

The plateletcrit: The role in differential diagnosis of small renal masses

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ABSTRACT

Objective: To evaluate the importance of preoperative plateletcrit value predicting malignancy in patients who undergo open surgery due to small renal masses.

Material and methods: Sixty-eight patients who underwent open partial or radical nephrectomy for renal masses were included in this retrospective study. In preoperative routine blood tests, renal ultrasonography and contrast-enhanced computed tomography were performed for all patients. Preoperative plateletcrit values were compared in patients with clear cell renal cell carcinoma (Group 1, 57 patients) and benign lesions (Group 2, 11 patients). The predictive ability of plateletcrit was analyzed by ROC-curves and Youden Index method was used to identify the cut-off value for plateletcrit.

Results: The mean age of patients was 57.33±8.65 years in Group 1 and 59.32±10.59 years in Group 2 (p=0.546). The mean tumor size was 31.1 ± 5.84 mm in Group 1 and 28.07 ± 6.25 mm in Group 2 (p=0.132). The median plateletcrit value was 1858,21 ± 268,49 in Group 1 and 2258,01±524,35 in Group 2 (p:0.017). The area under a ROC-curve was 0.756 (p<0.05).

Conclusion: Preoperative plateletcrit values may predict renal masses that can not be distinguished radiologically. Our results must be confirmed by large and properly designed prospective, randomized trials.

Key words: renal cell carcinoma, plateletcrit, platelets, inflammation

ПЛАТЕЛЕКРИТ: КІШІ БҮЙРЕК МАССАЛАРЫНЫҢ ДИФФЕРЕНЦИАЛДЫ ДИАГНОСТИКАСЫНДАҒЫ РӨЛІ

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ТҰЖЫРЫМДАМА

Мақсаты: Бүйрек массасының аздығына байланысты ашық операция жасайтын пациенттерде қатерлі жағдайды болжайтын операциядан кейінгі тромбоциттің маңыздылығын бағалау.

Материалдар мен әдістер: Бүйрек массаларына ашық ішінара немесе радикалды нефрэктомиядан өткен алпыс сегіз пациент осы ретроспективті зерттеуге енгізілді. Операцияға дейінгі жоспарлы қан анализінде барлық науқастар үшін бүйрек ультрадыбыстық және контрастты күшейтілген компьютерлік томография жасалды. Операция алдындағы тромбоциттің көрсеткіштері бүйрек клеткасының айқын клеткалық карциномасы бар науқастарда (1-топ, 57 пациент) және қатерлі зақымдары бар науқастарда (2-топ, 11 пациент) салыстырылды. Тромбоциттің болжамды қабілеттілігі ROC-қисықтарымен талданды және PMI үшін кесу мәнін анықтау үшін Юденнің J-статистикасы әдісі қолданылды.

Нәтижелер: Пациенттердің орташа жасы 1-топта 57,33 ± 8,65 және 2-топта 59,32 ± 10,59 жыл болды (p=0.546). Ісіктердің орташа мөлшері 1-ші топта 31,1 ± 5,84 мм және 2-ші топта 28,07 ± 6,25 мм болды (p=0.132). Тромбоциттің орташа мәні 1-топта 1858,21 ± 268,49 және 2-топта 2258,01 ± 524,35 құрады (p:0.017). ROC-қисығы астындағы аудан 0,756 құрады (p<0.05).

Қорытындылар: Операцияға дейінгі PCT мәні бүйрек массасын радиологиялық жағынан ажыратуға болмайтынын болжауы мүмкін. Біздің нәтижелеріміз үлкен және дұрыс жобаланған болашақ, рандомизацияланған сынақтармен расталуы керек.

Негізгі сөздер: бүйрек жасушаларының карциномасы, тромбоцит, тромбоциттер, қабыну

ТРОМБОКРИТ: РОЛЬ В ДИФФЕРЕНЦИАЛЬНОЙ ДИАГНОСТИКЕ МАЛЫХ ОБРАЗОВАНИЙ ПОЧЕК

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РЕЗЮМЕ

Цель: Оценить важность предоперационного значения тромбокрита, прогнозирующего злокачественное новообразование у пациентов, оперируемых по поводу малых образований почек.

