The Association Of Body Mass Index And Prostatic Cancer Histopathological Grade

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ABSTRACT

Background: Obesity, a global public health concern, has been repeatedly linked to the development of different cancers in epidemiologic and basic research studies, Prostate cancer is the most frequently encountered solid tissue cancer in men. Gleason score of the prostate cancer is one of the most important parameter, which provides the most important data about biological behavior of the cancer and affect on the selection of the treatment and its outcomes. Therefore, accuracy of Gleason score, based on histopathological analysis of the biopsy material, has a critical importance

Patients and Methods: A cross-sectional study with retrospective analytical elements, among prostate cancer patients who were diagnosed based on histopathology of prostate gland ,then classified accorrding to G.S (gleasson score) and body mass index.

Aim of this study: To evaluate the association between high body mass index and Gleason grade of prostate cancer.

Results: The results of this study showed that patients with high body mass index Significantly associated with high grade of prostate cancer, as (46.4% and 62.2% of overweight and obese patients respectively had high Gleason score above 7 while 12.5% of overweight and 8.1% of obese patients had low Gleason score and the p Value was (0.002).

Conclusion: This study found that high body mass index associated with increase high grade of prostate cancer.

Keywords: BMI : body mass index , G.S : gleasson score , prostate cancer .

علاقة زيادة كتلة الجسم كعامل خطورة لدرجة الزرع النسيجي لمرضى سرطان البروستاتا من النوع الغدي لشريحة من المرضى العراقيين

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الخلاصة

الخلفية : ربطت السمنة، وهي مصدر قلق عالمي، مرارا وتكرارا بتطوير أنواع مختلفة في دراسات البحوث الوبائية والأساسية، يعتبر سرطان البروستاتا من أكثر سرطان الأنسجة الصلبة في الرجال , في حين تعتبر درجة (كليسون) لسرطان البروستاتا من أهم المؤشرات لدرجة المرض، والتي توفر بيانات مهمة حول السلوك البيولوجي للورم الخبيث وتأثيره على اختيار العلاج ونتائجه لذلك، فإن دقة نتيجة درجة (كليسون) ، بناء على التحليل النسيجي لمادة الخزعة، لما لها أهمية حاسمة.

الهدف من هذه الدراسة: لتقييم الارتباط بين مؤشر كتلة الجسم المرتفع ودرجة (كليسون) في خزعات البروستاتا من المرضى العراقيين الذين يعانون من ورم البروستاتا الخبيث من النوع الغدي ,

الأساليب: أجريت هذه الدراسة بأثر رجعي وشملت (١٤٤) مريضا مصابين بسرطان البروستاتا تتراوح اعمارهم بين (٤٨ - ٩١) سنة من مستشفى الاورام التعليمي في مدينة الطب . تم جمع البيانات في الفترة ما بين نيسان ٢٠١٩ إلى كانون الاول ٢٠١٩ وشملت هذه البيانات وزن المرضى والطول ودرجة (كليسون) من تقارير الزرع النسيجي وقد تم تقسيم المرضى وفقا لمؤشر كتلة الجسم ومقارنة مع درجة معامل (كليسون).

النتائج : أظهرت نتائج هذه الدراسة أن المرضى الذين يعانون من مؤشر كتلة الجسم العالي يرتبط بدرجة عالية من سرطان البروستاتا, حيث ان (٤٦.٤٪ و ٦٢.٢٪) من المرضى الذين يعانون من زيادة الوزن والمرضى الذين يعانون من السمنة على التوالي لديهم درجة (كليسون) عالية فوق ال (٧), في حين أن (١٢.٥٪) من زيادة الوزن و8.1)٪ (من المرضى الذين يعانون من السمنة المفرطة لديهم نتيجة (كليسون) منخفضة وكانت قيمة (P (0.002 ، لذلك كانت هناك علاقة إحصائية كبيرة بين الدرجة عالية من درجة (كليسون) وزيادة مؤشر كتلة الجسم.

الاستنتاج : وجدت هذه الدراسة أن مؤشر كتلة الجسم العالي المرتبط بزيادة درجة عالية لمعامل (كليسون) لورم البروستاتا الخبيث .

الكلمات المفتاحية : معامل كتلة الجسم ، درجة كليسون ، ورم البروستات .

