E-ISSN
e-ISSN 2667-8721
Volume: 4 Issue: 1 April 2022

www.ejcritical.com

EURASIAN JOURNAL of CRITICAL CARE

EPAT
1999
Emergency Physicians Association of Turkey

Correction;

Dear colleagues;

The article which name is "Relationship Of The Procalcitonin Level On Admission With Curb-65 and Smart- Cop Scores In Hospitalized Patients With Pneumonia" was published in 2022;2(3);223-7 in our journal. When the type of the article re-evaluated, a mistake was detected. This article is an original article but it was written as a review article mistakenly. We would like to emphasize that the type of article is an original research.

Best regards
Editorial Board

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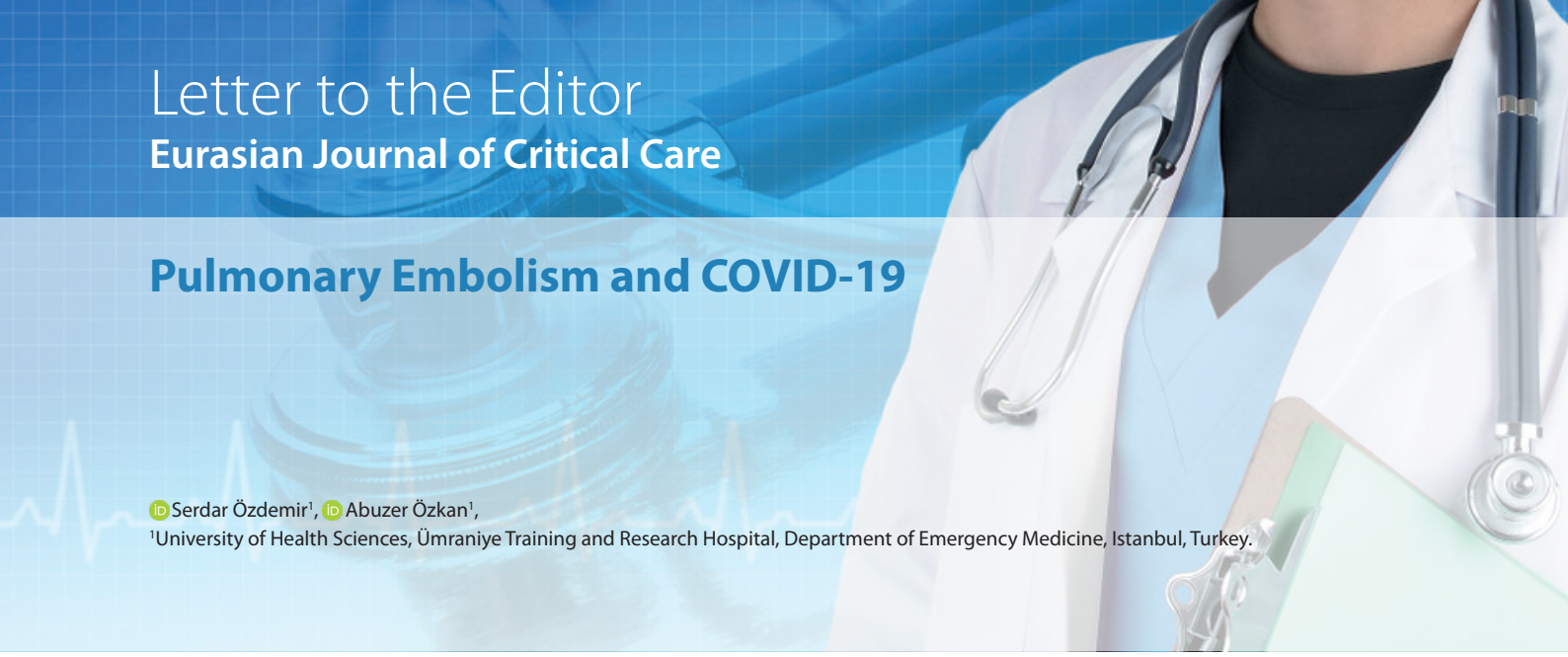
Eurasian Journal of Critical Care



Pulmonary Embolism and COVID-19

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Dear editor,

We have read the research titled "Analysis of Patients with Pulmonary Thromboembolism Who Received Thrombolytic Therapy in The Emergency Department" prepared by Emektar et al. with great interest[1]. We thank the authors and the editorial board for publishing this successful and informative paper contains data of patients presented on pre-pandemic period. The patient profile has also changed with the spread of SARS-CoV-2 worldwide. We also would like to mention a few important points about mechanism of pulmonary embolism in COVID-19.

Pulmonary embolism is one of the medical emergencies that should be recognized early because of its frequent occurrence, different clinical findings, and most importantly, high mortality rates. In the current literature, the measurement of D-dimer levels, which is one of the fibrin degradation products, has come to the fore in the diagnosis of pulmonary embolism[2]. It is a biomarker used in pulmonary embolism management algorithms. On the other hand, D-dimer is a biomarker used in the management of patients with COVID-19[3]. This is an indication of the fact that thrombotic processes are associated with mortality in COVID-19 patients.