Материалы и методы: В настоящее ретроспективное исследование было включено шестьдесят восемь пациентов, перенесших открытую частичную или радикальную нефрэктомия по поводу образований почек. Перед операцией всем пациентам были выполнены анализы крови, УЗИ почек и компьютерная томография с контрастным усилением. Проведено сравнение предоперационных значений

тромбоцитоза у пациентов со светлоклеточной почечно-клеточной карциномой (группа 1, 57 пациентов) и пациентов с доброкачественными поражениями (группа 2, 11 пациентов). Прогностическая способность тромбоцитоза была проанализирована с помощью ROC-кривых, а метод индекса Юдена был использован для определения предельного значения для тромбоцитоза.

Результаты: Средний возраст пациентов составил 57,33±8,65 лет в группе 1 и 59,32±10,59 лет в группе 2 (p=0,546). Средний размер опухоли составил 31,1±5,84 мм в группе 1 и 28,07±6,25 мм в группе 2 (p=0,132). Среднее значение тромбоцитоза составило 1858,21±268,49 в группе 1 и 2258,01±524,35 в группе 2 (p:0,017). Площадь под ROC-кривой составила 0,756 (p<0,05).

Заключение: Предоперационные значения тромбоцитоза могут предсказать образования почек, которые не могут быть распознаны рентгенологически. Наши результаты должны быть подтверждены крупными и правильно спланированными проспективными рандомизированными исследованиями.

Ключевые слова: почечно-клеточная карцинома, тромбоцитоз, тромбоциты, воспаление

Introduction

Renal cell carcinoma is common in western countries and constitutes 3% of all cancers [1]. Improvement in computed tomography and ultrasonography techniques have increased the diagnosis of occult renal masses [2]. They are usually detected incidentally on imaging studies performed for other occasions [3]. It is not possible to distinguish clinically aggressive from benign renal masses with existing clinical data. Although percutaneous renal biopsy is considered a safe procedure [4], accuracy to identify malignant renal masses is low [5]. So in the current conditions, the number of patients going to surgery due to benign masses has been increasing [6].

The relationship between inflammation and tumor biology has been a subject of great interest recently [7]. Many systemic inflammatory markers have been studied for their predictive significance in various types of cancer [8].

Platelets contribute to inflammation by interacting with proinflammatory cytokines and chemokines, as well as other myeloid cells and non-immune cells [9]. It also contributes to anti-inflammatory effects by inhibiting mononuclear cells by anti-inflammatory cytokine release [10]. Recent studies have focused on the key role of thrombocytes in cancer development and spread [11,12].

Plateletcrit (PCT) is a marker that has recently begun to be addressed. It is calculated by multiplying the total platelet count by the mean platelet volume (MPV) and can be easily calculated from complete blood cell count values [13].

Imaging techniques are still inadequate and can not prevent unnecessary surgeries. In this study, we examined the diagnostic value of PCT in small renal masses. This may be the first study to address this potential role for the PCT.

Material and methods

Sixty-eight patients who underwent open partial nephrectomy or radical nephrectomy for renal masses were included in the study between 2007 and 2017. Patient all preoperative data including anaesthesia risk score and comorbidities were analyzed

retrospectively. In preoperative period, routine blood tests, renal ultrasonography and contrast-enhanced computed tomography were performed in all patients. The exclusion criteria were as follows: having infection or inflammation; immunologic, splenic or renal diseases that may have affected platelet counts and MPV, pathologies other than renal cell carcinoma (RCC) for malignant masses and oncocytoma for benign masses. PCT was compared in patients with clear cell RCC (Group 1, 57 patients) and oncocytoma (Group 2, 11 patients). The predictive ability of PCT was analyzed by ROC-curves and Youden Index method was used to identify the cut-off value for PMI.

Statistical method

Normality distribution was investigated for all numeric variables. Categorical variables were described by frequencies and percentages and numeric variables were described by means and standard deviations or medians and interquartile ranges. The relationship between two categorical variables was tested by Chi-square test. Two independent means was compared by Student t-test and two independent medians were compared by Mann Whitney U-test. The predictive ability of PCT was analyzed by ROC-curves and Youden Index method was used to identify the cut-off value for PCT. A P-value less than .05 was accepted as statistically significant.

