Prostatic Adenocarcinoma: Age, Tumor Grade and Level of Serum Prostatic Antigen (PSA)

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Background: Prostate cancer is among the three most common cancers in men and among the leading cancer-related deaths worldwide. However, the incidence in the Arab region is much lower compared to the rest of the world and ranges from 5.5% to 39.2%. Several speculations were raised to explain the lower incidence in the Arab region including genetics causes, diet, lower testosterone levels and non-availability of PSA screening program.

Objective: To evaluate the pattern of cancer and its associations with age, tumor subtypes histological grade, PSA serum levels, and local invasion.

Design: A Retrospective Study.

Setting: Salmaniya Medical Complex, Bahrain.

Method: All histopathology reports of prostate cancer (biopsy and excision) between 1 January 2016 and 31 May 2018 were included in the study. The clinical information and histopathological reports were collected and analyzed by SPSS, 20th edition.

Result: Forty-two prostate cancers were diagnosed from 1 January 2016 to 31 May 2018. The mean age at diagnosis was 69.69 years. The disease was bilateral in 18 (43%) patients, unilateral in 9 (21%) patients and unspecified in 15 (36%) patients. The Gleason score of 7 was the most frequent score detected in 17 (41%) patients. The Gleason score was higher in the age group between 85-90 years and in those who had PSA serum levels > 100 ng/ml.

Conclusion: Prostate cancer is one of the most common cancers in Bahraini males, especially those above 65 years. The severity of the disease increases with age and PSA serum levels above the normal range. This highlights the importance of early detection by screening program targeting men in the age group 50-75 years.

Prostate cancer is one of the three most common cancers in men according to the World Health Organization (WHO), and a leading cause of death in the developed world[1]. The prevalence differs globally according to the diagnostic system utilized. PSA level is the most common screening tool, followed by confirmation of tissue biopsy[2].

Due to the widespread use of PSA level screening in North America, Australia, and Northern Europe, a high incidence of prostate cancer and associated mortality rates were reported[3,4]. The highest rate is in Australia with an incidence of 111.6 age-standardized incidence rate (ASIR) per 100,000 and a mortality of 12.9 ASIR per 100,000[5].

The incidence of prostate cancer is much lower in the Arab world. The ASIR is 39.2% in Lebanon and 5.5% in Saudi Arabia[6]. The reported frequency in Bahrain is 14.6%; however, there is no available data on mortality rates[6]. Several reasons have been suggested to explain the lower incidence in the Arab region, including genetic factors, dietary styles, lower testosterone levels and lack of screening programs for prostate cancer[7].

A wide spectrum of different morphological variants and subtypes of prostate cancers exist[8]. The acinar morphological type is the most common form and is seen in more than 90% of all prostate cancers[8].

Advancing age (median of 72 years) and a family history of prostate or breast cancer are major risk factors[9]. High incidental prostatic cancer is seen in patients who undergo operation for benign prostate enlargement especially at 70-80 years old and those with elevated PSA levels more than 10 ng/mL[10].

Gleason grading system was the most commonly used pathological grading system and the most powerful prognostic factors and to accommodate the changing practice of medicine[11].

Gleason score sum was used to predict the clinical outcomes[12]. Low Gleason scores accurately reflect the prognosis[12]. "Gleason

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score 6 (prognostic grade group I); Gleason score 3 + 4 = 7 (prognostic grade group II); Gleason score 4 + 3 = 7 (prognostic grade group III); Gleason score 4 + 4 = 8 (prognostic grade group (IV); and Gleason score 9–10 (prognostic grade group (V) are now widely used in clinical practice"[12].

The digital rectal examination (DRE) and core needle biopsy are the gold standard for the diagnosis of prostate cancer. When there is an abnormal DRE or abnormally elevated PSA, prostate biopsy should be taken from the apex, mid-portion and the base[13].

The aim of this study is to evaluate the pattern of cancer and its associations with age, tumor subtypes, histological grade, PSA serum levels and local invasion.

METHOD

All histopathology cases of prostatic cancer (biopsy and excision) between 1 January 2016 and 31 May 2018 were included in the study. The data relevant to age and type of tumor, histological subsets, grading and serum level of PSA were documented. The data collected were tabulated and statistically analyzed using SPSS, 20th edition.

RESULT

Forty-two prostate cancers were diagnosed from 1 January 2016 to 31 May 2018; twenty-eight (67%) biopsy specimens and 14 (33%) transurethral resection specimens. The age of patients ranged from 56 to 89 years old with an average of 69.7 years. There were no patients below the age of 54 years.

Table 1: Age Distribution of Patients with Prostatic Adenocarcinoma

| Age (years)	Total (42)	Percentage (%)
55-64	8	19
65-79	29	69
<80	5	12
Total	42	100

Six (14%) patients had the tumor only on the right lobe, 3 (7%) on the left lobe, 18 (43%) on both sides while 15 (36%) were not documented.

