A STUDY TO DETERMINE THE PREVALENCE OF INCIDENTAL PROSTATE CARCINOMA IN PATIENTS CLINICALLY DIAGNOSED WITH BENIGN PROSTATE HYPERPLASIA AND TREATED BY TRANSVESICAL PROSTATECTOMY AT THE UNIVERSITY TEACHING HOSPITAL IN LUSAKA, ZAMBIA

BY

FRED NTAMUHANGA GANYWAMULUME

A dissertation submitted to the University of Zambia in partial fulfilment of the requirements of the awards of the Degree of Master of Medicine in General Surgery at the University of Zambia

THE UNIVERSITY OF ZAMBIA
SCHOOL OF MEDICINE
LUSAKA

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Dr. Fred Ntamuhanga Ganywamulume
2017
DECLARATION

I, Fred Ntamuha Ganyawanumule, hereby declare that this dissertation represents my own work and that it has never to my knowledge been previously published in part or in full for a Diploma or a degree at any other university.

Acknowledgement for referenced materials has been appropriately made.

Sign: .............................................................

Date: .............................................................
CERTIFICATE OF APPROVAL

This dissertation of Fred Ntamuhanga Ganywanulume is approved as fulfilling part of the requirement for the award of the Degree of Master of Medicine in General Surgery at the University of Zambia.

Examiner 1
Name: 


Signature


Date


Examiner 2
Name: 


Signature


Date


Examiner 3
Name: 


Signature


Date
At the University Teaching Hospital, Department of Surgery, Urology section, prostate carcinoma is number one cause of mortality among patients. All the cases of prostate carcinoma mortalities are patients who present to the hospital when their disease is advanced with evidence of metastasis. At this stage, the cure is no longer possible, and the treatment is only palliative. It is also known that prostate carcinoma at the early stage can be present in pre-existing benign prostate hypertrophy (BPH). When diagnosed at this stage (as incidental prostate carcinoma), the cure is possible by means of radical prostatectomy or radiotherapy. At the University Teaching Hospital, Department of Surgery, Urology section, BPH accounts for more than 50% of all elective cases. The objectives were to determine the prevalence of incidental prostate carcinoma in patients clinically diagnosed with BPH who underwent transvesical prostatectomy and to determine the association between patient’s baseline characteristics and incidental prostate carcinoma. This was a sixteen (16) months prospective cross section study. The study consisted of ninety one (91) patients who underwent transvesical prostatectomy for benign prostate hypertrophy (BPH). All patients with prostate carcinoma prior to surgery were excluded from this study. The enucleated prostate glands were taken for histopathological analysis at the laboratory of the University Teaching Hospital. A simple random sampling method was used to capture the study participants. A questionnaire was administered on the second postoperative day to capture demographic characteristics and clinical data. Collected data was entered in Microsoft Excel Version 2007 and then transferred to SPSS software version 20 for statistical analysis. This study showed Ninety one (91) patients underwent transvesical prostatectomy, six specimens representing 6.6% of the enucleated prostate glands were found to have incidental prostate carcinoma. Patients with carcinoma showed their age ranging from 67 to 81 years with the average age of 75 years. While the average weight of enucleated prostate gland for all patients in the study was 78.55 grams; the enucleated prostate glands of those with prostate carcinoma had an average weight 60.50 grams. Among the indications for prostatectomy two parameters were found more likely to be associated with incidental prostate carcinoma. These parameters were failure of medical treatment, and renal failure. However after statistical analysis, the difference
between the associations of incidental prostate carcinoma and patients baseline characteristics was not statistically significant.

In conclusion this study has shown that 6.6% of the patients undergoing transvesical prostatectomy for benign prostate hyperplasia have incidental prostate carcinoma. All patients were 70 years old and above, with well differentiated prostate carcinoma, and with Gleason score of six. The rate of 6.6% of incidental prostate carcinoma as found in this study which is pre-PSA for practice sake, is in range of findings of incidental prostate carcinoma in studies conducted during the PSA era. This shows the safety of a well conducted clinical examination in differentiating benign prostate hyperplasia (BPH) from prostate carcinoma.
DEDICATION

I devote my work to my Lord Jesus Christ through whom I find strength every day also to my late father Kabwika Ganywamulume, my wife Kasongo Noellah Ntamuhanga and to my son D’Morel Kabwika and my daughter Prunelle Kinja for their support and love during this piece of work despite the less time I spent with them.
I would like to thank the Almighty God for his presence in life, his blessings and support throughout my life. He does above our expectation.

My love and appreciation to my wife, children, and friends for their patients in tolerating me as absent husband, father, and friends during the period it has taken for accomplishing this work.

To my late father, this would have been, a period of great happiness.

My great thanks to my supervisor and co-supervisor Dr. Mapulanga and Dr. Nenad for being there throughout from the formulation of this topic to the end of my full dissertation. They have been of great support, and interest in making sure that a good and acceptable work is produced despite their busy schedules. I have learnt from them to believe in myself and to seek guidance when needed. Without their patience and availability, this work would not have been produced. 

I would also want to thank Dr Yassa and Professor Odimba, Professor Hanna, and my own elder brother Jean Luck Mastaki, Mr Akakandekwa for their countless time in correcting, guiding, and motivating me throughout this dissertation. They have been of great impact in fulfilment of this dissertation.

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Last but not the least I would like to thank all those who directly or indirectly assisted me to ensure the research was carried out. I have to accept that they are a lot and I will always be grateful to them.
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<tr>
<td>AUA</td>
<td>American Urologist Association</td>
</tr>
<tr>
<td>AUR</td>
<td>Acute Urinary Retention</td>
</tr>
<tr>
<td>BPH</td>
<td>Benign Prostate Hyperplasia</td>
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<tr>
<td>BOO</td>
<td>Bladder Outlet Obstruction</td>
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<tr>
<td>CaP</td>
<td>Prostate Carcinoma</td>
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<tr>
<td>DRE</td>
<td>Digital Rectal Examination</td>
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<tr>
<td>ICP</td>
<td>Incidental Carcinoma of the Prostate</td>
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<tr>
<td>IPSS</td>
<td>International Prostate Symptoms Score</td>
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<tr>
<td>LUTS</td>
<td>Lower Urinary Tract Symptoms</td>
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<tr>
<td>PSA</td>
<td>Prostate Specific Antigen</td>
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<tr>
<td>TUR-P</td>
<td>Transurethral Resection of the Prostate</td>
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<tr>
<td>TVP</td>
<td>Transvesical Prostatectomy</td>
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<td>UNZA</td>
<td>University of Zambia</td>
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<tr>
<td>UTH</td>
<td>University Teaching Hospital</td>
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<tr>
<td>SPSS</td>
<td>Statistics Package for Social Sciences</td>
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<tr>
<td>TRUS</td>
<td>Trans Rectal Ultrasonography</td>
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CHAPTER ONE
INTRODUCTION

1.1 Background

Incidental prostate carcinoma in patients with benign prostate hyperplasia, treated by transvesical prostatectomy (TVP) or transurethral resection of the prostate (TURP) is 1.4 to 16.7%, but its incidence is decreasing due to the use of Prostate Specific Antigen (PSA) testing (Otto B et al, 2014; Adolfson J et al, 2008). Nevertheless, even in countries where PSA is routinely used as a screening test for prostate carcinoma, some patients are still being diagnosed with incidental prostate carcinoma. This would mean that in countries, which are still pre-PSA for practical sake, such as Zambia, incidental prostate carcinoma could still be higher. The incidental prostate carcinoma, contrary to what was believed in the past, can become aggressive and cause death (Andren O et al, 2006; Robinson D et al, 2007).

