Incidence of Prostatic Carcinoma in Transurethral Resection Specimen

Samah Abbas Hussein, Khitam Razzak Al-Khafaji[*]

Department of Pathology and Forensic Medicine, College of Medicine, University of Baghdad, Baghdad, Iraq.
*Correspondence to: Khitam Razzak Al-Khafaji (E-mail: khitam_razzak@yahoo.com)

Abstract

Objective This study done to identify the rates of incidentally detected prostate cancer in patients undergoing surgical management of Benign Prostatic Hyperplasia (BPH).

Methods This cross section study was done on all transurethral resections of the prostate (TURP) cases. One hundred and eighty one men, aged 45 to 94 year, underwent TURP and their specimens were sent for the histopathological analysis. Those with a known diagnosis of prostate cancer prior to TURP were excluded ($n = 5$) from the analysis.

Results Hundred eighty-one patients had prostatic enlargement; fifteen patients (8.29%) patients were found to have prostate adenocarcinoma. Grade of disease ranged from Gleason score 7 to 10. Majority of them (fourteen patients) aged 65 year or above.

Conclusion Prostate carcinoma is showing high grade at the diagnosis and widely frequent (8.29%) in TURP, especially in-patient above 65 years (11.0%) and therefore a screening program advised.

Keywords Incidence, prostatic carcinoma, transurethral resection specimen

Introduction

Carcinoma of the prostate is the most common internal malignancy among men in the United States and is responsible for 10% of cancer deaths in this population.[1] There are remarkable differences between world regions and countries in the incidence of clinically diagnosed prostate cancer.[2] The highest incidences are in North America, the Caribbean, Brazil, certain western European countries, Australia, and New Zealand. About 60% of all new prostate cancer cases in 2012 diagnosed in North America or Europe. In Iraq, Prostate cancer is fourth among the most common cancers.[3] Prostate cancer is the most common cancer, most of which have a high or very high level of human development. The lowest incidences are in Asia, several countries in the Middle East, and Africa. Both genetic and environmental influences have been implicated in these incidence differences. An environmental component (possibly related to diet) is confirmed by the fact that low-risk Asian men who move to a high-risk geographical area (such as the USA) have a marked increase in prostate cancer incidence. However, the annual incidence for all generations of Asian-Americans is roughly only half of that for Whites born in the USA, implicating genetic factors.[4] International differences in diagnostic practices, particularly differences in serum prostate-specific antigen (PSA) screening, are probably the greatest contributors to worldwide differences in incidence.[5] Their frequency increases with age, Almost 75% of the men diagnosed with prostatic cancer are age 65 or older and this fact well substantiated by careful observations at autopsy, but the tumors can be seen in younger patients.[6] The frequency with which incidental carcinoma is found at post mortem examination varies between 15% and 70%.[7] In addition, is directly related to the age of the patient and the thoroughness of the sampling. The TUR specimen that contain tumor may signify extensive spread by conventional carcinoma from the peripheral portion of the gland or may be a manifestation of the rare type of carcinoma from the transition zone. The probability of detecting a prostate carcinoma in the TUR specimen directly related to the amount of sampling.[8] When five blocks or 12 g of randomly selected chips are submitted, it estimated approximately 90% of the carcinomas will be detected,[9,10] While the examination of eight blocks, the probability of detection rises to 98%.[11,12] Also The need for submission of remaining tissue in the cases in which incidental carcinoma is found depends on whether the lesion is a T1a (recommended) or T1b (not needed).[13] The aim of study is to identify the rates of incidentally detected prostate cancer in patients undergoing surgical management of Benign Prostatic Hyperplasia (BPH).

