ORIGINAL ARTICLE

Crossectional Based Study of Prostate Cancer Malignancy in Patients Over 50 Years Old in Surabaya

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ABSTRACT

Introduction: Prostate cancer has the second most malignancy after lung cancer. In the male population, this prostate cancer is also one of the leading causes of death. This study would like to determine the correlation between the age factor over 50 years with the level of malignancy of prostate cancer. **Methods:** This study used a crossectional method on a patient over 50 years old with a prostate cancer diagnosis. Samples were taken from the records of prostate examination in the anatomic pathology laboratory of Hajj General Hospital Surabaya in 2018-2019. **Results:** The laboratory data distribution test showed that the age of 92 patients were between 61-70 years old (54.4%). Meanwhile, there were 39 patients (23.1%) aged > 70 years, and 38 patients (22.5%) aged 50-60 years. There is no significant correlation between the age of patients over 50 years old with the degree of malignancy of prostate cancer ($\chi 2$= 3.225; p-value = 0.199). The results of the examination also showed that the most malignant cancer was found in patients aged 61-70 years (7.0%), followed by patients over 70 years old and 50-60 years old, 2.3% and 0.6%, respectively. **Conclusion:** The number of prostate cancer case was mostly found in the age of group 61-70 years old as well as the number of malignant cancer, but there was no significant relationship between age groups and the level of malignancy.

Keywords: Elderly patient, Histophatology, Malignancy, Prostate, Cancer

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INTRODUCTION

Cancer is a condition in which cells in the body grow abnormally and uncontrollably and suppress normal cells. Worldwide, cancer will lead to death. Lung, prostate, liver, stomach, colorectal, and breast cancer are the most prominent cancer-caused deaths each year. The appearance of cancer new cases (18.1 million) and cancer deaths worldwide (9.6 million) in 2018 (1). In Indonesia itself, The Ministry of Health Republic Indonesia recorded that the prevalence of cancer among all ages was 0.14% in 2013 (2).

Prostate cancer occurs in the prostate gland of the male reproductive system, and it can lead to death. This cancer appears when the prostate cells start to mutate and multiply uncontrollably (3). Clinical manifestation of prostate cancer includes problems urinating and during sex (ejaculation), erectile dysfunction, dysuria, acute bone pain and also other symptoms. However, these signs are only detected at an advanced stage of prostate cancer. No clinical symptoms were appearing in the early stages of prostate cancer (4–6). Prostate cancer is only found in men because women do not have a prostate gland. Globally, it is estimated that prostate cancer ranks the 4th most common cancer in humans after lung, breast, and colorectal cancer with a total of 1.3 million sufferers. The incidence rate of cancer in men, prostate cancer, ranks 2nd, which is around 13.5% after lung cancer 14.5% (7). By 2030, it is estimated that the occurrence of prostate cancer will increase with increasing population and changes in age structure while the mortality rate will decrease caused by several factors (8).

The diagnosis of prostate cancer is determined with a digital rectal examination (DRE), prostate-specific antigen (PSA) blood test continued with transrectal ultrasound (TRUS) in a guided biopsy (9). Predictive factors for positive prostate in biopsy were observed with PSA and DRE. In most prostate cancer, elevated PSA and abnormality in DRE examination will show prostate cancer positive results. Suspicious DRE was noted as induration, nodule and asymmetry (10). Prostate-Specific Antigen levels which can measure with Enzyme-Linked Immunoassay (ELISA) (11), and Chemiluminescent Microparticle Immunoassay (CMIA)

method (12) or immunochromatographic measurement of serum (13).

Several factors can increase the risk of prostate cancer, including age. Prostate cancer is rarely observed in young men but becomes more common in the elderly after age 55 years and peaks at 70-74 years old (14). This can be caused that prostate cancer develops slowly and it preceded with dysplastic lesion several years before, showing that prostate cancers can also remain undetected before clinical manifestations appear (15). The progressed disease to malignancy was also increased substantially in elderly patients (over 75 years old of age) (16). Thus, early screening for those high-risk group would be beneficial to improve its survival rate in the individual over 50 years of age.

MATERIALS AND METHODS

This research is a descriptive study with the samples from all patients with prostate cancer who were examined at RSU Haji Surabaya in 2018-2019. The procedure for determining malignancy based on several procedures includes Digital Rectal Examination, Prostate Biopsy, and Histopathological Examination for Prostate Cancer.