Prostate cancer is the most common cancer diagnosed among men, and is the second leading cause of cancer mortality in American men after lung cancer (Presti. 2004). The prevalence of carcinoma of the prostate increases most rapidly with age. Unlike most cancers, which have a peak age of incidence, the incidence of prostate carcinoma continues to increase with advancing age, (Smith et al, 2003). Prostate carcinoma can present in one of the following three ways: (i) asymptomatic: diagnosed in patients treated for other diseases or during screening using measurement of prostate specific antigen (PSA). (ii) Prostate carcinoma can be diagnosed in patient presenting with lower urinary tract symptoms (LUTS) which are also the symptoms of benign prostate hyperplasia (BPH). (iii) Prostate carcinoma may present with symptoms of metastasis such as backache, paralysis of lower extremities, or faecal incontinence (Chang et al, 2012).

It has been shown that prostate carcinoma can coexist with pre-existing benign prostatic hypertrophy (Antunes et al, 2009). Diagnosis of prostate carcinoma combines digital rectal examination (DRE), prostate specific antigen (PSA), and TRUS biopsy. In view of the above, clinically diagnosed benign prostate hyperplasia still needs to undergo histopathological examination to ensure that there is no coexisting prostate carcinoma at the early stage (Chang et al, 2012).
A study conducted by Schent et al (2011) suggested that PSA and biopsy should be done on any patient presenting with benign prostate hyperplasia, who are being managed medically or surgically, as benign prostate hyperplasia can harbour significant clinically undetectable malignancy if not regularly screened.

Incidental prostate carcinoma is a clinically undetectable cancer found in enucleated prostate gland for benign prostate hyperplasia during histopathological examination (Norman et al, 2008).

Orsted et al (2011) stated that BPH and prostate cancer share features such as hormone-dependent growth, and response to anti-androgen. They however recognize that BPH is not considered as a premalignant lesion. Chang et al, share the same thought as Orsted that BPH is not a risk factor for prostate carcinoma, but that both diseases can coexist, therefore surgery for BPH increases the chance of diagnosing incidental prostate carcinoma (Chang et al, 2012)

Incidental prostate carcinoma which is either missed or inappropriately treated, as it is in the case where it is coexisting with BPH and treated exclusively as BPH only, can become aggressive, spread to other organs and cause death, (Andren et al, 2009; Antunes et al, 2006; Bostwicks 1995). When diagnosed as incidental prostate cancer which is still confined within the organ, curative treatment is possible by radical prostatectomy or radiotherapy. However, when diagnosed at a later stage, the treatment is only palliative. Prostate biopsy and PSA reduce the mortality by ensuring early diagnosis and appropriate treatment (Andren. et al, 2009).

The Gleason score is a system for grading prostate carcinoma according to the degree of differentiation of the two most prevalent architectural patterns. The primary grade is the pattern of cancer that is commonly observed and the secondary grade being the second most commonly observed in the specimen. Each grade varies from one to five and the final score is the sum of both grades. It can vary from two (1+1) to ten, (5+5) with higher score indicating poor prognosis (McAninch et al, 2004).

The Audit records of department of surgery at the University Teaching Hospital (UTH), in Lusaka Zambia, from the year 2011 to 2014, shows that carcinoma of the prostate was the number one cause of mortality in urology.
The same audit showed no single case of early prostate cancer surgery, when BPH accounts for more than 50% of all operations in urology. At UTH, PSA is not available to low income status patients (low cost patients), who account for the majority of patients. The diagnosis of benign prostate hyperplasia at UTH is made based on clinical examination, DRE and US scan examination assuming there is no cancer involved. Making diagnosis of BPH using those tools (clinically without PSA) and subsequent operative treatment by means of TVP could lead to increased number of incidental prostate cancer in the enucleated prostate gland.

Therefore, this study was conducted to determine the prevalence of incidental prostate carcinoma in patients undergoing transvesical prostatectomy (TVP) for benign prostatic hyperplasia (BPH) at UTH from January 2015 to April 2016.

1.2 Statement of the Problem

Prostate carcinoma has been found incidentally in transurethral and transvesical resection of prostate specimen without prior diagnosis in 5% to 13% of patients who underwent prostatectomy (Hirofumi et al, 2014; Adnan et al, 2012). The prevalence of incidental prostate cancer varies geographically and by race. The patient’s age is the most important predisposing risk factor as reported in different studies. Incidental prostate carcinoma is lower in Asian population, intermediate in men of European origin and higher among black African and black-Americans (Rebbeck et al, 2014; Alexander et al, 2013; Ming et al, 2008).

In developed settings, the diagnosis of BPH is made by clinical examination, DRE, US scan, and PSA. At UTH, the diagnosis is almost essentially clinical without using PSA.

According to the department of surgery audit from 2011 to 2014, transvesical prostatectomy (TVP), accounts for more than 50% of all elective urological operations. The same audit showed TVP to be almost exclusively for patients over the age of 45. This is a huge burden of a single pathology to account for more than 50% within the given age range of patients. This audit also reveals that prostate carcinoma is the number one cause of mortality in urology here at UTH.

Surprisingly, the accurate prevalence of incidental prostate carcinoma globally is not well known (Alexander et al, 2013; Ming et al, 2008). Whereas there are numerous studies that have documented the incidental prostate carcinoma in Caucasians, and other continents, there is a paucity of similar studies from Africa (Chikwudi et al, 2013).
Current researchers have requested to conduct studies concerning incidental prostate carcinoma in diverse settings, including Africa and other understudied populations, so that country-specific data may inform local policy decision makers on the potential of diagnosis with screening (Bell et al, 2015; Oluwole et al, 2015).