Pulmonary embolism is the most common cause of embolism originating from deep calf veins. In COVID-19, it was observed that deep calf vein thrombosis was not accompanied by frequent pulmonary embolism in patients. To explain this, the lung tissues of patients with respiratory failure with COVID-19 were examined postmortem. In these post-mortem studies, diffuse alveolar damage to mononuclear cells was observed in fibrin clusters in lung tissue. Other findings were diffuse endothelial inflammation in the lungs and direct viral infection of endothelial cells. The researchers reported these findings as fibrin plugs formed in the pulmonary microcirculation caused by the inflammatory process[4]. This was a pathogenesis that clinicians were not accustomed to in familiar pulmonary infections. This clinical condition was named as microvascular COVID-19 lung vessels obstructive thromboinflammatory syndrome. The long name of the syndrome has been shortened to MicroCLOTS. Although blood gas findings such as arterio-alveolar gradient indicate the diagnosis of pulmonary embolism in patients with severe respiratory failure, the absence of clots in computed tomography scans is a finding that supports the MicroCLOTS theory[5]. Another terminology for this pathogenesis was primary pulmonary thrombus[6].

As a result, understanding the pathophysiology in COVID-19 will positively affect the treatment processes.

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Received: 27.03.2022 • **Accepted:** 23.04.2022
DOI: 10.55994/ejcc.1093986

Cite this article as: Ozdemir S, Ozkan A. Pulmonary embolism and COVID-19. Eurasian Journal of Critical Care. 2022;4(1): 1-2

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Original Article
Eurasian Journal of Critical Care

Evaluation of Systemic Thrombolytic Treatment in the Emergency Service in Unstable and Resuscitated Patients Due to Massive Pulmonary Embolism

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Abstract

Background: PE accounts for 3% of out-of-hospital cardiac arrest. In this case, treating patients with thrombolysis during resuscitation has been associated with better survival. The aim of this study is to evaluate the use of systemic thrombolytic in unstable and/or resuscitated patients who are evaluated in the red area in emergency service practice and who are diagnosed with massive pulmonary embolism with bedside examinations.

Materials and Methods: This prospective study was designed on 17 patients who were transferred as unstable to the emergency service of a tertiary hospital by Emergency Health Services and/or who needed resuscitation due to non-shockable fatal rhythm disorder on admission and who underwent systemic thrombolysis due to the diagnosis of pulmonary embolism during resuscitation.

Results: Of the 17 patients included in the study, 52.9% were discharged and improvement was detected in unstable vital findings in 47.1% patients after thrombolysis. Of the bedside examinations performed on admission, ECG showed T wave negativity at V1-4 deviations and P-pulmonale in 41.2% patients and ECHO showed right ventricle dilatation indicating right ventricle dysfunction in 82.4% patients. CTPA taken after stabilization showed thrombus at bilateral pulmonary artery in 88.2% patients.

Conclusion: Cardiopulmonary arrest caused by PE is a life-threatening condition that requires urgent systemic thrombolysis. Patients who are evaluated as unstable or in need of resuscitation in the emergency service should be diagnosed quickly as a result of examinations performed at bed-side and thrombolytic treatment should be started.

Keywords: Emergency treatment, pulmonary embolism, massive, thrombolytic treatment

Introduction

Acute Pulmonary Embolism (PE) is a fatal condition caused by venous thromboembolism. Although its prevalence varies between societies, it doubles every ten years after the age of 40[1]. Clinical symptoms and signs are not specific. Most of the time, it presents with symptoms such as dyspnea, chest pain, syncope and hemoptysis. However, it can also present with acute pressure increase in right ventricle dysfunction and arrest which are indicators of decreased hemodynamic reserve and instability as a result of prevention of both circulation and gas exchange[2]. Acute PE should be suspected especially in out-of-hospital cardiac arrests of unknown cause if there is anon-shockable rhythm and in the presence of risk factors for venous thromboembolism[3].

PE accounts for 3% of out-of-hospital cardiac arrest. In such a situation, treating patients with thrombolysis during resuscitation in accordance with the recommendation of American Heart Association has been associated with better survival[4]. Thrombolytic agents form plasmin, which accelerates thromboembolism lysis, by activating plasminogen. Therefore, thrombolytic therapy is used in patients diagnosed with acute PE to rapidly resolve the embolic load and improve cardiovascular hemodynamic. However, since thrombolytic therapy is associated with life-threatening hemorrhage, careful patient selection is critical for the success of this therapy. In this case, it is very important to determine that the cause of the arrest is PE. Screening techniques such as transthoracic echocardiography (TTE), lower extremity Doppler ultrasonography, laboratory tests such as electrocardiography (ECG), troponin-I and D-dimer and risk scorings performed at bedside at resuscitation area in the emergency service will guide the diagnosis[5].

