the burden on families which possess serious financial and social problems as the case of the cancer of the prostate patients, most especially in the late stage. More significantly is the lack of early detection and management controversies such as, prostate specific antigen screen, treatment and limitation. Lack of cancer awareness and knowledge deficit on prostate-related issues have been linked with poor survival and mortality rate among men in Africa. This may also be related to the late presentation in Nigeria.

Is prostate cancer an enemy? Prostate cancer masquerades greatly in various ways in incidence among population worldwide. It is known that one in ten men will develop clinically significant PROSTATE CANCER IN THEIR LIFE TIME. The incidence among nations are as follows:

1. Incidence in American blacks - 258/100,000
2. Incidence in America Whites – 182/100,000
3. Incidence in American Hispanics - 104/100,000
4. Incidence in American Asians - 82/100,000
5. Incidence in Jamaicans - 304/100,000
6. Hospital incidence in UCH 200 new cases annually
7. Hospital incidence in LUTH - 127/100,000
8. Hospital incidence in UNTH - 192/100,000
9. Hospital incidence in NAUTH - 150/100,000
10. Japan/Korean - 9/100,000
11. China - 2/100,000
12. National Cancer Registry of Nigeria (2013) 45/100,000

It is important to note that exact incidence in Africa is not yet known due to poor recording, and figures are really not very accurate. The disease of prostate cancer is not always of clinical significance (No symptom/symptoms not worrisome) in very old men. Data from autopsy indicated 70% in 80 years-old men,

majority of who will died with other disease other than from prostate cancer. It is pertinent to note that prostate cancer affects every life directly or indirectly.

Pathology and Risk Factors

Despite the high incidence of prostate cancer, relatively little is known about the cause of the disease. Although the cause of the disease is not known, it is attributed to multi-factorial reasons. Epidemiological studies of potential genetic, environment and social issues may provide important clues. A number of risk factors have been attributed and suggested.

Recognised and Possible Risk Factors for Prostate Cancer

1. Ageing
2. Race
3. Genetic factors/Family History
4. Androgens
5. 5 alpha reductase
6. High fat western diet/Obesity
7. Sexual behaviour and sexually transmissible diseases
8. Environmental factors
9. Social-economic status
10. Occupation
11. Cigarette smoking
12. Heavy metal exposure
13. Vasectomy
14. Benign prostatic hyperplasia
15. Hormones

Mr. Vice Chancellor, Sir, permit me to elaborate on some of the factors mentioned above.

1. **Ageing:** Age is the strongest factor influencing the development of prostate cancer, which has been known as a disease of the elderly people. The disease is not common below the age of 50 years but steadily increases in incidence in males above the age of 60 years. The probability of

diagnosis in men younger than 40 years is 1/1990 and for men through 50 years is 1/45, while for men of 60 to 79 years is 1/7. It is pertinent to note that among black men prostate cancer tends to develop at early age than the white counterpart probably due to low live expectancy. Prostate increases faster with age than thus any other malignancy and with an increase in the elderly population; because of increased life expectancy worldwide, prostate cancer would continue to be a major health concern.

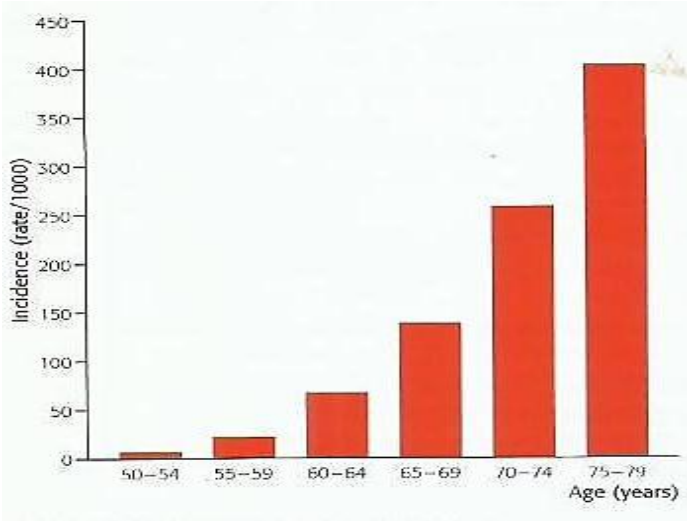


Figure 12: Age is the strongest risk factor for prostate cancer

2. **Race:** In a recent review by Morton, it was noted that African Americans still develop the disease more frequently and have a worst prognosis than their white counterpart. It is known that Nigeria constitute 35% of black population in the world and of every five black men in diaspora, one is a Nigerian. Thus, the implication of these on the likely burden of this disease in Nigeria. However, data on African black people are scanty but tend to support the findings that the disease is

rare in the Far East and Asia. Black men (including Nigerians) are at greater risk than Caucasians, Asians, and Orientals unless they migrate.

