

THE RISK FACTORS OF RENAL CELL CARCINOMA PATIENTS IN ARIFIN ACHMAD REGIONAL GENERAL HOSPITAL, RIAU PROVINCE, INDONESIA

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Abstract

Objective: To evaluate the incidence rate, patient profile, and risk factors of renal cell carcinoma patients. **Material & method:** We reviewed the medical records of incidence rate, patient profile, and risk factor of renal cell carcinoma patients in Arifin Achmad Hospital Regional General of Riau Province in January 2013 to December 2017. The data collected were sex, age, histopathology types, staging, smoking history, occupation, obesity, nutritional status, ethnic/tribes, history of hypertension and city/district origin. Approval on the study was obtained from the Ethical Review Board for Medicine and Health Research, Medical Faculty, University of Riau. **Result:** There were 18 renal cell carcinoma patients, consisting of 66.7% males and 33.3% females. Renal cell carcinoma was frequently (50%) diagnosed in the 41-50 age group. Most patients came from Pekanbaru city in 27.8% and most (50%) patients were Malay tribes (50%) followed by Javanese and Minang tribes. Sixty one percent of patients had risk factors for smoking history, obesity in 5.6%, normal nutritional status in 50% hypertension in 38.9% renal cell carcinoma patients. **Conclusion:** Risks factors of renal cell carcinoma patients in our hospital were Pekanbaru city origin, Malay tribe, smoking history, non-obesity and hypertension.

Keywords: Renal cell carcinoma; Risk factor; Obesity; Nutritional Status.

Introduction

Renal cancers includes 2-3% of all worldwide cancer cases and the third most frequent urological malignancy after prostate cancer and bladder cancer.[1] Over 90% of renal cancers types are renal cell carcinomas, known as Grawitz tumor or hypernephroma.[2] Renal cell carcinoma commonly occurs in adults found in the age of 40-70 years. The incidence in men more than women with ratio 2:1. Worldwide, around 270.000 new cases are diagnosed every year, and around 116.000 patients died every year.[3]

Various factors related to lifestyle might increase the risk of renal cell carcinoma including smoking, obesity and hypertension.[4] Cigarette smoke induces oxidative stress and kidney injury causing damage to the kidney. Free radicals in cigarette smoke cause oxidative DNA damage, which might result in cancer development.[5]

In obesity, adipose tissue releases adipokine into the bloodstream, which plays roles in energy balance, macromolecular metabolism, and signals throughout the body. Accordingly several adipokines such as leptin and interleukin-6 in obese patients might increase these molecules as a supporter of tumor growth.[5]

A study in Sweden showed the risk factors for hypertension in men at risk of renal cell carcinoma increased with increasing of blood pressure and decreases with a decreasing in blood pressure over time. The study

showed the effect of increasing tumors for hypertension and effective blood pressure control might reduce the risk of renal cell carcinoma.[6] The biological mechanism underlying the relation between increased blood pressure and an increased risk of renal cell carcinoma is unknown. A theory stated that chronic renal hypoxia accompanying hypertension increases tumor cell proliferation and angiogenesis by transcription factors.[5]

Materials and Methods

This was a descriptive study by reviewing medical records of incidence rate, patient profile, and risk factors of renal cell carcinoma in Arifin Achmad Regional General Hospital of Riau Province in January 2013 up to December 2017. The data collected were sex, age, histopathology types, staging, smoking history, occupation, obesity, nutritional status, ethnic/tribes, history of hypertension and city/district origin. Approval on the study was obtained from the Ethical Review Board for Medicine and Health Research, Medical Faculty, University of Riau.

Results

There were 18 renal cell carcinoma patients in this study and the amount of patients increased each year except in 2016 (See Table 1). There were more male patients than the female ones (See Table 2), in which most of the patients were in the group age of 41-50 years (See Table 3). Most patients came from Pekanbaru city in 27.8% (See Table 4), and most (50%) patients were Malay tribes followed by Javanese and Minang tribes (See in Table 5). Sixty one percent of patients had risk factors for smoking history (See Table 6), all of which were men. Patients with obesity only found 5.6%, the highest frequency was normal nutritional status in 50% (See Table 7). The history of hypertension was in 38.9%



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patients renal cell carcinoma (See Table 8), which is dominated by male patients.