INTRODUCTION

Overview on prostate cancer :

An estimated (1018) new cases of prostate cancer Were diagnosed in Iraq Accorrding to last Regestration in 2018 which is accounting (3.25%) of all new cancer cases [1] is the Fifth commonest cancer in male as shown in the table 1 below [2]

Table 1 : Top Ten Cancer in Male, Iraq, 2018 [2]

Top 10 cancer in male	number	Percent
Bronchus&lung	1830	13.44
Urinary bladder	1173	8.62
leukemia	1061	7.79
colorectal	1023	7.52
prostate	1018	7.48
Brain and other CNS	820	6.02
NonHodgkin lymphoma	680	5.00
Skin	584	4.29
stomach	524	3.85
pancreas	413	3.03
Total Top Ten	9126	67.04

Gleason Grade:

The Gleason grading Has been proven as a reproducible system for adenocarcinoma of prostate , it is strongly associated with prognosis, and accepted worldwide, which assesses the architectural details of malignant glands under low to medium magnification.[3] Five distinct patterns of growth from well to poorly differentiated were originally described by Gleason score using a scale from 1 to 5.[4]

Grade group 1 (Gleason score ≤6)
Grade group 2 (Gleason score 3 + 4 = 7)
Grade group 3 (Gleason score 4 + 3 = 7)
Grade group 4 (Gleason score 4 + 4 = 8)
Grade group 5 (Gleason scores 9 and 10)

Obesity:

As we all know the overweight and the obesity are associated with increased risk of at least 13 different types of cancer, however, still there is conflicting Data on the relationship between prostate cancer and the body weight. This is likely due to the different outcome measures used to define obesity, population differences, and other influential factors.[5-7]

Many observational studies have given evidence that even a 5-kg (11 pound) increase in weight since early adulthood is associated with increased risk for overweight- and obesity-related cancers.[8] a 5-kg/m^2 increase in BMI was associated with 20% higher prostate cancer–specific mortality.[9]

Obesity considers the second only to the tobacco smoking as a risk factor for all cancers, in regards to prostate cancer, obesity may lower the risk of low-grade indolent cancer, and increases the risk of high-grade aggressive prostate cancer .[10]

BMI is widely used as a marker for obesity, as it is easily measured , inexpensive ,can be collected in the clinic and is available in most patient medical records or could be using self-reported weight and height, it is calculated by person's weight in kilograms divided by the square of height in meters, BMI grades is shown in table 2.[11]

Table 2 : Grade of BMI according to Body weight [11]

BMI	Weight Status
Below 18.5	Underweight
18.5 – 24.9	Normal or Healthy Weight
25.0 – 29.9	Over weight
30.0 and Above	Morbid obesity

METHODS

A cross-sectional study with retrospective analytical elements , prostate cancer patients who were diagnosed based on histopathological study and attended to the Oncology teaching hospital in Baghdad Medical City between the first of April to the first of December 2019 were included in this study.

***Inclusion criteria:**

We included all patients with: Histopathologically proven Primary adenocarcioma of prostate.

RESULTS

A total number of 144patientswithprostatic cancer were enrolled in this study. The mean(±SD) age of patients was 67.9(±8.4) years, Ranging from between 48years-91 years.

20 (13.9%)of patients less than 60 years, 63 (43.8%) of patients between 60-69 years and 61 (42.4%)of patients patients ≥ 70 years, Figure 1.

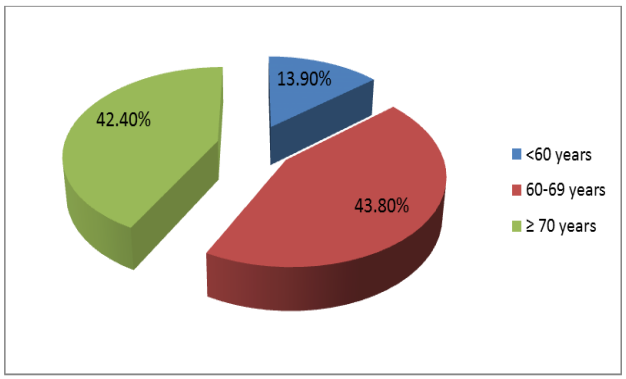

Figure 1 : Distribution of patients by age groups

The mean(±SD) body mass index (BMI) was 26.9(±4.5) kg/m^2, range between 19kg/m^2-46kg/m^2, the normal BMI was noticed in 51 (35.4%) of patients, overweight was found in 56 (38.9%) of patients and obesity was noticed in 37 (25.7%) of patients Figure 2.