3. **Genetic Factors/Family History:** Prostate cancer is known to have hereditary components with males' relatives of prostate cancer patients having an increased risk of developing the disease (23-27 times).
   It is known that 5 to 10% of prostate cancer are primarily due to high risk inheritance factors or prostate cancer susceptibility genes. It is also suggested that history of a brother or father with prostate cancer increases the risk which is inversely related to the age of affected relatives. This implies that there is two-fold risk in one relation and four-fold increase in more than two relatives. This risk may also increase in men who have a familiar history of breast/ovarian cancer in a sister and with men who have family history of both breast/ovarian and prostate cancer.
4. **Hormone:** Testosterone and its more potent metabolite, Dihydro testosterone, are essential for hormonal prostate gland growth, but at present the precise role of Androgen in the development of prostate cancer remain to be fully established.

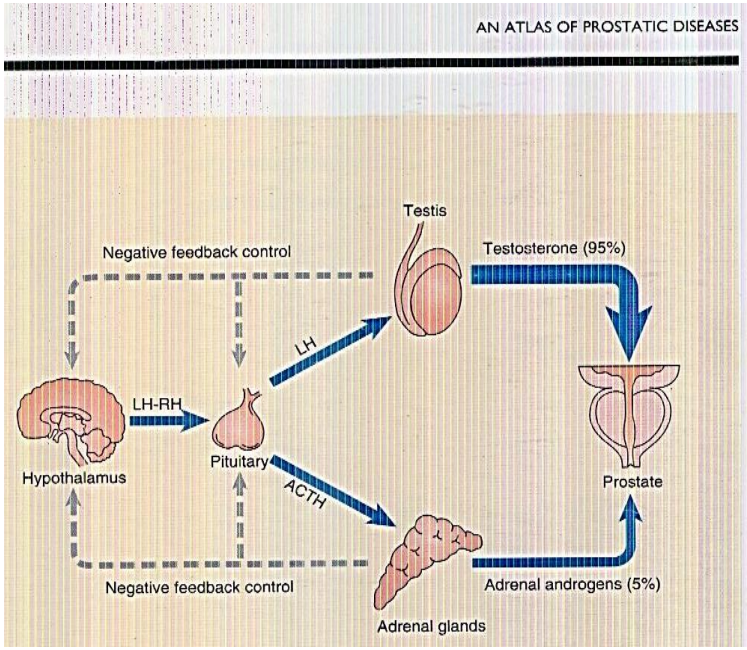


Figure 13: Growth and development of the prostate is under endocrine control. Luteinising hormone-releasing hormone (LH-RH) is secreted by the hypothalamus, and it passes down the pituitary stalk to stimulate the pituitary itself to release luteinising hormone (LH). LH in turn acts on the Leydig cells of the testis to induce secretion of testosterone (T), which stimulates prostatic growth. In addition, adrenocorticor-trophic hormone (ACTH) induces secretion of weak androgens, such as adrenostenediol, from the adrenal cortex. These adrenal androgens provide approximately 5% of the androgen drive to the prostate in the healthy subject, but may acquire greater importance after orchiectomy or administration of LH-RH analogues.

5. **Diet:** There is a correlation between the incidence of prostate cancer and red meat consumption. This may be related to reduction in vitamin A absorption, which can lead to

reduction in circulating B-carotene levels, which appear to protect the development of certain cancers.

It is known that men with higher serum levels of the short-chain omega-6 fatty acid linoleic acid have higher rates of prostate cancer. Those with elevated levels of long chain omega-3 (EPA and DHA) have lower incidence. Also, high level of trans-fatty acids, resulting from hydrogenation of vegetable oils, is also associated with increased risk of prostate cancer.

6 **Obesity:** The relationship between obesity and prostate cancer is somehow controversial and evidence-inconclusive. However, some studies associated decrease, and others, increased incidence and this might be accounted for by excess adipose on the hormone axis leading to more aggressive multiple mechanisms. For example, direct effect of excess adipose tissue on the hormone leading to more aggressive tumour biology, and adiposity aromatase which converts testosterone to oestrogens, reducing the T/oestrogen ratio. In some studies, obesity has been linked with lower testosterone levels which has been associated with a worse pathological stage in men with prostate cancer. It has also been associated with greater serum level of peptin, insulin and insulin like growth factor level, all of which may be mutagenic.

Mechanism Linking High Fat Diet and Risk of Prostate Cancer

There is a high link between high fat diet and the risk of prostate cancer which usually results in activation of nuclear Factor-Kappa B (NF-KB) in the abdominal cavity, thymus and prostate gland. Gupta and group from the C. Western University, Ohio, demonstrated an increased levels of NF-KB in mice fed on a high fat diet with increased level of oxidative stress markers that can significantly affect prostate gland.

7. **Sexual behaviour:** It has also been suggested that the risk of prostate cancer may increase among men who indulge in sex at early age or have multiple sexual partners or history of sexually transmitted diseases. The evidence is still equivocal. Vasectomy has also been implicated as a risk factor with inconclusive evidence.
8. **Environment and occupational factors:** Various environmental factors related to industrial chemicals have been identified as potential promoters of prostate cancer. Exposure to cadmium, working in a nuclear power industry and patients' exposure to high level of ultraviolent light are also likely risk factors.
9. **DNA:** DNA virus such as herpes simplex virus type 2 have been suggested as one of the environmental triggers of prostate cancer, but the evidence remains inconclusive.

What are the Symptoms?