Table 1. Distributive frequency of renal cell carcinoma patients according to year.

Year	N	F (%)
2013	3	16.7
2014	4	22.2
2015	5	27.8
2016	1	5.5
2017	5	27.8
Total	18	100

Table 2. Distributive frequency of renal cell carcinoma patients according to sex.

Sex	N	F (%)
Male	12	66.7
Female	6	33.3
Total	18	100

Table 3. Distributive frequency of renal cell carcinoma patients according to age.

Age (year)	N	F (%)
21-30	4	22.2
31-40	0	0
41-50	9	50
51-60	2	11.1
61-70	3	16.7
≥71	0	0
Total	18	100

Table 4. Distributive frequency of renal cell carcinoma patients according to origin.

Origin	N	F (%)
Pekanbaru City	5	27.8
Dumai City	0	0
Bengkalis District	2	11.1
Inhil District	2	11.1
Inhu District	2	11.1
Kampar District	3	16.6
Kuansing District	0	0
Pelalawan District	1	5.6
Rohil District	2	11.1
Rohul District	1	5.6
Siak District	0	0
Meranti Island istrict	0	0
Total	18	100

Table 5. Distributive frequency of renal cell carcinoma patients according to tribe.

Tribe	N	F (%)
Malay	9	50
Minang	4	22.2
Batak	0	0
Nias	0	0
Javanese	5	27.8
Total	18	100

Table 6. Distributive frequency of renal cell carcinoma patients according to smoking history.

Smoking History	N	F (%)
No	7	3.9
Yes	11	61.1
Total	18	100

Table 7. Distributive frequency of renal cell carcinoma patients according to nutritional status.

Nutritional Status	N	F (%)
Thin	4	22.2
Normal	9	50
Fat	3	16.7
Obesitas tipe 1	2	11.1
Obesitas tipe 2	0	0
Total	18	100

Table 8. Distributive frequency of renal cell carcinoma patient according to hypertension.

Hypertension	N	F (%)
No	11	61.1
Yes	7	38.9
Total	18	100

Discussion

There were 18 renal cell carcinomas in this study and there were increases of the case amount annually except in 2016 in 1 (5.5%) cases. The amount of renal cell carcinoma in Arifin Achmad Regional General Hospital increased in Elmasita study (2017) in the period of January 2010 to December 2015 in 13 cases and Yuwinanda study (2011) in the period January 2006 to 2009 in 4 cases.[7, 8]

A study in the United States (2014) stated that the amount of renal cell carcinoma cases increased every year.[9] Increased cases were supported by the advancement of diagnostic aids such as ultrasound and CT scans.[10] In addition, cancer treatment over the past few years had shown very rapid progress due to increasing role of tumor molecular biology and clinical implications especially vascular endothelial growth factor (VEGF) as a potential therapeutic target for metastatic renal cell carcinoma.[1]

This study showed the amount of cases in male were twice than female namely there were 12 (66.7%) cases in male and 6 (33.3%) cases in female. This study result was in accordance with a European study (2012) which found that in the age group 41-60 years the ratio of male and female cases was 2:1.[12] The mortality rate was also higher in men than in women. This high incidence and mortality were related to lifestyle factors such as smoking.[13] In women the estrogen hormone might reduce cancer risk because the hormone estrogen has anti-proliferative and apoptotic functions therefore the risk of kidney cell carcinoma in women is lower.[14]

This study result showed that renal cell carcinoma cases were more common in the age group 41-50 years (50%). This study result was incompatible with a study in the United Kingdom (2014) which showed that the incidence of renal cell carcinoma was highest in the age group 65-69 years.[15] With technological advances, renal cell carcinoma patients might be diagnosed earlier so that they might have good prognostic factors.[16] In this study the lowest age was 22 years while the highest age was 68 years. Renal cell carcinoma was rare in young adults, but this might be affected by genetic changes such as Von Hippel-Lindau disease.[1]