The aim of this study is to evaluate the use of systemic thrombolytic in unstable and/or resuscitated patients who are evaluated in the red area in emergency service practice and who are diagnosed with massive PE with bedside examinations.

Corresponding Author: Özlem Bilir **e-mail:** drozlembilir@gmail.com
Received: 30.12.2021 • **Revision:** 04.04.2022 • **Accepted:** 08.04.2022
DOI: 10.55994/ejcc.1050495

Cite this article as: Bilir O, Unlu A, Tasci F, Ersunan G, Atas I. Evaluation of systemic thrombolytic treatment in the emergency service in unstable and resuscitated patients due to massive pulmonary embolism. Eurasian Journal of Critical Care. 2022;4(1): 3-7

Materials and Methods

Study Population:

The study was designed as a retrospective study on 17 patients who were transferred as unstable to Recep Tayyip Erdoğan University Training and Research Hospital emergency service by Emergency Health Services and/or who needed resuscitation due to non-shockable fatal rhythm disorder on admission and who received systemic thrombolysis due to PE diagnosis during resuscitation between January 2019 and February 2020. The data of the patients were obtained from Hospital Information Management System. The study was evaluated and approved by the ethics committee of the university.

Systemic thrombolysis was applied to patients with thromboembolism risk factors who were transferred unstable to the emergency service due to out-of-hospital sudden cardiac arrest upon detection of right ventricle (RV) dysfunction in bedside transthoracic echocardiography (TTE) in the resuscitation room. Hospital records of all of the patients were reviewed in terms of demographic data, predisposing factors, clinical picture, diagnostic studies, hemodynamic status and the results.

Study Protocol:

To identify patients who received systemic thrombolysis after being diagnosed with PE among unstable patients admitted to the resuscitation area, I26, I26.0 and I26.9 ICD-10 codes used in the application of thrombolytic agents were used.

Patients with a systolic blood pressure of <90 mmHg or a ≥40 mmHg decrease in systolic blood pressure were considered as hemodynamically unstable. Bedside TTE was performed (Esaote Mylab 50 Xvision with a 5 MHz transducer). Echocardiographic criteria of RV dysfunction were evaluated as RV dilatation and/or increased diastolic RV-LV diameter ratio (> 0.9), hypokinesia of the free RV wall, tricuspid regurgitation jet velocity, or a combination of these[2]. Pulmonary hypertension, pulmonary artery systolic pressures were defined as > 40 mmHg. At the same time, electrocardiography (ECG), arterial blood gas, haematological profile, serum troponin I levels, D-dimer and coagulation parameters were requested for the patients. Systemic thrombolysis was achieved by bolus administration of Alteplase (rtPA recombinant DNA technology) 0.6 mg/kg (maximum 50 mg) in 2-15 minutes. D-dimer test was performed by using enzyme-dependent fluorescent method and any value higher than 500 ng / ml was accepted as positive (normal value range 0-500 ng/ml). Troponin I was performed by using electrochemistry luminescence method and values higher than 34.2 pg/ml were considered abnormal (normal value range 0-34.2 ng/ml).

Statistical Analysis:

Data were analysed by using SPSS for Windows version 17 (SPSS, Chicago, IL, United States). All metric and normally distributed variables were reported as mean ± SD. Categorical variables were presented as frequency and percentage.

Results

Patient characteristics: 10 (58.8%) of the 17 patients included in the study were female, male 7 (41.2%) and mean age was 78.05 ± 10.26 (min: 58, max: 95). The most frequent complaint of the patients on admission or in the period before admission was shortness of breath with 64.7% (n=11) and 23.5% (n=4) of the cases were admitted to the emergency service due to syncope. The most frequent clinical finding was low terms oxygen saturation (76.7%, n=13), followed with tachycardia with a rate of 64.7% (n=11) and tachypnea with a rate of 47.1% (n=8). 6 (23.5%) patients were found to have symptoms of deep vein thrombosis (DVT) and it was confirmed with lower extremity Doppler ultrasound imaging. In general, all of the patients were found to have risk factors for PE. The risk factors found were previous surgery/immobilization (41.2%, n=7), hypertension (17.6%, n=3) and malignancy in 3 (17.6%) patients (Table-1). Four of the patients were smokers (23.5%). Serum troponin I and D-dimer levels were above normal in all patients.