As men get older, the prostate gland usually grows bigger. This majorly occurs at the age of 50 years and above; hence, it affects older men. In fact, it is not the growth in its size but the trouble it causes, which does not depend on the size of the growth, because it surrounds the urethra (tube) from the bladder. As it enlarges, it squeezes the urethra and narrows its opening of the bladder. This may lead to the obstruction of the bladder outlet, which results in slowing down the flow of urine which is referred to as WEAK VOIDING.

WEAK VOIDING is one of the obstructive symptoms which occur gradually. This usually comes unnoticed by many men, and as it continues it may progress into delay in getting started. The urine flows with less force, travelling only a short distance (poor stream) and the flow of urine after the mainstream has finished, and sometime dribbled. Occasionally, a second large volume of urine is passed (sometimes called pis-en-deux).

Therefore, the following symptoms are likely to be experienced when the enlargement of prostrate directly obstructs the bladder outlet.

i. Delay in starting urination
ii. Chronic urge to urinate
iii. Straining to empty bladder
iv. Frequent urination (day and night)
v. Stop and start flow of urine
vi. Sense of incomplete bladder emptying
vii. Urinary retention

Anyone presenting with the above symptoms must visit a Doctor who will initiate investigations and refer accordingly.

However, in addition to symptoms of bladder outlet obstruction, local invasion of prostate cancer may produce varieties of other symptoms:

1. Haematuria (presence of blood in the urine)
2. Dysuria (painful urination)
3. Perennial and super pubic pain
4. Impotence
5. Incontinence
6. Loin pain also resulting from the obstruction of the urethra
7. Symptoms of renal failure
8. Haemospermia (bloody sperm)
9. Rectal symptoms including tenesmus.
10. Symptoms resulting from distance metastases

Detection of Prostate Cancer

The efficiency of cancer diagnosis of any population is a function of the degree of awareness accorded the condition among average potential sufferers in the population as well as the priority of rating of the condition/disease in the population by medical professionals - Physicians, Nurses and Paramedics and the Epidemiologists.

Due to the location of the prostate, it is difficult to access both in the detection and subsequent treatment, unlike the breast that is freely accessible.

Incidental Diagnosis of Prostate Cancer

Prostate cancer is normally present as an incidental finding after surgical procedure like transurethral resection of prostate and open prostatectomy for benign prostatic hyperplasia which are found to be microscopic foci of prostate cancer. Early detection of prostate cancer is the ultimate of any Urologist so that the scourge and the menace of this disease can be reduced to the barest minimum.

In other to detect this disease condition, it is important to routinely follow medical methods used in the diagnosis of any disease i.e. taking a very good comprehensive medical history based on the above symptoms as earlier described.

The following are necessary tests and examinations required to confirm the disease:

1. **Screening** - Early detection of prostate cancer with PROSTATE SPECIFIC ANTIGEN (PSA) from blood.
2. **Digital Rectal Examination (DRE)**
3. **New Biomarkers**

Why is PSA so Important?

Prostate Specific Antigen (PSA) is a glycoprotein that is responsible for liquefying semen. It is the most notable marker in the Kallikren family (Hk^3). It was first identified and purified in the 1970s. It is a 33-KD glycoprotein that acts as serine protease, widely publicised in the 1990s, being used to diagnose prostate cancer at an early stage when it can be cured. The use of PSA is multidimensional (both in the detection and monitoring of the disease process). PSA is normally present in the blood of men, but the question is how much of it is present in the blood. Presence of PSA in the blood is better described as 'LEAKING' from the prostate. It implies that more PSA will leak out of a

large prostate than a small one. Therefore, it means that as one gets older, the PSA will increase as his prostate enlarges.

Approximately, one third of men with PSA level above the normal range (≥ 4ng) have prostate cancer and the risk increases to more than 60% in men with prostate specific antigen levels above 10ng per ml. PSA measurement remains the most single screening test for prostate cancer and the predictive value is increased further if the measurement is combined as usual with Digital Rectal Examination (DRE). By the year 1996, it was clear that PSA represented the most effective method of detecting prostate cancer. PSA can detect twice as many prostate cancers compared with DRE.

Mr. Vice Chancellor, Sir, as good as this PSA is, it is by no means perfect. The results have to be interpreted with caution. In technical terms, it is not specific and it gives lots of false positive results. Some of the things that may alter PSA results include but are not limited to the following:

a. when prostate is infected (Prostatitis) after prostate operation or examination;
b. following simple visual examination of the bladder (Cysotossopy) or having a catheter passed;
c. older men;
d. large prostate (BPH); and
e. some herbal medicine and medication (Proscar – 50% decrease).

PSA is organ-specific but not tissue-specific and 20% of prostate cancers have normal levels of PSA (less than 4ng per ml).

The first research work on PSA measurement in the University of Ilorin Teaching Hospital was done and personally financed by me in year 2002, as the only Physician Urologist on ground then. From the research work done on PSA by Oghagbon, Kuranga et al. (2005), it was concluded that it is an important tool of measurement for the diagnosis of prostate cancer, and the highest mean level that was found then was

86.8ng per ml which was found in the eight decades of life among prostate cancer patients, while BPH patients in the nine decades of life had the highest PSA level of 23.3ng per ml. It was also concluded in the research work that PSA level in the studied patients was significant not only in the detection of the disease but also indicated late presentation, and that the prostate cancer disease is uncommon below the age of 50 years.