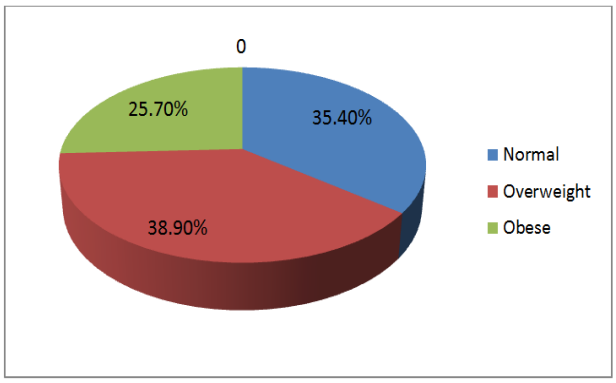

Figure 2 : Distribution of patients by BMI.

Gleason score was low score in 29 (20.2%) of patients, intermediate score in 48 (33.3%) of patients and high score in 67 (46.5%) Table 3.

Table 3 : Gleason score for studied patients.

Variable		Number and percent
Gleason score	Low (<7)	29(20.2%)
	Intermediate (=7)	48(33.3%)
	High (≥8)	67(46.5%)

There was a significant difference in the mean BMI with different Gleason score (p= 0.002). While no association was found between the age and The age of prostatic cancer patients was not associated with Gleason score (p=0.14). as in table 4 .

Table 4 : Relation of Gleason score with body mass index and Age.

Variable		Gleason score			P value
		Low	Intermediate	High	
BMI	Normal	19(37.3 %)	14(27.5 %)	18(35.2 %)	0.002*
	Overweight	7(12.5 %)	23(41.1 %)	26(46.4 %)	
	Obese	3(8.1%)	11(29.7 %)	23(62.2 %)	
Mean BMI ±SD		24.4±3.7	27.1±3.9	27.8±4.8	
Age	<60 years	3(15%)	6(30%)	11(55 %)	0.14*
	60-69 years	10(15.9 %)	21(33.3 %)	32(50 %)	
	≥70 years	16(26.2 %)	21(34.4 %)	24(39.3 %)	
Mean age ±SD		70.5±9.2	68±8.3	66.8±8	

*ANOVA test , ** Chi-square test, significant ≤0.05.

Logistic regression was done to find the predictive risk factor of high Gleason score cancer, after omitted the patients with intermediate Gleason score, the result showed that every increase in BMI by 0.203 there will be an increase in the risk to get high Gleason score cancer 1.22 time than low Gleason score cancer with p= 0.002 , Table 5 .

Table 5 : Logistic regression for high Gleason score cancer.

Variable	Coefficient	Odd ratio	95% CI of OR		P value
			Lower border	Upper border	
BMI	o.203	1.22	1.07	1.39	0.002*

*significant ≤0.05.

DISCUSSION

As the obesity is one of established risk factor for many cancers , and the prostate cancer is the most common non skin cancer worldwide , In our country is the Fifth commonest cancer affect Iraqi male according to Iraqi Cancer Registry 2018 [2].

In this cross sectional study we found that high BMI associated with high grade of prostate cancer, as (46.4% and 62.2% of overweight and obese patients respectively had high Gleason score above 7) while 12.5% of overweight and 8.1% of obese patients had low Gleason score . the p Value was (0.002) so there was a significant statistic relation between high grade of Gleason score and high BMI .

This result was also observed in many previous studies, such as Research in Chinese population which had been published in August 2016 as a retrospective study; data from 290 patients ,divided into two groups according to their BMI,(the high BMI group ≥ 25; was 143 cases) and(low BMI group < 25; was 147 cases). From the high BMI group 44,76% had high Gleason score, which was more significant than the low BMI group (p value is 0.027)These results indicate that the rate of high Gleason score was greater in the high BMI group than the normal BMI group.[12]

Another large Research Article Results from the REDUCE Study in United States of America; was a 4-year, multicenter,double-blind, placebo-controlled study that showed the obesity was only associated with high grade histopathology. [13]

Many explanations have been put forward one of them is the overweight and the obesity might increase risk of cancer through induction of metabolic and endocrine abnormalities, More recent data suggest that the fat cells secrete hormones (leptin and adiponectin) that have influence on prostate cancer growth.[14]

Other theory try to explain that through increasing levels of insulin, insulin-like growth factor, and sex hormones, also the degree of inflammation in the fat cell contribute to aggressive prostate cancer .[15]

CONCLUSION

High body mass index was associated with increse incidence of high Gleason grade of adenocarcinoma of prostate cancer .

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