Results

Mean age of patients was 57.33±8.65 years in Group 1 and 59.32±10.59 years in Group 2 (p=0.546). Mean tumor size was 31.1 ± 5.84 mm in Group 1 and 28.07 ±6.25 mm in Group 2 (p=0.132). The median PCT was 1858,21 ±268,49 in group 1 and 2258,01±524,35 in group 2 (p:0.017). Both groups were similar in terms of sex and tumor side (Table 1). 11 patients had oncocytoma, 14 patients had grade 1 tumor, 36 patients had grade 2 tumor and 7 patients had grade 3 tumor. Optimal cut-off value of PCT was 1975.2, with sensitivity of 70.2 % and specificity 72.7 % (Table 2). The area under the ROC-curve was 0.756 (p<0.05) (Figure 1). Predictive probability of PCT for tumor grade was statistically insignificant (p=0.617) (Figure 2).

Table 1 Distribution of demographic data between groups

	GROUP 1	GROUP 2	p
Age (years) (mean±sd)	56,18±8.06	59,51±10.59	0.328
Sex (male/female)	5/60	35/220	0.332
BMI (kg/m ²) (mean±sd)	27.91±6.19	26.04±4.48	0.238
ACCI (mean±sd)	1,91±1,30	2.28±1.43	0.429
ASA (1-2 / 3)	8/3	37/20	0.622
Surgical Technique			
(Partial / Radical) nephrectomy	6/5	29/28	0.827
Smoking (yes / no)	4/7	11/46	0.217
Size (mm) (mean±sd)	31.18±5.84	28.01±6.25	0.132
Side (right/ left)	4/7	25/32	0.235

ASA: AMERICAN SOCIETY OF ANESTHESIOLOGY

ACCI: AGE RELATED CHARLSON'S COMORBIDITY INDEX

BMI: BODY MASS INDEX

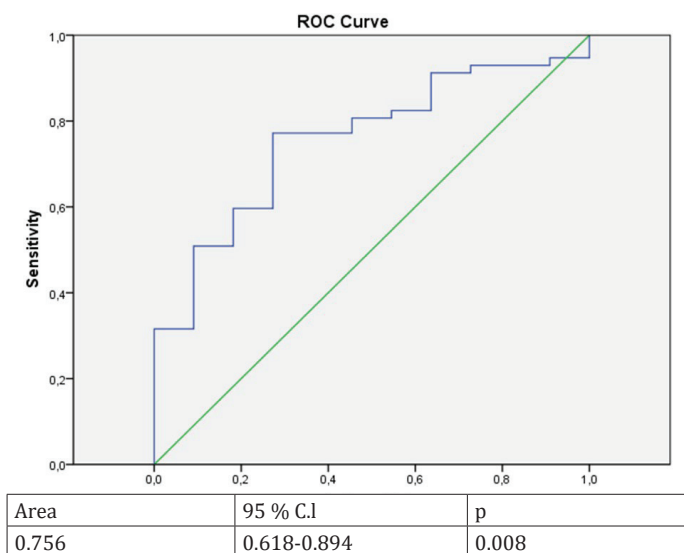
SD: STANDARD DEVIATION

Table 2

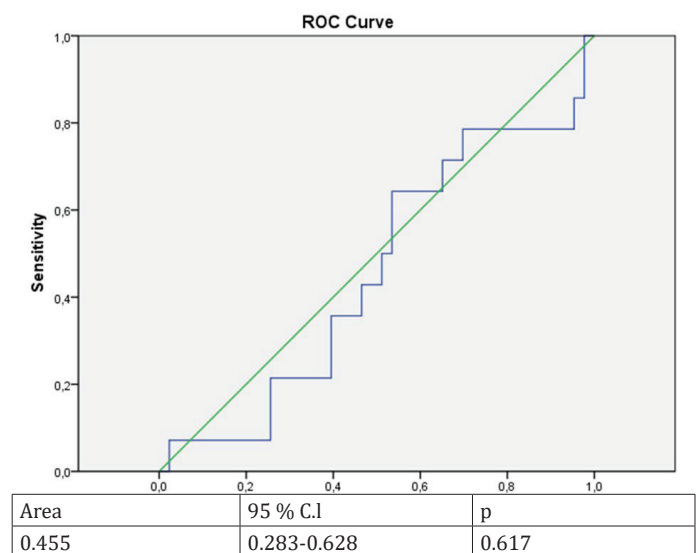
Distribution of hematological data between groups