Digital Rectal Examination

Digital rectal examination is the simplest, safest and most cost effective means of detecting prostate cancer disease provided the tumours is posteriorly situated (Peripheral zone) and large enough to be palpable. The test can be performed at different positions and most commonly used in left lateral position.

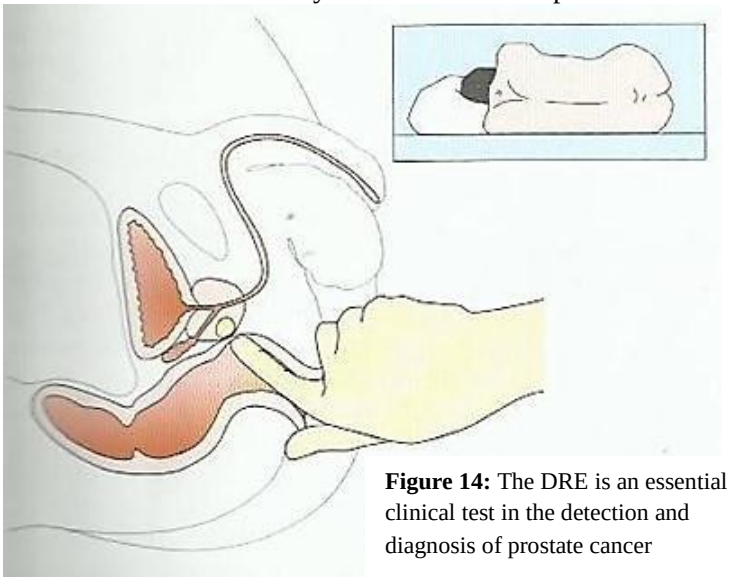


Figure 14: The DRE is an essential clinical test in the detection and diagnosis of prostate cancer

About 10-25% of Palpable Nodules on Rectal Examination Indicates a Chance of Cancer

Findings that may Indicate Prostate Cancer

1. Asymmetry of the gland
2. Hard or wooden consistency of part or all of the prostate
3. Lack of mobility of surrounding tissues due to adhesion
4. Palpable seminar vesicles

It is very common to have false positive diagnosis of prostate cancer on digital rectal examination in conditions such as BPH, prostatic calculi, prostatitis, seminar vesicle abnormalities, ejaculatory abnormalities, rectal walls phlebolith, TB prostate and rectal mucosal polyp or tumour.

Digital rectal examination was the only reliable means of detecting prostate cancer before the discovery and use of PSA in the 1990s.

In a study done by Kuranga, Adebisi, et al. (2000), the value of digital rectal examination was still found to be very relevant in the diagnosis of prostate cancer despite its limitations. The combined use of DRE and PSA enhances and increases specificity in the detection of prostate cancer. They concluded that DRE is effective and still has a role in the diagnoses and screening of prostate cancer, especially where the PSA value is low among black patients in developing or low resource countries like Nigeria.

Other New Biomarkers

Because of the limitations, false positive and false negative aspects of PSA, there is an unrelenting effort by researchers to find new biomarkers that will have high specificity and low false positive and negative values. The new ones that are not commonly used routinely and not yet available or in use in our environment are:

1. PCA3 (antigen detected in urine)
2. BPSA
3. Pro PSA – Specific for prostate cancer

Also, the use of dog in the diagnosis of PCA through the smell of urine of a suspected cancer patient (due to very high sensory organ of a dog which is about 100,000 times more than that of a human being) is at the experimental stage.

Diagnosis and Staging Of Prostate Cancer

The hallmark and staging of prostate cancer in particular is distinguishing between Gleason grades and localised extensive disease. This is very important in sorting out patients who will potentially benefit from treatment. With high sophistication in the development of imaging technic, there is improved and more accurate staging compared to what is being approved to DRE and PSA testing alone; both under staging and over staging remain common clinical problems. Thus, it is essential to develop staging techniques.

Transrectral Ultrasolography

Use of TRUS provides adequate and accurate images of the prostate gland in which diagnosis and biopsis could be taken by the introduction of a probe via the rectum to lie adjacent to the prostate. Characteristics of a normal prostate would show a well-defined and symmetrical gland surrounded by a discrete capsule. However, in a patient with prostate cancer, a number of ultra-sonographic abnormalities may be present such as:

a. Abnormal echo pattern (hypoechoic)
b. Loss of differentiation between central and peripheral zones
c. A-symmetrical of size or shape
d. Capsular distortion

Studies have shown that two-thirds of prostate tumours are hypoechoic which may result from other causes and the specificity of this finding for prostate cancer is only 20 to 25 percent.

TRUS is also useful in determining the extent of extra-capsular extension. This is more accurate and convenient than

digital guidance procedure as the biopsy needle can be guided through a pot incorporated in the ultrasound probe and its position visualised directly. Most prostate biopsy are now performed by this technique. Where it is available, CT and MRI via the biopsies are now the techniques in vogue and the anxillary investigation like PVR (Post-voidal residual urine) is a useful tool to also assess the bladder function in respect of complete emptying.