ECG Features: On admission, rhythm was asystole in 23.5% (n=4) of the patients. After admission, sinus tachycardia was observed in the ECGs of 41.7% (n=7) of the patients following the necessary stabilization interventions. ECG was found to be normal in 3 (17.6%) patients. The most common ECG anomalies were T inversion in V1-V4 and P-pulmonale in 7 (41.2%) patients. Other findings were RBBB with a rate of 35.3% (n=6), atrial fibrillation with a

Table 1: Demograpic data (n = 17)

Age	78.05 ± 10.26 (min: 58, max: 95)	
Gender	Female	10 (58.8%)
	Male	7 (41.2%)
Risk factors	Immobilization	5 (29.4%)
	Deep vein thrombosis	4 (23.5%)
	Smoking	4 (23.5%)
	Hypertension	3 (17.6%)
	Canser	3 (17.6%)
	Fracture surgery	2 (11.8%)
Pre-incident complaint	Shortness of breath	11 (64.7%)
	Syncope	4 (23.5%)
	Haemoptysis	1 (5.9%)
	Cough	1 (5.9%)

Minimum-Maximum (Mean ±Standard Deviation).

Table 2: Bedside diagnostic tests.

Admission rhythm	Asystole	4 (23.5%)
	Sinus tachycardia	7 (41.2%)
	V1-4 Twave inversion	7 (41.2%)
	P-pulmonale	7 (41.2%)
	Right branch block	6 (35.3%)
	Atrial fibrillation	4 (23.5%)
	S1Q3T3	2 (11.8%)
Risk ECHO	Pulmonary hypertension	15 (88.2%)
	RV dilatation	14 (82.4%)
	D-septum	13 (76.5%)
D-dimer	>500 ng/ml	17 (100%)
Troponin-I	>34.2 pg/ml	17 (100%)

Table 3: Treatment and outcome.

Vital Findings	Pre-treatment	Post-treatment
Systolic blood pressure	67.05 ± 37.37 mmHg	118 ± 23 mmHg
Respiratory rate	18.11 ± 9.91 min.	13 ±8.1 min.
Pulse oxymeter %	72.17% ± 30.97	93% ± 2.01
Response to trombolytic treatment	Post-treatment recovery	8 (47.1%)
	Temporary response to treatment	5 (29.4%
Outcome	No response to treatment	4 (23.5%)
	Discharge	9 (52.9%)
	Death	8 (47.1%)

rate of 23.5% (n=4) and S1Q3T3 changes in 11.8% (n=2) of the patients (Table-2).

ECHO Findings: The most common echocardiography finding was pulmonary hypertension in 15 (88.2%) patients. Other findings were RV dilatation suggesting right ventricle (RV) dysfunction in 82.4% (n=14) of the patients and D-septum finding in 76.5% (n=13) of the patients (Table-2).

Computerized Tomography Pulmonary Angiography (CTPA) Findings: Imaging examinations performed after stabilization of the patients (patients with airway safety, systolic blood pressure >90 mmHg, heart beat that provides peripheral perfusion after it is provided) showed thrombus image in both the right and left pulmonary artery in 88.2% (n=15) of the patients and in only unilateral (right or left) pulmonary artery in 11.8% (n=2) of the patients.

Treatment: After thrombolysis, improvement was detected in unstable vital findings in 47.1% (n=8) of the patients. Systolic blood pressure was found to increase to 118 ± 23mmHg from 67.05 ± 37.37 mmHg. The same improvement was detected in respiratory rate (from 18.11 ± 9.91 min. to 13 ± 8.1 min) and pulse oximeter values (from 72.17 ± 30.97% to 93 ± 2.01%). However, 23.5% (n=4) of the patients did not respond to thrombolytic therapy. 29.4% (n=5) of the patients responded temporarily to the treatment and then they became unstable again.

As a result of the treatment, no major complications such as hemorrhage, blood transfusion, intracranial hemorrhage or fatal hemorrhage developed during the study period. Following the bed-side thrombolytic treatment in the emergency service, the patients were followed in the Intensive Care Unit. Mean follow-up time was 4.76 ± 7.21 days. 52.9% (n=9) of the patients included in the study were discharged after follow-up (Table-3).

Discussion

The present study describes the features and results of 17 patients who were transferred as unstable to the emergency service and who were resuscitated due to non-shockable fatal rhythm disorder and who received systemic thrombolytic treatment after being diagnosed with massive PE with bedside examinations. Massive PE has a high mortality rate and systemic thrombolysis both decreases these rates and increases the quality of life. Guidelines created in line with the studies conducted also suggest the use of thrombolytic[6]. Its fast and effective use during cardiopulmonary resuscitation is an advantage over surgical methods. Especially in patients with unstable findings, systemic thrombolytic therapy that will restore the pulmonary flow as a result of examinations that will provide rapid diagnosis at the bedside will improve diagnosis[7]. In this study, it was found that 76.5% of the patients became stable after systemic thrombolytic therapy, while 38.5% were found to have temporary recovery. It was found that 52.9% of the patients were discharged after follow-up and treatment at the hospital.