	GROUP 1 (mean±sd)	GROUP 2 (mean±sd)	p
Hemoglobin (gr/dL)	13.18±1.69	13.64±1.66	0.406
Hematocrit (%)	39.02±4.27	41.12±4.66	0.172
Platelet counts (K/μL)	219.91±42.22	269.00±72.52	0.034*
Mean Platelet Volume (fL)	8.60±1.28	8.51±0.99	0.787
Neutrophil counts			
(K/μL)	4.79±1.56	4.98±1.37	0.681
Lymphocyte counts (K/μL)	2.13±0.63	2.24±0.69	0.621
Neutrophil ratio (%)	62.29±7.40	60.97±7.99	0.614
Lymphocyte ratio (%)	28.43±7.38	27.53±7.50	0.715
Neutrophil/Lymphocyte ratio (%)	2.42±1.03	2.85±3.53	0.696
Neutrophil/Lymphocyte ratio	2.43±1.00	2.40±1.09	0.945
Platelets / Lymphocyte ratio	115.35±49.16	126.36±39.00	0.414
PCT	1858.21±268.49	2258.01±524.35	0.017*

PCT: PLATELETCRIT

Figure 1 - PCT predictive probability of the malignancy

PCT: PLATELETCRIT

Figure 2 - PCT predictive probability of tumor grade

PCT: PLATELETCRIT

Discussion

Despite the delicate work on biomarkers, molecular biology, and genetic developments, the routine diagnostic and prognostic evaluation of RCC is still based on traditional clinicopathologic prognostic variables [14]. High cost, low level of evidence, and the troublesome preparation of these markers are the reasons why biomarkers are not routinely used clinically.

Many serum biomarkers such as CRP, fibrinogen, lymphocyte-monocyte ratio, neutrophil-lymphocyte ratio which may be closely related to the prognosis of RCC in the last decades have been described [15,16]. The recently obtained data have placed thrombocytes at the center of the inflammatory process [17-19]. Also recent data support that thrombocytes play an important role in the development and spread of some cancer [20].

Platelet count and MPV are the most important indicator of activity of platelets [21]. Studies show that MPV values are relatively high in patients with tumor [22]. However, how MPV values affect prognosis remains to be discussed. Osaka et al. reported an increase in MPV values in gastric tumors [23]. Mutlu et al. could not show such a relationship in tumor patients [24].

Increased platelet count in circulation is considered as

a poor prognostic indicator for many malignant diseases [25]. This is being explained by the overproduction of megakaryocyte stimulating cytokines [25]. On the other hand, it is also claimed that platelets act as a protective shield against circulating tumor cells [26]. The increase in the number of platelets was also investigated prognostically in RCC cases but the results were different from each other [25].

PCT is a biomarker that has recently attracted the attention of researchers. However, we think that the PCT could not see the interest it deserves. PCT refers to the total amount of platelets present. More commonly, it is involved in studies investigating inflammation, thrombosis, and cardiovascular pathophysiological events [27]. In our study, PCT was used for malignant benign differentiation of renal masses for the first time.

There are studies in the literature that show the relationship between prognosis and NLR. Gorgel et al. unlike these studies, reported that NLR could play a role in the malignant-benign distinction of renal masses [28]. In our work, we tried to use the PCT for this distinction. The prognostic relationship of platelet and RCC has been further investigated in the literature. Wang et al. high platelet-to-lymphocyte ratio in urological cancers is

a poor prognostic factor [29]. Olsson et al. in a study wrote that the production and destruction of systemic platelets increased in the case of cancer cells [30]. They also reported an association between increased platelet count and poor prognosis [30]. We could not determine a relationship between the groups according to the neutrophil count, lymphocyte count, neutrophil to lymphocyte ratio and platelet to lymphocyte ratios in this study including MPV values. In our study, platelet counts and PMI values were lower in the patient group with pathological malignancy.