Sonographic Assessment of Post-Voidal Residual Urine Volume in Patients with Prostate Gland Hypertrophy

Significant post-void residual (PVR) urine volume is a frequent manifestation of BPH. Assessment of this volume is an important routine investigation as serial measurements may indicate clinical progress. Bladder catheterisation is, however, widely regarded as the gold standard of measurement with its attendance risk of infection and trauma to the urethra and inaccurate measurement to some extent. Using ultrasonography which is a non-invasive method of assessing residual urine volume has been recommended as an alternative to catheter. As against this background, Amole, Kuranga and Benjamin (2004) carried out prospective studies using three dimensional measurement ultrasonography comparing it with catheterisation measurement which led to the derivation of a complex formula that determined the PVR urine volume more accurately in patient with BPH. A review of the literature showed that efforts at deriving a single empirical formula not based on geometrical shape result in wider range of errors. Our formula (PVR_{CUBIC}=374.57 + (-196.94 +V1) + (32.5539 + $V1^2$) + (-1.1480 + $V1^2$), where V1 = average of the length, L = width (T) and Depth (D_t) of the post-void urinary bladder. This formula is one of its kind in the world. It defines post-voidal PVR urine volume more accurately, non-invasive and with no cost to patients with prostatic gland enlargement. Significant post-void residuals can result in symptom of urinary frequency, noctorial,

overflow incontinence and recurrent urinary tract infection. Measurement of this residual volume is important to rule out other neurological abnormalities and/or obstructive voiding disorders and also useful in monitoring of clinical progress. This may apply to prostate cancer.

Using the measurement equation BPR will consider conventional transabdominal ultrasonography, a reliable method for accessing the residual volume in patient with BPH. The equation though very complex when compared with some of the pre-existing formulas can be integrated into the memory of the modern ultrasound machine for easy and faster computation. We are still searching for an ultrasound making industry to patent this research finding.

Staging of Localised Disease

There are basically five techniques that can be used in staging localised disease. They are:

1. DRE
2. PSA measurement
3. TRUS and ultrasound – guided by biopsy
4. CT scanning and
5. MRI

Digital Rectal Examination (DRE)/PSA Estimation

This has been exhaustively discussed above. However, it is important to note that accuracy of DRE in the diagnosis of prostate cancer is 30 – 50% with common under estimation because of the location of the tumour which may not be accessible for palpation by the examining fingers. It is significant in detecting significant cancer especially when PSA is normal. Within groups, there is reasonable correlation between PSA and pathologic stage. PSA levels above 10-20ng per ml are often an indication of tumour extension beyond prostatic capsule while levels above 40ng per ml suggest the bony spread (metastasis).

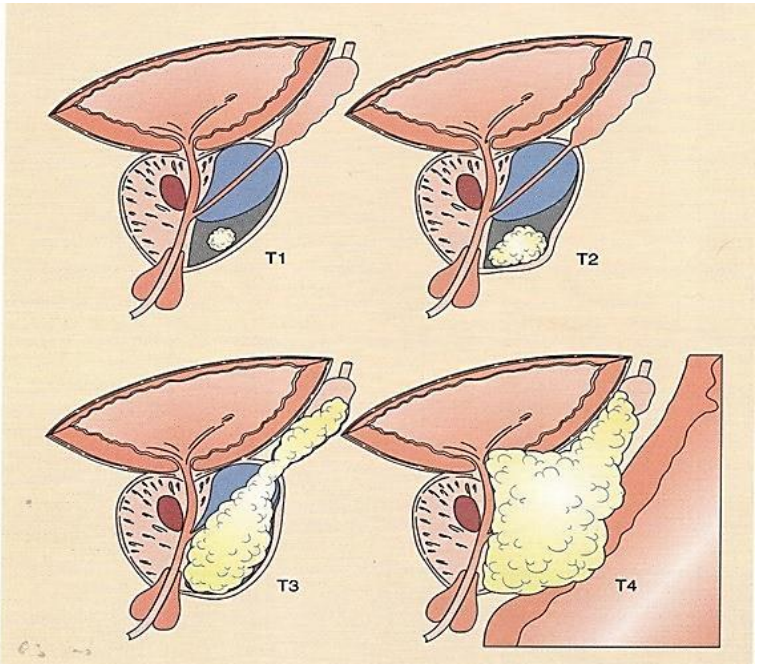


Figure 15: Clinical staging of prostate cancer: Most prostate cancers develop in the peripheral zone and, when sufficiently large, become palpable as a T2 lesion, A T3 lesion denotes invasion of the prostatic capsule, and a T4 lesion often involves either the seminal vesicles or other adjacent structures.

Prevention and Control of Prostate Cancer in Nigeria

Prevention is so much better than cure because it saves the labour of being sick – Thomas Adams. The common saying that prevention is better than cure is nothing but the truth in the case of prostate cancer disease. There are many opportunities to prevent this disease in Nigeria. This will not only reduce the death rate but also its associated suffering and agony and improve the quality of life from cancer. The long biological history of development of prostate cancer (twenty years as evidenced by the presence of precursor lesions that represent intermediate stages

between normal and abnormal cells (Malignant cells)), provides the opportunity to intervene before the malignancy is established.