While PE accounts for 3% of out-of-hospital cardiac arrests, the presences of non-shockable rhythm and thromboembolism history are the risk factors that lead us to the diagnosis that should be considered at bedside in this group[3]. In this study, 23.5% of the patients were found to have non-shockable rhythm asystole on admission and all of the patients were found to have risk factors of thromboembolism such as cancer, immobilization and deep vein thrombosis. Current rates were the same as other studies[3, 8]. However, while the rhythm of the patients' during admission was asystole in this study, it was found as PEA in literature[9]. We believe that this difference results from the time of transportation to the hospital after the incident. PE is a condition that has the potential of sudden and fatal deterioration and requires urgent diagnosis and effective treatment. However, it is not easy to reach correct diagnosis despite advancing technology. It is important to identify especially unstable patients in the emergency service with bedside diagnostic tools and to apply appropriate treatment methods. Hypotension and deteriorations in right ventricle functions should be defined with ECHO and risk factors should be evaluated with clinical probability scores[10]. Bedside methods were used in the diagnosis of the patients

in this study since they were unstable to be removed from the care area in accordance with the guidelines.

Aggressive methods such as systemic fibrinolysis, pharmaco-mechanical catheter or surgical pulmonary embolectomy are needed in patients with suspected or proven diagnosis of massive PE. Among the treatment methods, fibrinolysis has a practical use since it can be applied quickly and easily and is available in most health institutions. In arrest cases, fibrinolytic therapy combined with chest compressions can increase survival by restoring spontaneous circulation[11]. In studies conducted, mortality rates varying between 22% and 90% have been reported after fibrinolytic therapy[9, 12]. We found that 52.9% of our cases had been discharged after their treatment.

The fact that it causes life-threatening hemorrhage and literature information is based on retrospective analyses, case series and reports has caused concerns and fibrinolytic therapy to be applied less[13-17]. The most important concern is the fact that hemorrhages that may occur after fibrinolytic therapy, which causes injury to the abdomen and thoracic cavity, especially during chest compressions. Despite this, no high fatal hemorrhage risk was found in both the present study and the literature[18].

The tissue plasminogen activator adopted for fibrinolytic therapy is Alteplase[19]. The recommended application regime is 100 mg infusion for two hours. However, 2-hour long Alteplase application during cardio pulmonary resuscitation is not applicable for emergency service practice. For this reason, it has become preferable to apply bolus for 2 to 15 minutes at a dose of 0.6 mg/kg (maximum 50 mg). In studies conducted, the results of stabilization of hemodynamic state, recovery of spontaneous circulation and neurological recovery have been found to be as effective as 2-hour long regime[20-22]. The patient group in the present study was given 0.6 mg/kg dose bolus application and hemodynamic stabilization was obtained in 47.1%. 29.4% of the patients were found to become unstable again after short term recovery. These results are also in parallel with experimental studies which show that reperfusion following fibrinolytic therapy can improve micro circulation[23-25].

Conclusion

As a conclusion, massive PE is a life-threatening condition that requires urgent systemic thrombolysis. Unstable patients or patients in need of resuscitation who are evaluated in the emergency service should be diagnosed quickly and their treatment should be started as a result of bedside examinations. Bolus Alteplase therapy does not increase the risk for major hemorrhage even if chest compression is applied. In addition, bolus therapy was found to be as effective as 2 hour long regime on mortality and survival. The most important limitation of the study was the fact that it was carried out retrospectively in a single center on a small sample without control group. In addition, especially the sensitivity and specificity of ECHO, which is one of the bedside diagnostic methods used, is limited when compared with CTPA.

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Original Article
Eurasian Journal of Critical Care

Determination of Demographic Changes of Acute Pulmonary Embolism Patients Applied to Emergency Service: Retrospective Analysis of 60 Cases

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Abstract

Background: The aim of this study was to determine the clinical and demographical traits of the increasing number of patients diagnosed with pulmonary embolism and hence to contribute to the literature in order to analyze the possible changes occurred in time.

Materials and Methods: Our study is a retrospective study conducted with all patients over the age of 18 who applied to the emergency service and diagnosed with pulmonary embolism between 01.01.2017 and 01.01.2019. Demographic and clinical data of patients such as patients' complaints, background story, physical examination and laboratory inspections were determined by analyzing physical files formed at the application and saved data in the information system, and relationship between all the data was analyzed by determination of calculated wells criteria scores.

Results: Atotal of 60 patients were included in the study. The average age of the patients was 64.46 (16.95). Among the patients, 34 (56.7%) were female while 26 (43.3%) were male. Shortness of breath and chest-back pain were the leading complaints of emergency service applications by 36 (60%) and 16 (26%), respectively. The leading background stories of the cases were malignity with 14 (23%) patients, and hypertension with 12 (20%) patients. The most common physical examination indication was bruit with 21 (35%) patients and pretibial edema with 11 (18%) patients, while 12 (20%) patients did not show any symptom. Thrombolytic treatment was applied to 4 patients in the emergency service.

Conclusion: We believe that studies investigating demographic traits of life-critical and easy to skip diseases like pulmonary embolism which causes to apply to the emergency service will contribute to diagnosis.