Therefore, this research is to determine the prevalence of incidental prostate cancer in patients clinically diagnosed with BPH and treated by transvesical prostatectomy at the University Teaching Hospital in Lusaka, Zambia.

1.3 Study Justification

Carcinoma of the prostate is the second most common cancer in men worldwide. According to the University Teaching Hospital surgical audit from 2011 to 2014, prostate carcinoma is the number one cause of mortality in urology, accounting for more than eighty percent (80%) of mortality. Most of these mortalities present as cases of advanced prostate carcinoma with evidence of metastasis. Among these patients, some could have been initially operated on exclusively as cases of BPH. Where BPH accounts for more than 50% of urological elective surgery cases for all patients above 45 years old, there is no record of any early prostate cancer surgery in the same audit. This could mean that some of these patients treated with the assumption of being benign disease could have coexisting early prostate carcinoma. Therefore, this study intends to establish the prevalence of cancer in patients undergoing transvesical prostatectomy (TVP) for BPH. This information is vital for policy makers, clinicians and, patients. This study will help to establish whether additional screening tools such as PSA, TRUS biopsy should be performed on every patient presenting with symptoms and signs of bladder outlet obstruction to make BPH diagnosis more accurate and reduce the number of incidental prostate cancer after the subsequent surgical management of BPH.
1.4 Research Questions

1. What is the prevalence of incidental prostate carcinoma in patients undergoing transvesical prostatectomy (TVP) for BPH?

2. What are the baseline characteristics (patient’s age, enucleated gland weight, indication for surgery) of patients with incidental prostate carcinoma?

3. What is the relationship between incidental prostate carcinoma and patient’s baseline characteristics?

1.5 Objectives

1.5.1 General objective

To determine the prevalence of incidental prostate carcinoma in patients clinically diagnosed with benign prostate hyperplasia and treated by transvesical prostatectomy at the University Teaching Hospital.

1.5.2 Specifics objectives

1. To determine the baseline characteristics of patients with incidental prostate carcinoma in patients who underwent transvesical prostatectomy for BPH

2. To correlate the association between baseline characteristics and incidental prostate carcinoma

3. To describe the histopathological findings of enucleated prostate gland
Incidental prostate carcinoma is defined as a prostate carcinoma clinically undetectable, but eventually discovered in specimen of enucleated prostate gland for benign prostate hyperplasia when relieving bladder outlet obstruction (Brandon et al, 2014; Hirofumi et al, 2014; Norman et al, 2008).

Studies concerning prevalence of incidental prostate carcinoma revealed changes in different periods as whether they were conducted in the Pre-PSA era or the PSA era (Jones et al, 2009; Zigeune et al, 2003; Andren et al, 2009). In a retrospective study conducted by Jones et al (2009) to find out if the probability of finding incidental prostate carcinoma during TURP has decreased in the PSA era. They also compared the prevalence of incidental prostate carcinoma in pre-PSA era and PSA era. The study consisted of 228 men who underwent TURP for BPH to relieve the urinary bladder outlet obstruction. All patients with known or suspected prostate carcinoma prior to surgery were excluded. The finding was that 5.2% of patients had incidental prostate carcinoma. They also noticed that incidental prostate carcinoma had reduced in the PSA era as compared to the pre-PSA era where it was about 14.9%. The weaknesses in this study were that the method used was transurethral prostatectomy (TURP), they did not look for incidental prostate carcinoma by transvesical prostatectomy (TVP). Furthermore, in the result analysis, they did not search to establish the relationship between the volume of the enucleated prostate gland and the likelihood of incidental prostate carcinoma.

Prevalence of incidental prostate carcinoma also differs geographically being lower in Asia, higher among Caucasian, and African and Americans of black origin (Bell et al, 2015; Alexander et al, 2013, Lefi and Staszewsk, 2009, Parkin et al, 2002).

In the United States of American, several studies were conducted regarding incidental prostate carcinoma and showed different results. Nunez et al (2011) conducted a study where they wanted to find out the incidental prostate carcinoma among patients who underwent holmium laser enucleation (HoLEP) of the prostate for benign prostate hypertrophy (BPH). They found 10.7% to have incidental prostate carcinoma. Schenk et al (2011) in the study on the association of symptomatic benign prostate hyperplasia and prostate carcinoma found 10% of incidental prostate cancer in enucleated prostate gland. Jones et al (2009) conducted a
research to find out if incidental prostate cancer has reduced in the PSA era. The study consisted of histopathological prostate specimen analysis of patient who underwent TURP for BPH. They found 10% of incidental prostate cancer. The gap in the above studies is that all of them are prostate specimen resected by TURP; there is no record of prevalence of incidental prostate carcinoma from enucleated prostate specimen by TVP. In a retrospective study carried out by Merril et al (2002) on the incidental prostate cancer of the general population in America found 10% of incidental prostate cancer in the TURP specimen for BPH. The gaps in both above studies are that they concern only TURP specimen and are retrospective studies.

In a study conducted by Tristan et al (2010) in Argentina, on the prostate cancer as an incidental finding in transurethral resection of prostate for BPH they found 7% of prostate cancer as an incidental finding. Antunes et al (2006) in Brazil conducted a study to analyse the risk factors for incidental prostate carcinoma in patients with BPH. The study comprised 218 patients who underwent either TURP or TVP. They found 6.2% to have incidental prostate carcinoma. Maroli et al (2012) carried out a study on standard surgical treatment of BPH. Hundred patients over the age of 79 underwent TURP or TVP. The findings were that 6% of the patients had incidental prostate carcinoma. The weakness in this study is that this prevalence is a combined result of both TVP and TURP methods.

In the Europe continent a lot of studies were conducted concerning incidental prostate carcinoma. According to a study done in Sweden by Andren et al (2009) on the incidence and mortality of the incidental prostate carcinoma; in over 10% of all the diagnosed prostate carcinoma were incidentally detected in the prostate adenoma specimen. A retrospective study conducted by Hernandez F et al (1999) in Spain, which evaluated the incidence of incidental prostate carcinoma and the PSA ability to predict its presence. The study consisted of eight hundred and sixty two (862) patients who underwent prostatectomy for a period of four years. Digital Rectal Examination provided no suspicion of carcinoma. Fifty five percent (55%) of these patients underwent transvesical prostatectomy (TVP) and forty five percent (45%) underwent transurethral resection of the prostate (TURP). The volume of the prostate in both groups on ultrasound scan were 107+/63cc and 45 cc, respectively. The findings were that 6% had incidental prostate carcinoma, of which 65% was T1a and 35% T1b. the PSA in patients with ca prostate was significantly (P0.05) higher than in those who were exclusively BPH patients.
Patients with PSA > 10 ng/ml presented a significantly (P < 0.05) higher incidence of prostate cancer (P < 0.02). They concluded that PSA was not a good predictor of incidental prostate cancer.