Prostate cancer is an attractive and appropriate target for primary prevention because of its incidence, preference and disease-related mortality.

The most visible, practicable, applicable and cost effective approaches to prostate cancer control using life style changes (dietary alterations) are as follows:

1. Avoidance of red meat (saturated fat is known to be a big devil).
2. Grilling may add dangerous chemicals to the meat (i.e. *suya*) that we often like to take in Nigeria.
3. High levels of heterocyclic amines which have been found to have mutagenic potentials.
4. Eating of food rich in Omega–3 fatty acids from salmon, trout, mackerel, herring and sardine is known to decrease risk of accruing the disease by greater than 30%.

Chemo Preventions

What we want to achieve by the use of chemo prevention is to decrease the incidence of prostate cancer, and at the same time reduce both treatment side effects and mortality. For an agent to be effective as a chemo preventive, it has to be non-toxic agent that acts at specific molecular steps in a carcinogenic process.

Prostate Anti-Oxidance

5 alpha reductase inhibitors (type 1, type 2) and other hormonal agents, like statins, are among the many agents currently being investigated in prostate cancer prevention.

Tomatoes have been shown to contain lycopene (a natural chemical and a powerful anti-oxidant) which is responsible for the colours in tomatoes, water melon and grape fruits. It also helps to destroy the free radicals that are mutagenic.

Other anti-oxidant rich foods and vegetables like broccoli, cauliflower sprouts and cabbage are advisable and recommended to be taken four to six servings a day. This is because they are rich in Vito-chemicals and have a cancer protective effect (Di-indolylmethane) which has anti-hydrogenic and immune modulating properties.

Experimental evidence in mice has shown that Capsaicin is a chemical found in peppers which has been shown to have 80% capability of cancer cells death in the animal. This underscores the importance of pepper in the preparation of soup in our environment. This is in support of the common saying among the Yoruba that "*Emi ti ko je ata emi yepere ni*" meaning "*Anyone who does not consume pepper is an insignificant person*". Important minerals for prostate health sources also include Brazil nuts, sea foods, chicken, eggs, Soya Isoflavine (soya, legumes, fruits and soil products). Also important is quercetin, a flavonoid with anti-cancer properties found in apples, green tea, onions and red wines.

Finally, there are several natural agents that block the development of DHT (Dihydrotes tosterone) in the prostate gland. Such agents include Sawpalnitto which contains fatty acids, steroids blocking build-up of DHT in the glands, Soya products which contain sensten, diademing which also inhibits its build-up and the popular garlic.

Treatment

Mr. Vice Chancellor, Sir, any person experiencing any of the symptoms referred to earlier must visit a doctor who will initiate investigations and refer accordingly for prompt treatment. There are many options available for treatment depending on the state of diagnosis and available equipment. Among the available options are medical and surgical remedies with evidence-based good success rate. New treatment options like proton-ablation and immunotherapy are now been introduced.

The Most Common Form of Prostate Cancer is Adenocarcinoma of Prostate Gland

A prostate cancer can be treated in many ways depending on the stage of the cancer as at the time of diagnosis. The following methods are currently available:

1. Watchful waiting/active surveillance: No treatment is involved in watchful waiting initially. It is rather the periodic monitoring of PSAs and DRE and possibly x-ray. This implies that the individuals would not benefit from definitive treatment for their prostate cancer. Active surveillance is different from watchful waiting in that the main goal is to give definitive treatment to men with prostate cancer that may progress and also to decrease the risk of treatment - side effect - in such men whose cancer is likely to progress. With this method, the patients also undergo periodic PSAs and DRE, with definitive therapy instituted when changes in those parameters are noted.
2. Surgery
   a. Radical prostatectomy
   b. Orchidectomy (Surgical or Medical)
3. Cryotherapy, Laser Therapy and High Intensive Focus Ultrasound
4. Radiotherapy:
   a. External beam
   b. Interstitial (brachytherapy)
   c. Conformal
5. Hormonal treatment
6. Chemotherapy
7. Proton ablation

Challenges of Management of Prostate Cancer in Nigeria

Managing cancer of the prostate in a developing economy is indeed very challenging. Some of these challenges were extensively discussed and elucidated in a paper written and presented by Dr. Popoola and Dr. S. A. Kuranga at the UICC on

8th July, 2006, in Washington DC, USA. The following were identified as factors affecting the optimal deliverance of treatment to cancer patients in Nigeria.

1. **Inaccuracy of Current Staging Methods**

Because of lack of relevant equipment and tools for the diagnosis of this disease, physicians are faced with problems of struggling with current staging methods available in our institutions. For example, imaging with endo rectal MRI may improve diagnosis. Also, molecular staging, employing polymerase chain reaction (PCR technology) to identify cells capable of producing messenger RNA coding for PSA appears to offer the near prospect of detecting microscopic prostate tumour in the circulation.