Method

After obtaining Institutional Review Committee (IRC) approval, this study was conducted at the department of pathology, Ghazi AL-Harriri Hospital, Baghdad medical city, Iraq. This study was performed on all cases of transurethral resection of the prostate that provided a tissue specimen between 1st January 2018 to 31st December 2020. Hundred and eighty-one men, aged from 45 to 94 years, were identified as having BPH who underwent TURP. The patient were divided into two groups i.e. first group consisting of patients younger than 65 years and the other group being 65 years or more. Data of this study were collected from the hospital record which include demography details, findings of digital rectal examination (DRE), PSA value and histopathological results. Patients with a preoperative diagnosis of prostate carcinoma were excluded from the analysis ($N = 5$). Data were tabulated in Microsoft excel sheet. Percentages and Frequencies were calculated for descriptive data meanwhile Pearson Chi-square test was used to compare the association between categorical data. P-value less than 0.05 was considered significant.

Results

Cross sectional study for 181 patients with mean and SD of age of patients 68.4 ± 8.6 years old. With minimum, age 45 and maximum 94 years old. (70.2%) of patients were at age 65 years and above, the distribution of Gleason grade in patients with malignant prostatic lesion appear as (33.3%) of patients in grade (4), (26.7%) of patients in grade (3 and 5). As shown in Tables 1 and 2.

According to Table 3; there is significant association between age of patients and prostatic lesion; (11%) of patients (fourteen) with age 65 years or more have malignant prostatic lesion, while (1.9%) of patients (only one) below 65 years have malignant lesion.

The distribution of prostatic lesions in general, fifteen of patients (8.29%) with malignant prostatic lesion, hundred sixty six (91.7%) with benign prostatic lesion as in Figure 3A. The distribution of benign prostatic lesions; (57.23%) of patients with BPH and (36.75%) of patients with BPH with chronic inflammation as in Figure 3B. The distribution of malignant prostatic lesions; four of patients (26.67%) with high Gleason score and (73.33%) of patients with moderate Gleason score as in Figure 3C.

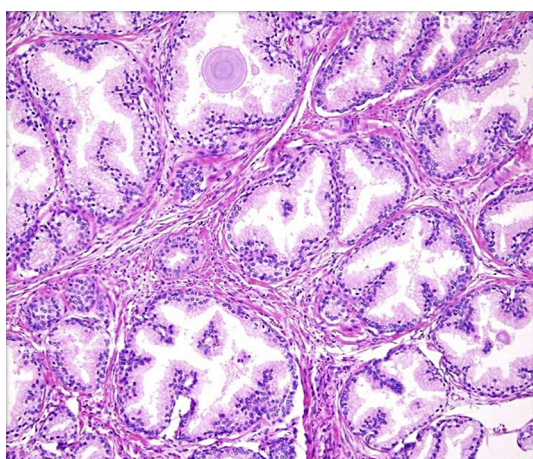Fig. 1 **Prostate chips obtianed by transurethral resection of prostate.**[14]

Fig. 2 **Benign prostatic hyperplasia (BPH).**[15]

Table 1. **Distribution of patients according to age**

Age	Frequency	Percentage
Below 65 years	54	29.8
65 years and above	127	70.2
Total	181	100.0

Table 2. **Distribution of Gleason Grade in patients with malignant prostatic lesion**

Gleason Grade		
Grade 1	0	0.0
Grade 2	2	13.3
Grade 3	4	26.7
Grade 4	5	33.3
Grade 5	4	26.7
Total	15	100.0

Table 3. **Association between age of patients and prostatic lesions**

Variables		Age		P-value
		Below 65 years	≥ 65 years	
Prostatic lesions	Benign %	53 (98.1%)	113 (89.0%)	0.042
	Malignant %	1 (1.9%)	14 (11.0%)	
	Total %	54 (100.0%)	127 (100.0%)	

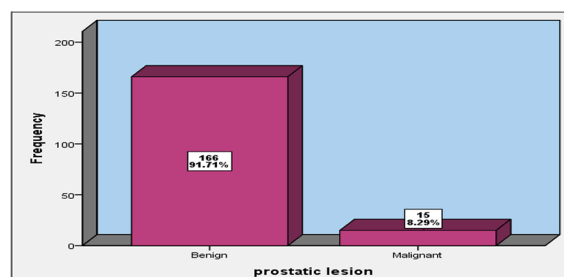P-value ≤0.05 (significant).