Hirofumi et al (2014) conducted a three years retrospective study in Japan. The aim was to establish the preoperative parameters to predict incidental prostate carcinoma. The study consisted of 307 patients who underwent transurethral prostatectomy to relieve the bladder outlet obstruction due to benign prostate hypertrophy. Patient’s age, PSA, total prostate volume, and pathological diagnosis on TURP specimen were assessed. They found that 10.1% of the 307 who underwent TURP for BPH had prostate carcinoma, and that patients age and prostate volume had significant independent impact on the detection of the incidental prostate carcinoma. The gap in this study is that results are for specimen obtained by TURP only and it is a retrospective study. In a multicentre retrospective study conducted by Chaghee et al., 2011 in Korea, on preoperative clinical factors for diagnosis of the incidental prostate carcinoma. The aim was to identify potential preoperative factors of incidental prostate carcinoma (IPca) in patients undergoing tissue-ablation treatment for BPH. It consisted of 1613 patients who underwent TURP or TVP for BPH. Before surgery, biopsy was performed in all patients with less or equal to 4.0 ng/ml, with abnormal digital rectal examination (DRE). As predictive factors of IPca; age, body mass index, PSA, transurethral ultrasonography findings, including total prostate volume, and transition zone volume were reviewed. The result showed 78 patients (4.8%) of specimen with incidental prostate carcinoma. They further concluded that DRE finding, PSA, and transition zone volume to be independent predictive factors for diagnosing Incidental Prostate carcinoma in patients undergoing TVP or TURP for BPH. The gap in this study is that this incidental prostate prevalence is given without discrimination of the prevalence of those who underwent TVP or TURP. Mosli et al (1997) on incidental prostate carcinoma in a tertiary hospital in Saudi Arabia, found 7.2% of patients with incidental prostate carcinoma, and reported 3.3% of incidental prostate carcinoma at the national level.

The weaknesses in all these above researches are that they were all retrospective and concerned patients who underwent surgical management by TURP. When TURP is the surgical method used for BPH, prostate adenoma (diseased prostate gland) is removed partially to relieve the urinary bladder outlet obstruction, meanwhile when TVP is the surgical method used, almost the whole of the adenoma is enucleated.
Since during TVP the whole diseased gland is enucleated, prevalence of incidental carcinoma could even be higher than the one found during TURP. At UTH, almost all cases of BPH surgically managed are done by TVP.

In Africa, there is less work done concerning incidental prostate carcinoma, and all studies noted here are from Nigeria.

Okani et al (2013) in Ibadan, western part of Nigeria studied the incidence of subclinical prostate disease at autopsy. The study consisted of 79 prostate glands from autopsy. All patients with history of prostate related illness were excluded from the study. Their findings were 6.3% had incidental prostate carcinoma. The gap in this study is that it concerned autopsy cases. Patients did not undergo operation for BPH. In a study carried out by Mohamed et al (2005) in Nigeria, on histopathological patterns of prostate disease in Nigeria found 12.3% of incidental prostate carcinoma among the patients with benign prostate hyperplasia. Obirah et al, 2011, conducted a study on histological study of prostate carcinoma in Port Harcourt, Nigeria. 17.2% were incidental carcinoma found in specimen of prostate gland enucleated from patients treated surgically for BPH.
CHAPTER THREE

METHODOLOGY

3.1 Study design

The study type was a prospective cross section study. As it was prevalence study looking for incidental prostate carcinoma (outcome) in-patient with benign prostate hyperplasia (exposure) at the time of surgery, and no further follow-up was conducted.

3.2 Study Site

This study was carried out at the University Teaching Hospital (UTH), Department of Surgery, Section of Urology. It is largest hospital in Zambia. It provides a variety of health care from primary to tertiary, and this deals with both inpatients and outpatients.

3.3 Target population

The aim was to capture all patients with Benign Prostate Hyperplasia (BPH) seeking care at the University Teaching Hospital during the whole period when this study was being carried out.

3.4 Study Population

All patients with benign prostate hyperplasia scheduled for transvesical prostatectomy who met the inclusion criteria.

3.5 Study Duration

This study was conducted at the University Teaching Hospital in the Department of Surgery, Urology Section for a period of 16 months.

3.6 Sample size

Sample size was calculated from the standard prevalence formula

The available verified point prevalence figure from Africa was 6.3% was taken as the prevalence in formula of incidental prostate carcinoma:-
\[ N = \frac{Z^2 \times P(1-P)}{(E)^2} \]

N = sample size

Z = statistic for a given level of confidence, this being considered 95% in our study, \( Z = 1.96 \)

E = confidence interval, here considered 0.05%

P = the expected prevalence of condition in this case 6.7%

\[ N = (1.96)^2 \times 0.063(1-0.063) = 91 \text{ cases} \]

3.7 Sampling method

The sampling method was by simple random using Excel to select study participants.

3.8 Inclusion criteria

- All BPH diagnosed patients treated by TVP
- Patients agreeable to participate in this study

3.9 Exclusion criteria

- Patient not agreeable to participate in the study.

3.10 Study limitations

Histological result were obtained as T1 only, without specifying either, they were T1a or T1b.

As the majority of this study population were of low-income status (low cost patients), their baselines PSA was not present during the BPH diagnosis.

Being a prevalence study, no follow up was conducted to determine the clinical or biological behaviour of the incidental prostate carcinoma in our setting.

This study was a hospital-based study, hence not representative of general country population.
3.11 Variables

- Demography;
  - Age,
- Clinical indications of TVP in patients with BPH
  - Renal failure
  - Bladder stone
  - Failure of medical treatment
  - Recurrent gross haematuria
  - Recurrent urinary tract infection.
- Pathological weight (in grams)
- Histological findings
  - Cancer present,
  - Cancer absent.
- Gleason score for those with prostate carcinomas.

3.12 Case definition

A case of incidental prostate carcinoma was defined as carcinoma found in enucleated prostate gland performed to relieve the bladder outlet obstruction for benign prostate hypertrophy (BPH), and in which cancer was not known prior to surgery.

3.13 Data collection

The surgical team was informed of the study and asked to place the whole of the enucleated prostate gland in a specially supplied specimen container with formalin 4% after weighing the specimen. The operative theatre list was reviewed twice weekly to identify cases of BPH in line with the inclusion criteria for patients planned for surgery; patients were then traced on the wards. The participants were invited to join the study after going through the information sheet with them and addressing any pertaining questions. Patients, who could not read, had the study information explained to them orally in their local language.
It was made clear during the explanation about the study, that the participants were able to withdraw from study without any consequence in their disease management. The Consent was sought and once obtained; the enucleated prostate gland was traced and taken for histopathological analysis at the University Teaching Hospital laboratory.