This work has some limitations. First, this is a single-center study based on retrospective hospital records. Secondly, the plateletcrit may be affected by different situations we cannot detect. The third is the low patient count. We shall assume that well-designed, homogeneous and wider patient numbers will

increase our prognosis with prospective studies. If our view is to be supported, plateletcrit could be used as a simple tool in the surgical decision of small renal masses.

Conclusion

When we review the literature, platelet and thrombocyte-derived markers have been investigated as prognostic indicators in malignant diseases. According to this study, PCT values before surgery may be used in prediction of renal masses that can not be distinguished as malignant or benign clinico-radiologically. From this point of view, this study seems to lead in this regard. But the results should be supported by prospective large patient series.

Disclosures: There is no conflict of interest for all authors.

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The effect of conscious sedation on salivary alpha-amylase levels during third molar surgery

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ABSTRACT

Aim: The aim of the present study was to investigate whether salivary alpha-amylase levels could be decreased by conscious sedation in the patients undergoing impacted third molar extraction.

Material and methods: A total of 18 male patients were recruited. All patients were administered the Modified Dental Anxiety Scale test. Patients were divided into a test group (procedures under sedation) and a control group (procedures under local anesthesia). Systolic blood pressure, diastolic blood pressure, oxygen saturation, and heart rate were monitored at different study time-points. Five samples of saliva were taken from each patient: the first time the patient came to the clinic, the patient sat in the chair for extraction, before local anesthesia, immediately after extraction, at 4 h after extraction.

Results: Although no statistically important difference was found for systolic blood pressure ($p>0.05$) between groups, postoperative diastolic blood pressure level of control group was statistically higher than the test group ($p=0.030$). Also, a statistically significant decrease was found in the oxygen saturation level in postoperative time compared to preoperative time ($p<0.05$).

Conclusion: Even though conscious sedation may be a solution for dental anxiety and phobia, our results indicated that sedation did not affect acute stress levels during oral surgery.

Key words: conscious sedation, dental anxiety, stress biomarkers, salivary alpha-amylase, tooth extraction

ҮШІНШІ АЗУ ТІСТІ АЛЫП ТАСТАҒАНДА САНАНЫҢ САҚТАЛУЫМЕН СЕДАЦИЯНЫҢ СІЛЕКЕЙ БЕЗДЕРІНІҢ АЛЬФА-АМИЛАЗА ДЕҢГЕЙІНЕ ӘСЕРІ

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ТҰЖЫРЫМДАМА

Мақсаты: Зерттеудің мақсаты ретинолярлық үшінші азу тісі алып тасталған пациенттерде есін сақтай отырып, седациядан кейін альфа-амилаза сілекей безінің азаюы мүмкін екендігін зерттеу болды.

Материалдар мен әдістер: Барлығы 18 ер адам іріктелді. Барлық пациенттер өзгертілген стоматологиялық процедураның қорқыныш шкаласы бойынша тексеруден өтті. Науқастар тәжірибелік топқа (седативті процедура) және бақылау тобына (жергілікті анестезиядағы процедура) бөлінді. Систолалық қан қысымы, диастолалық қан қысымы, оттегінің қанығуы, жүрек соғу жылдамдығы зерттеу уақытының әртүрлі нүктелерінде бақыланды. Әр пациенттен сілекейдің бес үлгісі алынды: пациент клиникаға келді, науқас алып тастау үшін орындыққа отырды, локальды анестезия алдында, шығарғаннан кейін, шығарылғаннан кейін 4 сағаттан кейін.

Нәтижелер: Топтар арасында систолалық қан қысымында статистикалық маңызды айырмашылық жоқ ($p>0.05$), бақылау тобындағы операциядан кейінгі диастолалық қысым деңгейі эксперименттік топқа қарағанда жоғары ($p=0.030$). Сонымен қатар, операциядан кейінгі уақытпен салыстырғанда оттегінің қанығу деңгейінің статистикалық тұрғыдан төмендегені анықталды ($p<0.05$).

Қорытынды: саналы седация стоматологиялық процедурадан қорқудың шешімі бола алатынына қарамастан, біздің нәтижелеріміз стоматологиялық операция кезінде өткір стресс деңгейіне әсер етпегенін көрсетті.

Негізгі сөздер: сақталған санамен седация, стоматологиялық процедуралардан қорқу, стресс биомаркерлері, сілекей безі альфа-амилаза, тіс жұлу