Keywords: Emergency service, acute pulmonary embolism, demographic changes

Introduction

Pulmonary embolism is a disease setting of a venous thromboembolism (VTE) with a deep vein thrombosis. It is usually hard to diagnose the disease and suspecting is necessary first to diagnose. It is 3rd leading cardiovascular cause of death[1]. Investigations in United States of America revealed 1-2 pulmonary embolism incidence in thousand people and it is accepted as a preventable disease[2]. The most common symptoms of the disease are sudden start of shortness of breath, stinging chest pain, tremor, cyanosis, hemoptysis and sometimes pain with swollen legs[3].

The increase of specialist employment in emergency services and development of technical facilities in emergency services might have increased the number of investigations about acute pulmonary embolism in patients with non-specific clinical picture. In fact, recent studies indicate the increase in cases with pulmonary embolism diagnosis due to the enhanced access to diagnostic tools[4]. Although this situation leads to increase usage of some imaging techniques, the major concern is what contribution is made in return to the risks caused by the radiation and contrast matter load to the patients. As a result of these facilities, how much diagnosing low risk or non-life-threatening pulmonary embolism patients would contribute to patient survey is still among the topics which are unclarified and should be investigated.

Besides the developing emergency service standards and the number of qualified doctors, increase in the population would naturally contribute to the number of patients diagnosed with acute pulmonary embolism. Moreover, environmental standards and life standards of the present patient population are not compatible with the life standards of the previously diagnosed acute pulmonary embolism patients whose demographic data have been used in the current studies

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Received: 24.01.2022 • **Accepted:** 16.02.2022
DOI: 10.55994/ejcc.1062164

Cite this article as: Orun S, Bol O, Akoz A. Determination of demographic changes of acute pulmonary embolism patients applied to emergency service: retrospective analysis of 60 cases. Eurasian Journal of Critical Care. 2022;4(1): 8-11

Together with the sources and directions formed by many professional institutions supporting the careful use of imaging resources, suggestions for the choice of CT angiogram usage for patients with pulmonary embolism suspicion are now accessible[4,5]. However, the researches taken into account during the formation of such suggestions should be conducted in the light of data obtained from recent samplings, and for this, the introduction of demographical studies which are usually reified but of high fundamental importance is required.

Our aim to conduct this study was to contribute to the literature for the analysis of potential changes happening over time by determining the clinical and demographic traits of the increasing number of patients diagnosed with pulmonary embolism.

Materials and Methods

Our study is a retrospective study conducted with all patients over the age of 18 who applied to the emergency service and diagnosed with pulmonary embolism between 01.01.2017 and 01.01.2019. Physical files of the cases formed at the application and saved data in the information system were analyzed. Patients with missing background information were eliminated even if they were diagnosed with acute pulmonary embolism.

Demographic and clinical data of patients such as patients' complaints, background story, physical examination and laboratory inspections were determined and relationship between all the data was analyzed. Calculated wells criteria scores of the patients were evaluated. Moreover, the presence of hypoxia-hypocarbia and its coupling with S1Q3T3 wave pattern in electrocardiogram was investigated. In order to gather the standard patient data, a case report form was prepared. All laboratory results were selected from the first results obtained at the time of patients' application to emergency service. Physical exam results were recorded individually for each patient. Prior to the study, approval with the date and number of 08.10.2021-86030 was obtained from Namık Kemal University Faculty of Medicine Ethical

Statistical analysis

All data were stored in IBM SPSS Statistics 18 software. Kolmogorov-Smirnov test was used to evaluate the normality distributions of the parameters. Pearson Chi-square test was used to relationship between categorical variables. Mann-Whitney U test was conducted to find out the relationship between numerical variables. Continuous variables were expressed as mean ± standard deviation. Numerical expressions of categorical values were expressed as absolute number and percentage. $p < 0.05$ was accepted as statistically significant.

Results

A total of 137572 files were scanned for this study. 171 patients whose ICD code was acute pulmonary embolism were selected for further detailed investigation. The sampling size was determined to be 60 after eliminating patients with missing background information and incorrect ICD codes and a total of 60 patients were included in the study. The average age of the patients was 64.46 (16.95). Among the patients, 34 (56.7%) were female while 26 (43.3%) were male.

Shortness of breath and chest-back pain were the leading complaints of emergency service applications by 36 (60%) and 16 (26%), respectively. They were followed by 6 (10%) fever and 5 (8.3%) hemoptysis (Table 1).

Table 1: Complaints of the cases applying to the emergency department

Dyspnea	36(%60)
Chest-back pain	15(%25)
Fever	6(%10)
Hemoptysis	5(%8,3)
Syncope	4(%6,6)
Lower extremity pain	4(%6,6)
Weakness	3(%5)
Tachycardia	3(%5)

The leading background stories of the cases were malignity with 14 (23%) patients, and hypertension with 12 (20%) patients. They were followed by coronary arterial disease and heart failure, and asthma and COPD, respectively. There was no disease history in 6 patients. Detailed data about patients' background stories are given in Table 2.