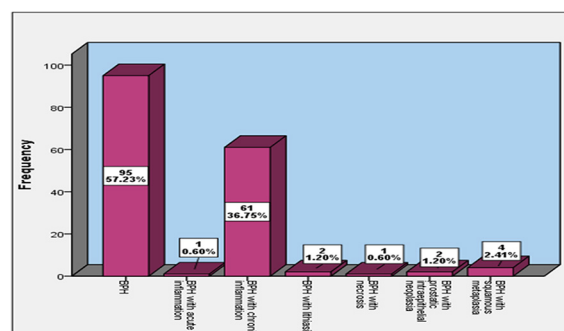Fig. 3A **Distribution of prostatic lesions in general.**

Fig. 3B **Distribution of benign prostatic lesions.**

Fig. 3C **Distribution of malignant prostatic lesions.**

There is no significant association between age of patients and benign prostatic lesion as shown in Table 4.

There is no significant association between age of patients and Gleason grade as shown in Table 5.[16]

There is no significant association between age of patients and malignant prostatic lesion as shown in Table 6.

Table 4. **Association between age of patients and types of prostatic lesions**

Variables		Age		Total
		60 years and below	Above 60 years	
Benign Prostatic lesions	BPH	33 (19.9%)	62 (37.7%)	95 (57.2%)
	BPH with acute inflammation	0 (0%)	1 (0.6%)	1 (0.6%)
	BPH with chronic inflammation	17 (10.2%)	44 (26.5%)	61 (36.7%)
	BPH with lithiasis	1 (0.6%)	1 (0.6%)	2 (1.2%)
	BPH with necrosis	0 (0%)	1 (0.6%)	1 (0.6%)
	BPH with prostatic intraepithelial neoplasia	2 (1.2%)	0 (0%)	2 (1.2%)
	BPH with squamous metaplasia	0 (0%)	4 (2.4%)	4 (2.4%)
	Total	53 (31.9%)	113 (68.1%)	166 (100%)

P-value = 0.22 (not significant).

Table 5. **Association between age of patients and Gleason Grade**

Variables		Age		Total
		Below 65 years	≥ 65 years	
Gleason grade	Grade 1 (%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Grade 2 (%)	0 (0.0%)	2 (13.3%)	2 (13.3%)
	Grade 3 (%)	0 (0.0%)	4 (26.7%)	4 (26.7%)
	Grade 4 (%)	1 (6.7%)	4 (26.7%)	5 (33.3%)
	Grade 5 (%)	0 (0.0%)	4 (26.7%)	4 (26.7%)
	Total (%)	1 (6.7%)	14 (93.3%)	15 (100.0%)

P-value = 0.54 (not significant).