Should the consent be declined, the patient’s relatives took the enucleated prostate gland to the laboratory, and the patient’s management or care was continued as it was planned by the treating doctor.

Clinical data were collected in the surgical ward two days preoperatively. Data of interest were age of the patient, indication of the operation, any preoperative biopsy. Information was entered in the data collection sheet. Patient’s intraoperative notes were reviewed as well and the weight of the enucleated gland noted.

As the histopathology results were availed by the laboratory, histopathological features such as the presence or absence of features of carcinoma, and Gleason score, were recorded as well as conclusion and diagnosis.

Patients found to have prostate cancer were reassured of the disease not being lethal and of an appropriate treatment. They were then referred to their attending doctor for active surveillance or radical prostatectomy depending on the protocol in view of their lifespan and Gleason score.

3.14 Actual data collection

3.14.1 Surgical

- Collection of enucleated prostate gland
- Weight of the enucleated prostate gland
- Placement of the enucleated prostate gland in the specimen container

3.14.2 Patient’s baseline characteristics

- Age of the patient
- Indication of surgery such as:-
- Gross haematuria
- Failed medical treatment
- Recurrent urinary tract infection
- Urinary bladder stone
- Renal failure

3.15 Data collection and analysis

Data was collected using a data collection sheet attached in appendix according to the above specific objections.

The data collected was entered into Excel version 2007 and then transferred to SPSS software version 20 for statistical analysis.

The research comprised of three questions; the strategy to answer them was as follows:

Descriptive analysis was used for:

- The prevalence of incidental prostate carcinoma, a continuous variable. Mean and standard deviation was determined.

- Baseline characteristics:
  - Age (by birthday): being a continuous variable, Mean and standard deviation were determined.
  - Weight of enucleated gland which is a continuous variable, therefore mean and standard deviation were determined
  - Indication for surgery: categorical variable. Frequency, percentage, and pie were determined.

- Association between incidental prostate carcinoma (IPC) and patients baseline characteristics;
  - IPC and age: correlation was determined
  - IPC and weight of the enucleated prostate gland: correlation was determined
  - IPC and indications; Annova will be determined and if p value is significant we will run a logic regression.
### 3.16 Summary for strategy study analysis

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>SCALE</th>
<th>STATISTIC</th>
<th>INFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Incidental prostate cancer</strong></td>
<td>Continuous</td>
<td>Mean and standard deviation</td>
<td>Histogram</td>
</tr>
<tr>
<td>(ICP)</td>
<td></td>
<td>Histogram</td>
<td></td>
</tr>
<tr>
<td><strong>2. Baseline characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (birthday)</td>
<td>Continuous</td>
<td>Mean and standard deviation</td>
<td>Histogram</td>
</tr>
<tr>
<td>Weight of enucleated gland</td>
<td>Continuous</td>
<td>Mean and standard deviation</td>
<td>Histogram</td>
</tr>
<tr>
<td>Indication for operation</td>
<td>Categorical</td>
<td>Frequency or Percentage</td>
<td>Pie</td>
</tr>
<tr>
<td><strong>3. Association between</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICP and Age</td>
<td>Continuous</td>
<td></td>
<td>Correlation</td>
</tr>
<tr>
<td>ICP and weight</td>
<td>Continuous</td>
<td></td>
<td>Correlation</td>
</tr>
<tr>
<td>ICP and indication</td>
<td>Continuous and categorical</td>
<td></td>
<td>Anova</td>
</tr>
</tbody>
</table>
3.17 Ethical Consideration

1. Benefits; no direct benefits to the patient of this study, but the subsequent patients, clinicians and policy makers may benefit from the findings of the study,

2. Risks; no risk to the patient as the study is not interventional or experimental; it was an observation study with no change in clinical practice. The data in our study concerned only the specimens collected during surgery.

3. Confidentiality; information was kept confidential by the researcher and patients who gave their codes not their names. Data in this study was kept under lock and key by the researcher alone, and when analysing the data they were entered on the computer with the password known only by the researcher.

4. Willingness; patients were not forced or coerced to participate; and were told that they could withdraw at any time without any interference with patients case management.

Having met the above ethical issues, Ethical approval was sought from the University of Zambia Biomedical Research Ethics Committee. Permission was obtained from UNZABREC secretary located at ridgeway campus.
CHAPTER FOUR

RESULTS

This chapter presents the results of the study. The general objective of the study was to determine the prevalence of incidental prostate carcinoma in patients clinically diagnosed with benign prostate hyperplasia and treated by transvesical prostatectomy at the University Teaching Hospital. The specific objectives were: a) to determine the baseline characteristics of patients with incidental prostate carcinoma in patients who underwent transvesical prostatectomy for BPH; b) to correlate the association between baseline characteristics and incidental prostate carcinoma; and c) to describe the histopathological findings of enucleated prostate gland.

4.1 Baseline characteristics of Patients

Ninety-one patients were involved in this study. The age of the patients ranged from 60 to 85 years, and the average age of the patients was 71.40 years with a standard deviation of (SD) of 6.326. The median age of the patients was 71 years while the mode was 76 (11 patients were aged 76 years) (Figure 1). The duration of onset of symptoms to the time of surgery ranged from 1 to 75 months, with an average duration of 14.95 months (median = 12 months and mode = 12 months) (Figure 2). The enucleated size of the prostate adenoma ranged from 25 to 180 grams, with a mean of 78.55 grams (media = 75 g; mode = 25 g). Figure 3 below shows that the most prevalent indication for surgery was failed medical management (47; 52.0%), followed by renal failure (24; 26.0%), and bladder stones (10; 11.0%). Only one (1%) patient had refractory haematuria as an indication for surgery. Another indication for surgery was patient’s inability to afford medical treatment (9 patients representing 10%). Further results indicated that none of the 91 patients had experienced recurrent urinary tract infection as an indication of surgery.
Figure 1: Age Distribution of patients

Figure 2: Duration of symptoms to the time of surgery
4.2 Prevalence of incidental prostate carcinoma in BPH patients treated by TVP

The histopathological results revealed that only six patients (6.6%), out of 91 patients in the study, had ICP (Table 1). Further analysis revealed that four of these patients had a Gleason score of 6, one patient had a Gleason score of 7, and the one patient had a Gleason score of 9.

| Table 1: Histopathological findings |
|-------------------------------------|--------|--------|
| No cancer present                   | Frequency | Percent |
| Cancer present                      | 6      | 6.6    |
| Total                               | 91     | 100.0  |
Table 2: Frequency distribution of Gleason score

<table>
<thead>
<tr>
<th>Gleason score</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>3+3=6</td>
<td>4</td>
</tr>
<tr>
<td>4+3=7</td>
<td>1</td>
</tr>
<tr>
<td>5+4=9</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6</strong></td>
</tr>
</tbody>
</table>

Table 2 shows the Gleason score varies from 6 to 9 with a mode of 6; four patients had Gleason score of 6.