Digital Rectal Examination

Digital rectal examination (DRE) is a diagnostic modality that is easy to perform. If there is a prostate, the results of this examination could be used to determine the tumor stage. The presence of nodules, hard consistency or asymmetric enlargement of the prostate are signs of prostate cancer malignancy. Digital rectal examination is the first line to suspect prostate cancer in a person (17).

Histopathological Examination for Prostate Cancer

The histopathological examination will determine the type of tumor and grade. The type of tumor is generally found adenocarcinoma. The tumor grade can be determined using the Gleason score system in the form of a number between 2-10 (18). Laboratory examination procedures to detect prostate cancer using histopathological slides from the biopsy of a prostate organ with procedures including tissue fixation with formalin solution and phosphate buffer with a ratio of 1:9 for 24 hours. They are then continued with tissue processing including dehydration, clearing and impregnation processes. Embedding processed were done with liquid paraffin at a temperature of 60^{o}C to make frozen and solid paraffin blocks obtained after cooling. Paraffin blocks then cut with microtomes with a thickness of 4-6 µm each. The hematoxylin-eosin staining (Abcam, Cambridge, UK) was done in a slice section. Slice section will be mounted by giving entellan liquid on the slide then covered with a cover glass; reading the results is done by making observations under a 400x microscope (Olympus CX33) (Olympus, Shinjuku) to see a microscopic characteristic of the cell structure.

Data analysis

All data of patients diagnosed with prostate cancer were analyzed by a descriptive statistical test using chi-square and Cramer's V correlation.

RESULTS

A total of 169 patients had performed prostate examination using the histopathology method in the anatomical pathology laboratory of the Hajj General Hospital, Surabaya. The laboratory data distribution test (Table I) showed that most of the study subjects were between 61-70 years old, with 92 patients (54.4%). Meanwhile, there were 39 patients (23.1%) aged> 70 years, and 38 patients (22.5%) aged 50-60 years. There were 17 patients (10.1%) who showed malignancy (malignant type), most of which were found in patients aged 61-70 years old, while 152 patients (89.9%) had no malignancy (benign type).

There is no significant difference in the number of samples examined in 2018 (50.3%) and 2019 (49.7%) with p-value = 0.595. Likewise, there was no significant difference in the samples examined per month, where the lowest case was found in December. Based on the results of laboratory tests, nodular prostatic hyperplasia (89.9%) which was a benign type were commonly found in these examinations. At the same time, the most common type of malignant cancer was prostate adenocarcinoma (8.9%).

Table II presented the data of patients on the malignancy level. There is no significant correlation between the age of patients over 50 years old with the degree of malignancy of prostate cancer ($\chi 2$= 3.225; p-value = 0.199). The results of the examination also showed that the most malignant cancer was found in patients aged 61-70 years (7.1%), followed by patients over 70 years old and 50-60 years old, 2.4% and 0.6%, respectively.

DISCUSSION

The data distribution of prostate cancer based on age was similar to other literature which reported that the occurrence of prostate cancer generally starts at the age of 50 years (19). Our results were also following several previous studies conducted by Siregar (20), which showed that the largest age group in prostate cancer was 60-70 years (25.3%) from 194 total samples. Solang et al also reported that there was an increased number of prostate cancer cases every year from 2013 to 2015, 25.9%, 35.2%, and 38.9%, respectively. The increasing number of prostate cancers is related to life expectancy, which is currently increasing yearly so that the number of older adults will increase. At the same time, the