All cases (100%) were adenocarcinoma. The most common histologic subtype was acinar adenocarcinoma diagnosed in 40 (95%) patients and ductal adenocarcinoma in 2 (5%) patients. No squamous cell carcinoma, transitional cell carcinoma or others were documented. Table 2 shows the Gleason pattern of the prostatic adenocarcinoma patients in this study.

Table 2: Gleason Pattern

Gleason pattern	Number of patients (42)	Percentage (%)
3+3	11	26
3+4	8	19
4+3	8	19
4+4	4	10
4+5	5	12
5+4	3	7
5+5	1	2
Not available	2	5

The average Gleason score was 7.3 in patients between 55-59 years old, 6.5 in patients between 60-64 years, 6.4 in patients between 65-69 years, 6.9 in patients between 70-74 years, 7.8 in patients between 75-79 years, 7.5 in patients between 80-84 years and 9 in patients between 85-90 years, see figure 1.
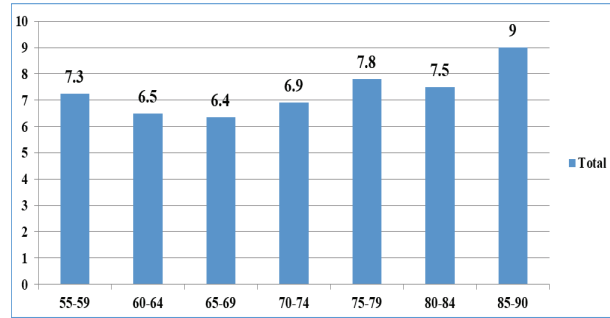
Figure 1: Age Group and Average Gleason Score

Patients who had PSA levels below 20 ng/ml had an average Gleason score of 6.2; patients who had PSA levels between 20-40 ng/ml had an average score of 6.6; PSA levels between 40-60, 60-80 and 80-100 ng/ml had an average score of 8 and more than 100 ng/ml had an average score of 8.3, see figure 2.
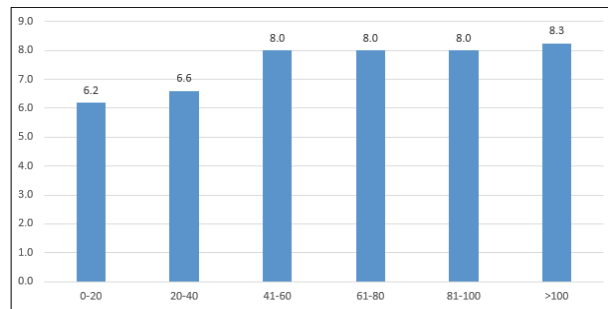
Figure 2: Correlation between Serum PSA Level and Gleason Score

The analysis of the pathological grade is represented in table 3. The grade was not available in 2 patients.

Table 3: Cancer Prostate Grade

Grade	Number (42)	Percentage (%)
1	11	26
2	8	19
3	8	19
4	4	10
5	9	21
N/A	2	5

Twenty-two (52%) patients had a perineural invasion, 5 (12%) had adipose tissue invasion and only one (2.4%) patient had vascular invasion, see table 4.

Table 4: Cancer Prostate Invasion

Invasion	Positive	Negative
Perineural invasion	22	20
Adipose tissue invasion	5	37
Vascular invasion	1	41

DISCUSSION

In our study, the mean age of the patients was 69.7 years, similar to a study by Osses et al[14]. There was no patient below the age of 54 years old in our study, which is consistent with a study by Baade et al who stated that prostate cancer is rare below the age of 50 worldwide[15].

In our study, the most frequent Gleason score was 7 in 17 (41%) patients which is similar to the findings of Al-Maghrabi et al[16].

In our study, the Gleason score increased progressively with age. This is also consistent with findings of Pepe et al and Muralidhar et al[17,18].

There was a positive correlation between serum PSA and Gleason score in our study, similar to a study by Okolo et al[19].

In our study, 22 (52%) patients had a perineural invasion. Feng et al found a perineural invasion in the prostatic biopsy in 33.8% of the patients and Hashimoto et al found perineural invasion prevalence in radical prostatectomy in 71%[20,21].

Our study was limited by its retrospective nature and the relatively small sample size. Although the sample was small, our final result showed that the prostate cancer prevalence and Gleason score increase with age.

We recommend that male population over 50 years should be screened for the early detection of prostate cancer. Unless there is a widespread commitment to improve the collection and reporting of data on prostate cancer, an accurate assessment of the real burden of the disease, and conducting national screening and treatment planes might not be possible.

CONCLUSION

Prostate cancer is one of the most common cancers in males in Bahrain, especially in the elderly. Early detection by screening programs is important.

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