### 4.3 Relationship between incidental prostate carcinoma and patient’s baseline characteristics

The study also aimed at establishing the relationship between incidental prostate carcinoma and patient’s baseline characteristics of age, enucleated gland weight, and indication for surgery.

#### 4.3.1 Associations between age and ICP

The average age of all patients (n=91) in the study was 71.40 (SD=6.4). Those without cancer (n=85) were aged on average 71.14 (SD=6.295) while the average age of patients (n=6) who had cancer was 75.00 (SD=6.164). An independent samples t test was conducted to establish whether there was a significant difference between age and ICP. The test was conducted at significance level of 0.05. The results were not significant (t=−1.453; df=89; p=0.150).

<table>
<thead>
<tr>
<th>Histopathological findings</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>No cancer present</td>
<td></td>
<td>Age of patient</td>
<td>85</td>
<td>71.14</td>
<td>6.295</td>
</tr>
<tr>
<td>Cancer present</td>
<td>6</td>
<td>Age of patient</td>
<td>83</td>
<td>75.00</td>
<td>6.164</td>
</tr>
</tbody>
</table>

#### 4.3.2 Associations between enucleated gland weight and ICP

The mean enucleated gland weight of all patients participating in our study (n=91) was 78.55grams, those with no cancer (n=85) had an average of enucleated prostate gland weight of 77.14grams (SD=44.148); while the mean enucleated gland weight of patients who had cancer (n=6) was 60.50 (SD=54.621). An independent samples t test was conducted to establish whether there was a significant difference between enucleated gland weight & ICP.
The test was conducted at significance level of 0.05. The results were not significant (t=0.879; df=89; p=0.382).

**Table 4: Enucleated gland weight: group statistics across patients with ICP and without ICP**

<table>
<thead>
<tr>
<th>Histopathological findings</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enucleated size of the prostate adenoma (grams)</td>
<td>No cancer present</td>
<td>85</td>
<td>77.14</td>
</tr>
<tr>
<td></td>
<td>Cancer present</td>
<td>6</td>
<td>60.50</td>
</tr>
</tbody>
</table>

### 4.3.3 Association between indications for surgery and ICP

Fishers’ Exact test was conducted to establish whether there was an association between indications for surgery and ICP, at a significance level of 0.05. A Chi square test was not valid in this study because in some cases the expected counts were less than 5. It was not possible to determine an association between recurrent urine tract infection and ICP as the former was a constant (i.e. all the 91 patients had not experienced recurrent urine tract infection).

#### 4.3.3.1 Association between renal failure and ICP

Table 5 below shows that three patients out of 65 patients who did not experience renal failure had ICP while three patients out of 26 patients who experienced renal failure had cancer. The results from Fishers’ Exact test were not significant \( (\chi^2 = 1.196; \text{df}=1; \ p = 0.348) \), i.e. there was no association between renal failure and presence of cancer (Table 6).

**Table 5: Association between renal failure and ICP**

<table>
<thead>
<tr>
<th>Renal Failure</th>
<th>Histopathological findings</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Cancer present</td>
<td>Cancer present</td>
</tr>
<tr>
<td>No</td>
<td>62</td>
<td>3</td>
</tr>
<tr>
<td>Yes</td>
<td>23</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>6</td>
</tr>
</tbody>
</table>
**Table 6: Significance of renal failure and ICP**

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>1.445&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1</td>
<td>0.229</td>
<td>0.348</td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td>0.348</td>
<td></td>
<td>0.348</td>
<td>0.224</td>
</tr>
</tbody>
</table>

(a) 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.71

(b) Computed only for a 2 x 2 table

(c) The standardized statistic is 1.196.

### 4.3.3.2 Association between bladder stone and ICP

Table 7 below shows that six patients out of 81 patients who did not have bladder stone had ICP while none of the 10 patients who had bladder stone had cancer. The results from Fishers’ Exact test were not significant ($\chi^2 = -0.837; df = 1; p = 1.000$), i.e. there was no association between presence of bladder stone and ICP (Table 8).

**Table 7: Association between bladder stone and ICP**

<table>
<thead>
<tr>
<th></th>
<th>No cancer present</th>
<th>Cancer present</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>bladder stone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>75</td>
<td>6</td>
<td>81</td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>85</strong></td>
<td><strong>6</strong></td>
<td><strong>91</strong></td>
</tr>
</tbody>
</table>

**Table 8: Statistic Significance of bladder stone and ICP**

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>0.793&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1</td>
<td>0.373</td>
<td>0.616</td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td>1.000</td>
<td></td>
<td>1.000</td>
<td>0.487</td>
</tr>
</tbody>
</table>

(a) 1 Cell (25.0%) have expected count less than 5. The minimum expected count is .66.

(b) Computed only for a 2x2 table

(c) The standardized statistic is -.886.
4.3.3.3 Association between failed medical management and ICP

Table 9 below shows that two patients out of 42 patients who did not experience failed medical management had ICP while four out of the 49 patients who had experienced failed medical management ICP. The results from Fishers’ Exact test were not significant ($\chi^2 = 0.648; df=1; p = 0.683$), i.e. there was no association between failed medical management and presence of cancer (Table 10).

Table 9: Association between failed medical management and ICP

<table>
<thead>
<tr>
<th></th>
<th>Histopathological findings</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No cancer present</td>
<td>Cancer present</td>
</tr>
<tr>
<td>Failed medication management</td>
<td>No</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>85</td>
</tr>
</tbody>
</table>

Table 10: Statistic significance of failed medication management and ICP

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>0.425$^a$</td>
<td>1</td>
<td>0.515</td>
<td>0.683</td>
<td>0.415</td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td></td>
<td>0.683</td>
<td>0.415</td>
</tr>
</tbody>
</table>

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.77.
b. Computed only for a 2x2 table
c. The standardized statistic is .648.