Table I : Data distribution of laboratory test of prostate cancer

Variables	Category	Age-based Samples, *n* (%)			Total of samples, *n* (%)	*p-value*
		50-60 years old (*n*=38, %= 22.5)	61-70 years old (*n*=92, %= 54.4)	> 70 years old (*n*=39, %= 23.1)		
Malignancy level	Malignant	1 (0.6)	12 (7.1)	4 (2.4)	17 (10.1)	0.199
	Benign	37 (21.9)	80 (47.3)	35 (20.7)	152 (89.9)	
Year	2018	21 (12.4)	43 (24.4)	21 (12.4)	85 (50.3)	0.595
	2019	17 (10.1)	49 (29.0)	18 (10.7)	84 (49.7)	
Month	January	4 (2.4)	7 (4.1)	2 (1.2)	13 (7.7)	0.625
	February	5 (3.0)	7 (4.1)	3 (1.8)	15 (8.9)	
	March	3 (1.8)	8 (4.7)	2 (1.2)	13 (7.7)	
	April	2 (1.2)	4 (2.4)	2 (1.2)	8 (4.7)	
	May	3 (1.8)	12 (7.1)	3 (1.8)	18 (10.7)	
	June	0 (0.0)	2 (1.2)	3 (1.8)	5 (3.0)	
	July	4 (2.4)	8 (4.7)	5 (3.0)	17 (10.1)	
	August	2 (1.2)	8 (4.7)	4 (2.4)	14 (8.3)	
	September	2 (1.2)	11 (6.5)	0 (0.0)	13 (7.7)	
	October	3 (1.8)	4 (2.4)	5 (3.0)	12 (7.1)	
	November	3 (1.8)	11 (6.5)	6 (3.6)	20 (11.8)	
	Desember	7 (4.1)	10 (5.9)	4 (2.4)	21 (12.4)	
Type of prostate cancer	Prostatic Adenocarcinoma	1 (0.6)	10 (5.9)	4 (2.4)	15 (8.9)	0.384
	Nodular Prostatic Hyperplasia	37 (21.9)	80 (47.3)	35 (20.7)	152 (89.9)	
	Urothelial Carcinoma	0 (0.0)	2 (1.2)	0 (0.0)	2 (1.2)	

Table II : Analysis of Prostate Cancer Malignancy in Patients Over 50 years old

Variables	Category	Malignancy Level, *n* (%)		χ^2	*p-value*
		Benign (*n*=152, %= 89.9)	Malignant (*n*=17, %= 10.1)		
Age	50-60 years old	37 (21.9)	1 (0.6)	3.225	0.199
	61-70 years old	80 (47.3)	12 (7.1)		
	> 70 years old	35 (20.7)	4 (2.4)		
Year	2018	78(46.2)	7 (4.1)	0.629	0.428
	2019	74 (43.8)	10 (5.9)		
Month	January	12 (7.1)	1 (0.6)	7.378	0.768
	February	13 (7.7)	2 (1.2)		
	March	12 (7.1)	1 (0.6)		
	April	7 (4.1)	1 (0.6)		
	May	15 (8.9)	3 (1.8)		
	June	5 (3.0)	0 (0.0)		
	July	16 (9.5)	1 (0.6)		
	August	14 (8.3)	0 (0.0)		
	September	10 (5.9)	3 (1.8)		
	October	11 (6.5)	1 (0.6)		
	November	17 (10.1)	3 (1.8)		
	Desember	20 (11.8)	1 (0.6)		

elderly is a significant risk factor in the incidence of prostate cancer (19).

The majority of the malignant type found adenocarcinoma prostate, followed by urothelial carcinoma. Five distinct type of prostate cancer were granular neoplasms, urothelial carcinoma, squamous neoplasms, basal cell carcinoma and neuroendocrine tumors (21). The most dominant observed prostate cancer were adenocarcinomas (as a subtype of granular neoplasms, 95%) while the remaining type was interstitial cell carcinoma, neuroendocrine carcinomas

(small cell) or sarcoma (22). Hence, the terminology of prostate cancer refers to adenocarcinoma of the prostate. The research data above were also in support the previous studies conducted by Solang et al (19) which showed 23 patients (100%) with prostate cancer, found adenocarcinoma features in histopathological examination.

The Ministry of Health of the Republic of Indonesia (23) also stated that prostate cancer rarely occurs under 40 years of age, but the incidence increases rapidly at the above age. The results were in accordance with some previous report by Putriyuni and Hilbertina (24) which found 163 cases with prostate adenocarcinoma in the 61-70 years old was about 63 cases (38.65%), and only 3 cases (1.8%) were found in the age of ≤ 50 years old. Andreas et al (25) reported that a total of 238 cases with adenocarcinoma prostate in the age of 61-70 years old in 2003-2011. According to data from the Surveillance Epidemiology and End Result (SEER), in 2004-2005, prostate cancer was most often found at an average age of 67.2 years (24). The increase in the occurrence of prostate cancer in old age is related to the degeneration of the prostate so that prostate cells are more susceptible to mutations and develop as malignancies (26).

CONCLUSION

The prostate cancer and malignant case at the age above 50 years old was mostly found in the age of group 61-70 years old. There is no correlation between age groups and the level of malignancy.

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