2. **Challenges of Giving Adequate Treatment**

Prostate cancer is a potentially curable disease; hence, being diagnosed of it is not a death sentence. However, most patients present late making palliative option the only treatment for the Physician. Facilities for radiotherapy are limited to five teaching hospitals in Nigeria and there is no time whereby all the five are optimally functional at the same time.

3. **Lack of Culture of Effective Screening**

One of the most important benefits of effective screening is detecting the prostate cancer disease early at the stage that it can be cured with less cost and social burden on the family. The culture of effective screening is yet to be imbibed properly due to reasons such as funding, understanding and acceptability by the patient.

4. **Lack of Knowledge About the Disease**

Going by the data of the 1991 population census of Nigeria, only about 5.1% of men within the age group of 40 years are literate. There is no doubt that this figure must have improved

and increased significantly with the current total population of about 198 million. There is a need for aggressive and extensive enlightenment programmes and advocacy to stimulate the awareness of the community about the disease.

Poor Access to Facility

Due to logistic reasons, many rural dwellers in Nigeria have poor access to health facility.

5. **Lack of Man Power**

With the exponential rate of increase of the Nigerian population, the number of trained urologists has not matched the age-related prostate diseases.

Table 4 compares the distribution of specialised urological services, trainers, registered trainees and equipment in Nigeria as at 2007 and 2018.

I found out that out of the 14 Tertiary Health Institutions sampled in Nigeria, only 5 were fully accredited to train urologists in Nigeria in 2007. This has improved by 2018 where 9 of the 14 Tertiary Health Institutions have been fully accredited to train Urologists while the remaining 5 have partial accreditation. Ilorin is one of the centres with full accreditation.

Between 2007 and 2018 only the University College Hospital, Ibadan, and National Hospital, Abuja, have most equipment required to diagnose many urological diseases, while the remaining 13 Institutions have no bone scan and urodynamic machine. Most of the institutions that previously lacked facilities such as TRUSS, CT scan and MRI in 2007 now have them courtesy of the VAMED project which was established during the tenure of President Olusegun Obasanjo in 2007. **Table 4**

Institution	Fellows & Trainers		Registrars in Training		TRUSS		TURP SET		CT SCAN		MRI		Bone Scan		Uro-Dynamics		Accreditation Status	
	2007	2018	2007	2018	2007	2018	2007	2018	2007	2018	2007	2018	2007	2018	2007	2018	2007	2018
University College Hospital, Ibadan	3	5	-	5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Full	Full
Aminu Kano Teaching Hospital, Kano	3	6	-	3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	Full	Full
Lagos University Teaching Hospital, Lagos	2	3	-	3	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes	-	-	-	-	Partial	Partial
Obafemi Awolowo	2	2	-	2	No	-	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	Full	Full

Teaching Hospital, Ile-Ife																		
University of Ilorin Teaching Hospital	2	3	-	2	-	-	-	Yes	-	Yes	-	Yes	-	-	-	-	Partial	Full
Ahmadu Bello University Teaching Hospital	3	3	-	3	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	-	-	Full	Full
Usman Dan Fodio Teaching Hospital, Sokoto	1	4	-	1	No	Yes	Yes	Yes	Yes	Yes	-	Yes	-	-	-	-	Partial	Full
University of Benin Teaching Hospital, Benin	2	6	-	2	-	Yes	Yes	Yes	-	Yes	-	-	-	-	-	-	Partial	Full
University of Calabar Teaching Hospital, Calabar	2	3	-	2	-	Yes	-	Yes	-	Yes	-	-	-	-	-	-	Partial	Full
Olabisi Onabanjo Univ. Teaching Hospital,	1	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	Partial	Partial

Sagamu																		
National Hospital, Abuja	2	2	-	2	-	Yes	-	-	Yes	Yes	Yes	Yes	-	-	-	-	No	Partial
Federal Medical Centre, Bida	1	2	-	0	-	-	-	-	-	-	-	-	-	-	-	-	No	Partial
University of Nigeria Teaching Hospital, Enugu	3	3	-	2	-	Yes	-	Yes	-	-	-	-	-	-	-	-	Full	Full
Lagos State University	3	3	-	1	-	Yes	-	-	-	-	-	-	-	-	-	-	No	Partial

*Table 4 shows that there is tremendous improvement in the level of manpower and equipment needed for prostate cancer care. However, it is grossly inadequate based on the exponential increase in cases nationwide.***Health Financing (out-of-pocket expenses)**

Due to the fact that the health financing system in Nigeria is mainly out-of-pocket expenses, it is difficult for most patients to fund the treatment needed for prostate cancer. Kudos to the Federal Government of Nigeria for the introduction of the National Health Insurance Scheme (NHIS) which, when fully implemented, covers the vulnerable in the society.

6. **Challenges of Diagnosing Prostate Cancer Disease**

Up till today in some centres in Nigeria, only the combined DRE and PSA is the first-line available test to diagnose PSA. This constitutes a serious limitation to the diagnosis of the disease.