Table 6. **Association between age of patients and prostatic lesions**

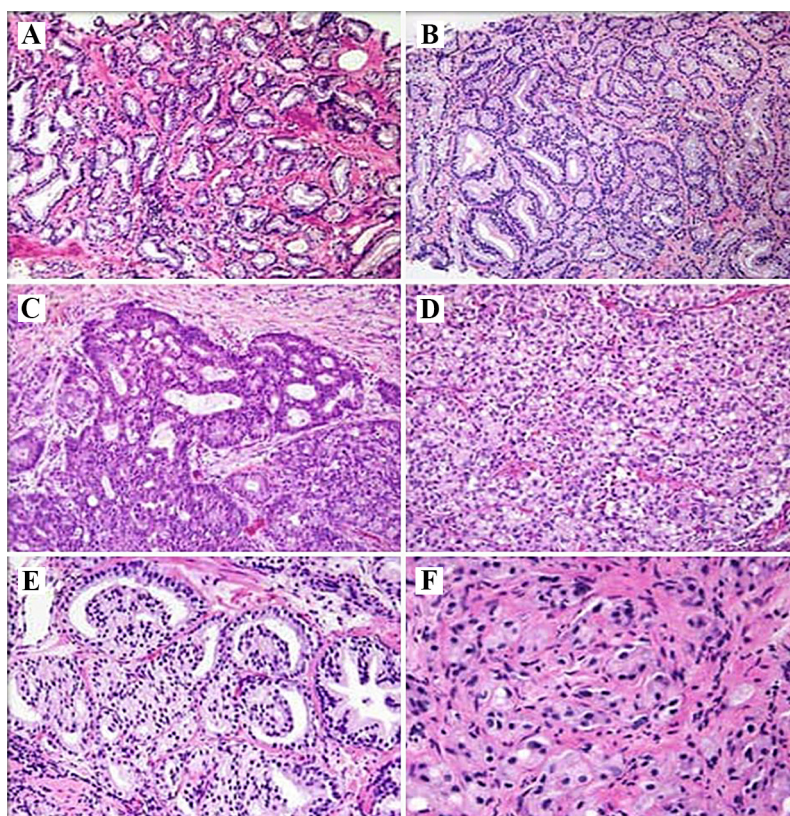| Variables		Age		Total
		Below 65 years	65 years and above	
Prostatic lesions	High %	0 (0.0%)	4 (26.7%)	4 (26.7%)
	Moderate %	1 (6.7%)	10 (66.7%)	11 (73.3%)
	Total %	1 (6.7%)	14 (93.3%)	15 (100.0%)

P-value = 0.733 (not significant).

Fig. 4 **A. Gleason score 3 + 3 = 6 (Grade Group 1). B. Gleason score 3 + 4 = 7 (Grade Group 2) with minor component of cribriform glands. C. Gleason score 4 + 4 = 8 (Grade Group 4) with irregular cribriform glands. D. Gleason score 4 + 4 = 8 (Grade Group 4) with fused glands with cytoplasmic vacuoles. E. Gleason score 4 + 4 = 8 (Grade Group 4) with glomeruloid glands. F. Gleason score 4 + 4 = 8 (Grade Group 4) with poorly formed glands.**[16]
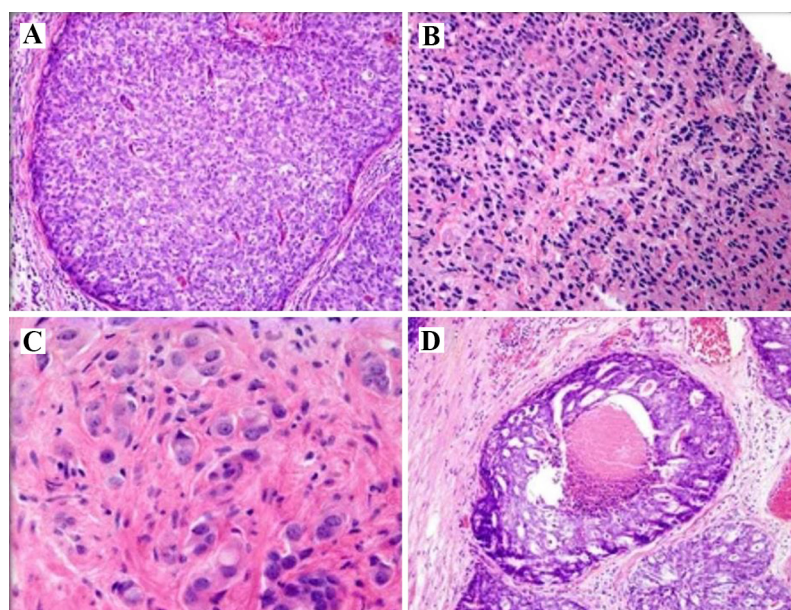
Fig. 5 **A. Gleason score 5 + 5 = 10 (Grade Group 5) with solid sheets of cells. B. Gleason score 5 + 5 = 10 (Grade Group 5) with cords of cells. C. Gleason score 5 + 5 = 10 (Grade Group 5) with individual cells. D. Gleason score 5 + 4 = 9 (Grade Group 5) with cribriform glands, some with necrosis.**[16]