Table 2: History of the cases

	n(%)
malignancy	14(%23,3)
Hypertension	12(%20)
CAD+CHF	11(%18,3)
Asthma+COPD	8(%13,3)
DM	2(5%)
immobilization	2(5%)
No features	6(%10)

CAD: coronary artery disease, CHF: chronic heart failure COPD: chronic obstructive pulmonary disease, DM: diabetes mellitus

The most common physical examination indication was bruit with 21 (35%) patients and pretibial edema with 11 (18%) patients, while 12 (20%) patients did not show any symptom. Symptoms of physical examinations are given in detail in Table 3.

Table 3: Physical examination findings in the cases

	n(%)
Ral	27 (%45)
Ronkus	13 (%21,66)
PTE	16 (%26,66)
Homans	5(%8,33)
No features	15(%25)
Inspection failed	3(%5)

PTE: pretibial edema

When the average laboratory data of the cases were analyzed, the data were determined as follows: D-dimer 8.24 ± 8.75 mg/L (0-0.55), troponin 22.03 ± 30.5 ng/L (0-14), creatinine 1.00 ± 0.35 mg/L (0.5-0.9), and urea 42.95 ± 24.18 mg/L (19-44). Moreover, in 20 (33.3%) of the cases there was hypoxia-hypocarbia coupling, in 5 (8.3%) patients S1Q3T3 wave pattern was detected in electrocardiogram (Table 4). The cases were categorized in terms of VTE risk according to the Wells scoring system. While 1 (1.7%) patient fell into low-risk group, 53 (88.3%) patients were in medium risk group, and 6 (10%) patients were in the high-risk group.

Table 4: Laboratory data of the cases

	Mean ± std n(%)	Cut-off range
D-dimer mg/L	8,24 ± 8,75	0 - 0,55
CRP mg/L	98,01 ± 146,36	0 - 5
Troponin ng/L	22,03 ± 30,5	0 - 14
Urea mg/L	42,95 ± 24,18	19 - 44
Creatin mg/L	1,00 ± 0,35	0,5 - 0,9
WBC 10^3/uL	10,69 ± 3,98	4 - 10,5
Hg g/dL	12,01 ± 2,1	12,5 - 16
Platelet 10^3/uL	241,95 ± 104,84	132 - 356
pH log [H+]-	7,44 ± 0,07	7,35 - 7,45
pO2 mmHg	71,35± 111,55	80 - 100
pCO2 mmHg	34,91 ± 9,07	35 - 45
Pt sn	14,73 ± 5,99	10 - 15
Aptt sn	24,73 ± 3,77	21 - 32
INR INR	1,18 ± 0,15	0,8 - 1,3
ECG- S1Q3T3	5(%8,3)	
Hypoxia-hypocarbia coexistence	20(%33,3)	PaO2<80mmHg PaCO2<40mmHg

CRP: C reactive protein, WBC: wight blood cell, Hg: hemoglobin, Pt: prothrombin, Aptt: activated partial prothrombin time, INR: international normalized time, ECG: electrocardiography, std: standard deviation.

A total of 45 patients included in the study were hospitalized in the service for further tests and treatment, while 15 were interned in the intensive care unit. Also, thrombolytic was applied to 4 patients in the emergency service. While 5 patients died while followed in the intensive care unit, 55 patients were discharged with full recovery.

Discussion

The incidence of PE increases with age. The PE incidence was determined to be 1 in 100,000 among young individuals, while this ratio was indicated to increase hundred times above the age 80[2]. In a study conducted by Duru et al. (2012), 86 (42%) over 205 patients diagnosed with PE were over age 65, and the average age of all cases was determined to be 61.55 ± 4.44[6]. The results of our study were close to those of literature. Among our patients, 27 (45%) were below 65. We consider that risk factors that increase by age increase the pulmonary embolism incidence, and also changing environmental conditions and habits can lower the age of prevalence of PE.

The situation is similar for the sex. DE Lilienfeld stated that PE was more common among males than females in all races as a result of his analysis of data in USA between 1979-1996[7]. This ratio was detected to increase in the favor of women in the study of Mutlu LC, 2005[8]. The number of female patients were higher than that of males. We speculate that there may be different causes of this situation, such as the increase of in-vitro fertilization applications in women and the enhancement of embolic events caused by the medications used in this treatment, or raise of smoking among women which is a serious risk factor for PE, or increase in the deskwork rates due to the increased partaking of women in business life and its setting ground for embolic events.