4.3.3.4 Association between refractory haematuria and ICP

Only one patient had refractory haematuria and this patient no ICP. Since there was, only one patient with refractory haematuria a statistical test was conducted to establish an association between haematuria and ICP due was to lack of sufficient data.
4.4 Summary of the results
The main objective of this study was to determine the prevalence of incidental prostate carcinoma in patients clinically diagnosed with benign prostate hyperplasia and treated by transvesical prostatectomy at the University Teaching Hospital. Out of a sample of 91, only six patients had ICP. The major indications for surgery were failed medical management, renal failure, bladder stone, and patient inability to afford medical treatment. The results showed no association between incidental prostate carcinoma and patient’s baseline characteristics such as age, enucleated gland weight, failed medical management, renal failure, and bladder stones.
CHAPTER FIVE
DISCUSSION

Prostate carcinoma is the number one cause of mortality in the Urology section of the surgical department at University Teaching Hospital. It is a source of concern in view of the results from this study that shows that 6.6% of patients undergoing transvesical prostatectomy for benign prostate hyperplasia have incidental prostate carcinoma. These findings are in line with a study done by Okani et al (2013) in Ibadan western part of Nigeria where the prevalence of incidental prostate carcinoma was 6.6%.

Several others studies have been conducted comparing the prevalence of incidental prostate carcinoma during the pre-PSA era and the PSA era. Tombal et al (1999) reported a decrease in the rate of incidental prostate carcinoma from 27% to 9% when comparing the pre-PSA and PSA era in over 1600 patients who underwent surgical management for BPH. Mai et al (2000) also showed a significant decrease from 12.9% to 8% of incidental prostate cancer in pre-PSA and PSA era respectively. In a study conducted by Jones et al (2009), which compared the findings of incidental prostate cancer in pre-PSA and PSA era, they found a decrease from 14.9% to 5.2%. As noted from the studies above, incidental prostate cancer in the pre-PSA era was varying from 27% to 12.9%.

In this study which was pre-PSA for practical sake, with no PSA screening programme and no preoperative PSA tests done in patients who underwent TVP, the incidental prostate carcinoma prevalence is much lower, being in a similar range of findings of the studies conducted in countries which have moved to PSA era. This emphasises the importance of a well-conducted clinical examination in diagnosing BPH and differentiating it from cancer especially in poor resource countries with little diagnostic tools.

Contrary to previous studies which had shown incidental prostate cancer to be without lethal potential (Cantrell et al, 1981; Epstein et al 1986) and in which conservative management was recommended, it has now been proven that when incidental prostate carcinoma is not treated, it can become aggressive and cause death (Bostwicks et al, 1995; Antunes et al, 2006; Robinson et al, 2007; Andren et al, 2009). Treatment of incidental prostate carcinoma takes into consideration three parameters, which are patient’s lifespan, comorbidities and tumour’s Gleason score. It varies from watchful waiting, active surveillance, radical prostatectomy, radiotherapy and hormonal therapy (European Association of Urology (EUA) guidelines).
We could see from the findings of this research that as much as 6.6% of patients are being treated as benign prostate hypertrophy meanwhile they have coexisting prostate carcinoma. TVP is not the appropriate treatment for those patients. They would need some kind of active management without which some may present later with advanced prostate carcinoma.

Benign prostate hyperplasia (BPH) is a source of concern in urological patients with the average age at presentation of 60 to 70 years of age, (Abdus, 1999). In this study, the average age of patients with BPH was 71.1 years. These findings are comparable with other reported studies (Thomas et al 2009; Amos et al 2009). Furthermore, in this study, the average age of patients with incidental prostate carcinoma was 75 years; the average weight of the enucleated prostate gland without prostate carcinoma was 77.1g, while those with incidental prostate cancer were found to have an average enucleated prostate gland weight of 60g. The association between these two parameters (age and weight of the enucleated prostate gland) and incidental prostate carcinoma were not statistically significant. During the data analysis, we did not find a relationship between the age of patients, weight of enucleated prostate gland and incidental prostate carcinoma. The findings of this study compare well with a study conducted by Mounir et al. 2007 in Tunisia, where they showed that volume of enucleated prostate gland did not influence the diagnosis of incidental prostate carcinomas. Furthermore, in a retrospective study conducted by Tristan D. et al (2010) when analysing the characteristics of patients with incidental prostate carcinoma; hundred (100) patients with bladder outlet obstruction due to benign prostatic hyperplasia from June 2007 to August 2009 underwent TURP. They found that patients of the age greater than 69 years old, and with smaller prostate volume, had incidental prostate carcinoma in their enucleate prostate gland.

In a study conducted by Hirofumi et al 2014 in Japan, where he was evaluating the preoperative parameters to predict incidental prostate carcinoma, patient’s age, total prostate volume and pathological diagnosis on transurethral prostatectomy specimen were assessed. Analysis of these parameters and incidental prostate carcinoma were evaluated. The findings of this study showed that 10.1% of patients had incidental prostate carcinoma. The age of 75 years and above, and the volume equal to or less than 50 cubic centimetre were risk factors for the diagnosis of incidental prostate carcinoma. They concluded that older patients, small prostate volume and absence of previous needle biopsy could be independent risk factors for detecting incidental prostate cancer, and recommended further external studies to validate their result. The difference in our study findings, and those obtained from Hirofumi et al, could be related to the difference in the sample sizes of the two studies. Indeed, in Hirofumi’s
study, the sample size was 307 patients, whereas in this study it consisted only of 91 cases. The second factor that could explain the differences in findings was that their study was conducted in multiple centres whereas this study was conducted in one centre only. It should be stated however, as it was shown in both studies, that the small weight of the enucleated prostate gland and the age of 69 years and above should raise a high index of suspicion for the diagnosis of incidental prostate carcinoma. This was also the same observation in studies conducted by Alberto et al. 2006; Tristan et al. 2010.

The indications for surgery were failed medical treatment, renal failure, bladder stones, and patient’s inability to afford medical treatment. In this study, the association between the indications for surgery and diagnosis of incidental prostate carcinoma were not found to be statistically significant.

Several studies in addition to ours have looked at Gleason score in patients with incidental prostate carcinoma. In a study conducted by Tristan et al. an incidental prostate carcinoma detection rate of 7% among hundred patients who underwent TURP. Six patients had a Gleason score of 6 (3+3), and only one had a Gleason score of 7 (3+4). in Hirofumi et al.’ study showed that as much as 82% of patients with incidental prostate carcinoma had a Gleason score of 6 (3+3), followed up of 14% with Gleason score of 7 (3+4) and only 4% with a Gleason score of 8 (4+4). Ming et al. in their study on the prevalence of incidental prostate cancer in the general population found that patients with incidental prostate cancer had a mean Gleason score 6.2 as it was varying from 6 (3+3) to 7 (3+4). Only one patient among hundred and fifty one (151) was found to have a Gleason score of 8 (4+4). Of note, this was a very young patient of the age of 39 years. In a long follow up of patients with incidental prostate carcinoma, Tombal et al. showed that T1b lesions associated with higher Gleason score and higher risk of progression.