The patients from Pekanbaru city had the highest percentage (27.8%) in this study. This might be caused by adequate facilities and infrastructure resulting in the patients might easily go to Arifin Achmad Regional General Hospital in Riau Province. In addition, Pekanbaru had largest amount of population compared to other districts or city in Riau Province.[17]

Malay tribe was the most in 9 (50%) patients followed by Javanese tribe in 5 (27.8%) and Minang tribe in 4 (22.2%) patients. The majority of tribal sequences in renal cell carcinoma cases were in accordance with the distribution of the three largest tribes in Riau Province namely Malay, Javanese and Minang tribes.[18] Arifin Achmad Regional General Hospital of Riau Province was the top referral hospital with more complete facility than districts or city in Riau Province. This might also be the reason that more Malay tribes were in this study.

Renal cell carcinoma patients with smoking history were in 11 (61.1%) cases which all were men. Data from National Basic Health Research (2013) found that the highest percentage of active smokers who smoke every day in the age range of 30-34 years in 33.4% and male smokers were more than female one in 47.5% compared to 1.1%.[19] According to National Central Statistic Agency, 29.6% of the population aged ≥ 15 years in Riau Province were smokers and the average Indonesian population who smokes uses 12 cigarettes every day.[19, 20] Based on the type of occupation, farmers, fishermen, or labourers were active smokers in which the largest percentage of 44.5% compared to other occupational groups.[19]

Free radicals in cigarettes might increase the risk of cancer through DNA destruction. Various contents of cigarettes had been proven to damage DNA such as benzene, polonium-210, benzo(a)pyrene and nitrosamines. [21] In addition, in cigarettes there is also a nicotine content that causes temporary pleasure effects that can cause dependence on the smoker in which was widely used by male workers.[22] The strong urge that arises in the senses to continue smoking is difficult to

eliminate, especially in people who are addicted to cigarettes.[23]

This study result showed the most cases had normal nutritional status in 9 (50%) cases followed by underweight in 4 (22.2%) cases and in 3 (16.7%) cases with obesity. Based on the data, it could not be ascertained that the nutritional status of patients at risk of renal cell carcinoma was patients with normal nutritional status. This data might be affected because generally cancer patients can be through drastic weight loss, especially at an advanced stage.[24]

This study showed only 2 (11.1%) obese type 1 patients were risk factors for renal cell carcinoma. In United States, 40% cases of renal cell carcinomas were related to obesity. An estimated 24% of men and 34% of women who experience an increase in body mass index every 5 kg / m² will increase their risk of kidney cancer in 30% .[25]

Pathology that underlies between obesity and the increased risk of kidney cancer is not known yet but several mechanisms had been reported where one of which was related to adipose tissue. Adipose tissue is not only stores energy, but also functions as an endocrine organ. Adiponectin and leptin are peptide hormones secreted by adipocytes which might affect the development of kidney cancer which is shown through the effects on inflammation, insulin resistance and abnormal cell growth.[25]

History of hypertension in this study there were 7 (38.9%) cases of renal cell carcinoma. Almost half of these cases had histories of hypertension in which were dominated by men. In European study (2008) on the association of increased blood pressure with the risk of renal cell carcinoma showed a twice to three times increase in risk.[26] Several studies consisting of patients in Europe and the United State (2016) also reported similar results.[5]

Several studies showed higher risk in patients with uncontrolled hypertension with a period of ≤ 5 years.[27] Regular control of blood pressure might reduce the risk of renal cell carcinoma. The biological mechanism underlying this risk factor is not clear. A theory shows that chronic renal hypoxia accompanying hypertension might increase tumor cell proliferation and angiogenesis.[5]

Management of renal cell carcinoma patients accompanied by hypertension must be treated in hospital. Patients without history of previous hypertension must be considered if there is a potential increase in blood pressure. During the first 2 weeks or the first cycle of treatment, blood pressure must be routinely checked to avoid various complications of acute hypertension.[28]

Conclusion

Risks factors of renal cell carcinoma patients in our hospital were Pekanbaru city origin, Malay tribe, smoking history, non-obesity and hypertension.

Conflict of Interest

The author has nothing to disclose.

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