Discussion

This study showed an incidental prostate cancer rate of 8.29%. This detection rate is lower than previous study in Iraq and same several other recently published series; however, it is consistent with the overall decrease in incidental prostate cancer in the PSA era. Hassawi et al. Study done at 2010 in Mosul showed that the incidental prostate cancer rate was 11.9% in 320 patients.[17] Regarding the grading most diagnosed cases of prostate carcinoma in this study were in grade 2, 3, 4 and 5 (Sum: 7−10) (13.3%, 26.7%, 33.3%, 26.7% respectively (Table 2) while in Hassawi et al. study the grading were 3, 4, 5 (Sum: 8−10) (7.9%, 47.4%, 44.7% respectively),[17] such high grades at diagnosis when compared with those reported in western countries can be related to the same reasons influences the rate of prostate carcinoma which include age, race, location, genetic influences and dietary factors that are contribute for this geographical variations.[18] Mai et al. showed similar results in the review of almost 1000 TURP specimens. They found significant decreases in the overall detection rate from 12.9 to 8%.[19] Recently, Jones et al. found the rate of incidental prostate cancer decrease from 14.9% to 5.2% (pre versus post PSA era) in over 700 patients.[20] Other possible causes for the reduction in incidental prostate cancer include the increased use of medical therapy that lead to decreased rate of surgical management of BPH as well as an increased use of ablative therapies, which do not always provide tissue for pathologic analysis in patients who essentially require surgical management of their BPH.[21,22] Several studies, in addition to this study, have looked at the incidental prostate cancer rate in the PSA era. Prior to our findings, detection rates in the PSA era ranged from 4.8% to 16.7%.[19−21,23-26] Dellavedova et al. found the detection rate of incidental prostate cancer was 7% when they reviewed 100 patients who underwent bipolar TURP.[21] Helfand et al. studied the postoperative changes in PSA and PSA velocity in patients undergoing surgical management of BPH; they found the rate of incidental prostate cancer rate was 8.7% in

313 patients who underwent monopole or bipolar TURP.[24] They also showed that postoperative PSA velocity was higher and PSA values decreased less in patients who had incidental prostate cancer compared to BPH.[24] Voigt et al. found an incidental prostate cancer rate of 11.1% in their study trying to identify risk factors for clinically relevant prostate cancer discovered incidentally.[23] 3.4% of the patients in their series had clinically relevant prostate cancer Gleason grade 7−10 disease or pT1b. Trpkov et al. have reported the highest incidental prostate cancer rate (16.7%) in the PSA era; however, their study included patients with known prostate cancer.[25] A recent multi-centric study by Yoo et al. showed the rate of incidental prostate cancer was 4.8% in over 1600 patients.[26] In addition to DRE findings, they found the combination of transitional zone volume and PSA could be useful predictors of incidental prostate cancer. Overall, these studies continue to support a decreased overall prevalence of incidental prostate cancer in the modern era. In addition, they support the use of the technologies that do not provide tissue for pathologic examination at the time of BPH surgical management. Besides this, the importance of diagnosis of prostate cancer in younger males is well established in contemporary urological practice.[27] In our study, one of the patient had incidental detection of carcinoma prostate in population younger than 65 years and grade 4. However in a study done by Thapa N. et al., none of the patient had prostatic carcinoma in population younger than 65 years and 4.8% in older age group.[27] Moreover, Marlon Perera, prostate cancer was diagnosed in 13.4% of the younger group and 28.7% in the older group.[28] Of the diagnosed prostate carcinoma, the 92.2% were of acinar adenocarcinoma subtype, with similar proportions between subgroups. Within the younger group, a significantly higher rate of low-grade prostate cancer was diagnosed (Gleason score 6) but in my study none of the patient diagnosed with low-grade prostate cancer (Gleason score 6).[29]

Conclusion

Prostate carcinoma is showing high grade at the diagnosis and widely frequent (8.29%) in TURP especially in-patient above 65 years (11.0%) and therefore a screening program is advised. ■

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