This study shows that Gleason score finding in the specimen analysis of enucleated prostate gland varies from (67%) for 6 (3+3), 17% for 7(3+4) and then 16% for 9 (5+4). As this result may be slightly different of the other above studies, it is however, consistent with the overall findings, where almost the whole patients with incidental prostate carcinoma are found to have the Gleason score of 6, and only a very small number have a Gleason score of 7 or 8, sometime 9. It has also been shown that young patient with incidental prostate carcinoma tend to have a high Gleason score and higher risk of progression.
6.1 Conclusion

The main objective of this study was to find the prevalence of incidental prostate cancer in patients treated for BPH by TVP. We also wanted to find out the association between the patients’ baseline characteristics and incidental prostate carcinoma.

The findings were that 6.6% of our study population had incidental prostate carcinoma. Their Gleason score ranged from 6 to 9, with mode of 6 (4 out 6 patients with carcinoma had a Gleason score of 6). Patients who were 74 years old and above were more likely to have associated incidental prostate cancer in their enucleated prostate gland although statistically not significant. There was no relationship between indications for surgery and incidental prostate carcinoma. The findings of this study shows the emphasis of the need of thorough evaluation of the patients in terms of good history taking, physical examination with digital rectal examination. This being more important in poor resources countries such as Zambia.

The European Association of Urology (EAU) guidelines recommends watchful waiting for patients with life expectation less than 10 years with well-differentiated incidental prostate carcinoma. The rationale behind the concept of watchful waiting is in the observation that incidental prostate carcinoma progresses slowly, and is diagnosed in older patients, in whom there is a high incidence of co-morbidities and related high competitive mortality.

The findings of this study showed that all patients with incidental prostate carcinoma were above 70 years of age and the majority of them had a Gleason score of six. Therefore, in accordance with EAU guidelines, we would say that these patients would need watchful management because the active management of their disease will not improve their quality of life.

In view of the result of this study, it should be stated that in patients undergoing TVP for BPH should have the histopathological result of the enucleated gland before being discharged. This is because some of those patients will have incidental prostate carcinoma and in that case, they will benefit from an appropriate management such as radical prostatectomy, active surveillance or watchful management. Furthermore, in this study, the prevalence of incidental prostate carcinoma was 6.6% compared with studies, which are conducted in countries where PSA is used in the diagnosis of BPH. (Countries, which have
moved to PSA era). This shows the importance and safety of a well-conducted clinical examination discriminating BPH from prostate cancer. In conclusion, a well-conducted clinical examination could be safe especially in poor resource countries.

6.2 Recommendation

In view of the results of this dissertation, it is therefore, recommended that all patients undergoing Transvesical Prostatectomy for Benign Prostate Hyperplasia should have histopathology results of their enucleated adenoma traced urgently before they are discharged.

A long prospective study following up patients with incidental prostate carcinoma should be conducted to determine the clinical or biological behaviour of incidental prostate carcinoma in our region.

Study using PSA in the diagnosis of benign prostate hypertrophy should be conducted to see the impact of the PSA on the diagnosis of incidental prostate cancer in patient undergoing prostatectomy for benign prostate hypertrophy in our setting.
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Garth, A. Alexandra, L. Tahseen, A. Gerald, E. (1998). A Gleason Score of 7 Predicts a Worse Outcome for Prostate carcinoma Patients Treated with Radiotherapy, American Cancer Society 1


Jones Js, Follis H, Johason J (2009). Probability of finding T1a and T1b (incidental) prostate cancer during TURP has increased in the PSA era. Prostate cancer and prostatic disease. 12: 57-60.


APPENDIX I: Participant Information Sheet

My name is Freddy Ntamuhanga Ganywamulume, a resident medical doctor in general surgery, department of surgery at the University Teaching Hospital. I am conducting a study on prevalence of incidental prostate cancer in-patient clinically diagnosed benign prostatic hypertrophy and treated with transvesical prostatectomy. Reason being that prostate carcinoma is number one cause of mortality in urology patients and always present at late stage where disease has spread to other organs and is no longer curable. In addition, it is known that carcinoma of the prostate at early stage can be found in a pre-existing benign prostate hypertrophy. By doing enucleated prostate biopsy we can diagnose the cancer of the prostate at early stage, and this can be treated and cured.

I would like to ask you to take part in the study by allowing us to collect the enucleated part of your prostate gland during the operation.

Although you may not directly benefit from participating in the study, you will make a huge contribution by assisting clinician to make better decision of further screening tools before carrying out the prostatectomy. You may also benefit in sense that if we find a cancer in your enucleated prostate gland specimen, you will benefit from other treatment modalities or further follow up.

This study will not delay your treatment nor prolong your stay in the hospital.

The study will not impose any particular risks to you, as no intervention procedure will be done to you, but your own doctors according to the standard hospital care at University Teaching Hospital in patients will treat you with your condition.

I will keep your records confidentially. The records will be kept in the computer, with a password only accessible by the researcher. No one else will be aware of your participation in this study except yourself and the researcher. However, you could inform any other person of your will.

If you feel that you have been injured or inconvenienced as a direct result of your participation in the study, you have the liberty to withdraw from the study at any time without any consequence on the management of your condition.
In any case, of any question or clarifications, please contact me Dr Fred Ntamuhanga Ganywamulume on 0978452560, department of surgery, University Teaching Hospital, P/B RW1X, Lusaka.

You may also contact the chairman of the University of Zambia Biomedical Research Ethics Committee, Ridgeway campus, P.O Box 50110, Lusaka, Zambia telephone: 0211-256067 if you would like to know your right as a research participant.
APPENDIX II: Certificate of Consent

Your signing of this form means that you understand the information presented and that you want to participate in the study. You understand that participation is voluntary and you may withdraw from the study at any time. If you agree to participate in the study, kindly sign the consent form that follows.

I, .......................................................... of address........................................ on this day of ........... month of ....................... of the year ............... do understand the importance and the risks of participating in this study have been explained to me.

I have read the foregoing information, or it has been read to me. I have had an opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research and agree to the terms of the study as laid by the researcher.

Signature or print of participant: ..............................

Right thumb of participant (if unable to sign): ......................

Name of the participant: .......................Date: ....................... (Day / month / year)
APPENDIX III: Data collection Sheet

Study number: …………………

1. Demographic characteristic
   1.1 Age

2. Indications for surgery
   2.1 Renal failure
   2.2 Recurrent urine tract infection
   2.3 Bladder stone
   2.4 Failed medication management
   2.5 Refractory haematuria
   2.6 Others: …………………………………………….

3. Histopathological findings
   3.1 No cancer present
   3.2 Cancer present
   3.3 If cancer present, Gleason score