Diagnosing PCD is not as easy as diagnosing breast cancer. Firstly, the location of prostate gland is hidden in the pelvic, thus making accessibility difficult for both diagnosis and treatment. Secondly, it requires skills and investigative tools in the form of laboratory or radiological equipment. Olapade-Olaopa and Onawola (2006) reported on the available facilities in centres accredited to train urologists in Nigeria, and as at that time only two centres had facilities for TURP although the situation has greatly improved by way of centres that can now perform the TUR procedure. As a matter of fact, it is compulsory for any training institution to perform these as a condition for accreditation. The same study also identified that, there was only 32 Urologists in a population of about 130 million. With a present population of about 198 million, there are about 180 trained Urologists, which is far less than expected.

Our Findings are

1. it is now a common knowledge that prostate cancer is the most common cancer among men in most countries, especially in USA and the incidence is on the increase in Nigeria;
2. if prostate cancer is detected early, it can be cured;
3. being diagnosed with prostate cancer if detected early does not amount to DEATH SENTENCE;
4. black men are more likely to get and die from prostate cancer than other men;
5. prostate cancer is more aggressive among Black Africans than other coloured men;
6. having a member of one's family with prostate cancer increases the chance of getting prostate cancer;
7. getting up in the mid night too often may be a sign of prostate cancer particularly among the aged; and
8. prostate cancer treatment is available in Nigeria.

Prostate Cancer Myths

1. prostate cancer is only found in old men;
2. prostate cancer cannot run in families; "that is not my portion";
3. doing only one test PSA or DRE is enough to diagnose prostate cancer;
4. being diagnosed with prostate is a death sentence;
5. 'real men' do not do DRE;
6. sexual activity increases the risk of developing prostate cancer; and
7. having prostate cancer would take away the patient's manhood.

Conclusion

The prostate is a very important reproductive gland. It supplies seminal fluid liquefying decoagulum semen so as to provide efficient and effective fertility with substantial anti-bacteria effect. As man's age progresses, this gland serves as a nidus for varying degrees of diseases and the most sustained of much concern today is cancer of the prostate. It has become a topical issue in discourse today. Prostate cancer remains a disease of global public health concern. The good news I have for every one seated here today is that it is one of the diseases that when diagnosed early can be cured with strong emphasis on awareness and prompt access to good health facilities.

Recommendation

Mr. Vice Chancellor, Sir, I wish to recommend the following:

1. Every female and male should take interest in her or his family's health.
2. Men should endeavour to eat healthy and reduce consumption of saturated fat and red meat. Men's diet should be rich in lycopene (tomato) and other nutrients such as carrots and fresh vegetables which are in abundance in Nigeria. It is also advisable to consume foods that are rich in Omega–3 fatty acid derivable from fish.
3. The National Medical Laboratory Sciences Council should ensure and monitor the performance of PSA tests both at the public – State and Federal - and private laboratory facilities to ensure authentic and reliable results.
4. Government should create Ministry of the Aged or better still Ministry of Men Affairs. Government should provide special policies that will bring relief to the aged, especially as it relates to age-related diseases like prostate cancer and BPH.
5. The National Assembly or through the Executive should enact a law that would allow the aged in Nigeria to access

free medical treatment for prostatic disease. In the developed world, particularly in the United Kingdom and the United State of America, when one attains the age of 60 years, transport and medical services are obtained free of charge. The aged are put into consideration when laws are being formulated.

6. Government at all levels should organise and conduct a programme to promote awareness and early detection of prostate cancer as a matter of policy. This programme may include but not limited to the dissemination of information regarding the symptoms and signs of prostate cancer, the risk factors associated with it, the benefit of early detection, the treatment and consequences of delay in treatment.
7. There should be improvement in the financing of Tertiary Health Institutions so that up-to-date equipment can be purchased and relevant training provided. This will reduce medical tourism abroad.
8. Department of Counselling should be created at various levels of health centres for promotion and counselling on awareness, the need to report early and treatment options.
9. Establishment and promotion of referral services and screening programmes.
10. The President of the Federal Republic of Nigeria should make a proclamation on National Prostate Cancer awareness in the year 2018, such as similar to that of passing of the Cancer Act 1971 (the so-called war on cancer) as it was in the United States of America.
11. There should be an Act on prostate cancer; the Prostate Cancer Research and Prevention Act. The prostate cancer research and prevention institutes should be domiciled in tertiary institutions and funded by TETFUND.
12. The University of Ilorin, through the University Research Grant Fund, should as part of its community service mandate and conduct screening projects in our host communities.

With the above recommendations, my most distinguished audience, I thank you for your patience and attention.

Mr. Vice Chancellor, Sir, I thank you most sincerely, I am done!

Acknowledgement

I would like to first acknowledge and appreciate the Almighty God, my Creator, Who has been so magnanimous, kind and merciful to me. Which of His favour will I deny? He protected, guided, and guard me to be able to achieve my potentials despite all obstacles, odds and challenges. Allahu-AKbar!

It is pertinent at this juncture, to show appreciation to all the people who in one way or the other contributed positively to my success in life. To my dear caring, loving and inspiring parents, Alhaji Saadudeen Adebayo Kuranga and Alhaja Bedhau Kuranga, there is no word that can capture the depth of my gratitude to you for labouring so hard to bring me up to my present level. I thank God that you are alive today to witness this historic and memorable event.

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