Surgical intervention, DVT and heart disease were the most frequent among the background stories in many studies[2,3,6-8]. Chronical heart failure (19%), chronical respiration failure (16.5%), and malignity (5%) were stated to be the most frequently encountered additional diseases in the study by Duru et al.[6]. Surgical intervention, DVT story and heart disease were still present among the background stories of the patients, but malignity was the leading with 14 (23%) patients. We speculate that the increase in prevalence of malignities and increase in the survey of cancer patients are among the most important reasons of this situation. Moreover, oncology follow-up patients are high since our hospital is a tertiary care health service, and the preference of our clinic in case of emergency by these patients can be among the reasons of this situation.

The clinics of patients diagnosed with PE changes depending on the localization of thrombus and demographic and background story. PIOPED (Prospective Investigation of Pulmonary Embolism Diagnosis) study stated that rate of incidence of shortness of breath, pleuritic chest pain and cough complaints were 85%, 64% and 53%, respectively, in cases

diagnosed with massive PE cases; while the same complaints were 82%, 85% and 52%, respectively, in cases with sub-massive PE[9]. The most common symptoms in our study were dyspnea and back-chest pain, as compatible with the literature. Symptoms and clinical findings were generally stated to be of high sensitivity but not of sufficient specificity in the evaluation of patients with PE[1]. We attribute the non-reflection of limited changes of the demographic data of the cases included in this study to the clinical findings to the mentioned situation.

Another important area of use of the demographic and clinical data is the evaluation of diagnosis probability of the cases. In the manual about pulmonary embolism published by European Respiratory Society (ESC) (2019), it was indicated that the symptoms and clinical findings should be evaluated together with the risk factors for VTE, and by this means, different clinical or pre-test probability classifications corresponding to increasing real prevalence of PE cases with final diagnosis could be done in the patients suspected for PE[4]. Wells and Genova scoring systems are the common risk scoring systems in this application, which are also suggested in the current manuals[10-12]. Hence, we think that presence of malignity having a score equivalent in these scoring systems confirms the hypothesis of our study stating the importance of evaluation of demographic data.

Limitations

1. Our findings and results may be regional owing to the monocenter study.
2. The data of some patients could not be accessed and included since the study was a retrospective one.

Conclusion

The number of cases diagnosed with pulmonary embolism has been increased recently due to the enhanced accessibility of diagnostic tools. However, there are a few studies evaluating the interaction of this increase with factors other than the developing diagnostic methods. We believe that demographic studies carried out in different periods will contribute to determine the potential changes. Of course, in order to make a clearer comment on this issue, there is a need for many studies examining the demographic characteristics of different societies.

Funding: *No financial support or funding was received for the study.*

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Original Article
Eurasian Journal of Critical Care

Detection of Breath Alcohol After Oral Anti-Inflammatory Spray Use

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Abstract

Background: We aimed to investigate the effect of ethanol-containing oral antiseptic sprays on breath alcohol levels and its relationship with time and body mass index.

Materials and Methods: This study includes the results of 99 patients. Body mass index of each individual was recorded. Individuals were asked to blow into the alcoholmeter immediately after taking 8 puffs of oral antiseptic sprays and in this way, the breath alcohol concentration. 0th minute value was obtained. The measurements were repeated three times, at the 3rd, 5th, and 10th minutes. Breath alcohol concentration values were recorded.

Results: The median age of the patients was 34 (IQR 25-75: 28-42) and 55 (55.6%) of the patients were male. While the mean alcohol level measured at the 0th minute was 0.075 ± 0.013 promil, the mean alcohol level measured at the 10th minute was 0.001 ± 0.004 promil. A statistically significant difference was found between the alcohol levels measured at the 0th, 3rd, 5th, and 10th minutes (χ^2:288,762, p<0.001). A statistically significant difference was found between all groups in the pairwise comparison of alcohol levels measured at the 0th, 3rd, 5th, and 10th minutes (p<0.001).

Conclusion: This study shows that ethanol-containing sprays may exceed the legal criteria in breath alcohol measurements.

Keywords: Emergency department, breath alcohol measurement, oral antiseptic spray, alcoholmeter, body mass index

Introduction

Alcohol is one of the main causes of traffic accidents all over the world. However, laws and restrictions on drunk driving differ from country to country. According to the traffic laws enacted in our country, driving under the influence of alcohol is forbidden for professional drivers, but non-professional drivers are allowed to drive with breath alcohol levels up to 0.5 promile (corresponding to 50 mg/dL ethanol in the blood)1. Studies have shown that the use of some soft drinks, foods, and drugs can cause short-term false positive breath alcohol concentration (BAC) values. Roadside preliminary breath alcohol testing is one of the strongest deterrents available for police enforcement. However, some products such as mouth spray, frequently taken by individuals, are sometimes used as a justification for high BAC levels[2].

When analyzing a person's breath, the alcoholmeter analyzes the alcohol expelled from the lungs along with the air of alveolar origin. One of the most important causes of false positive results with alcoholmeter is residual alcohol in the mouth, throat, and stomach. Oral antiseptic sprays (OAS) are generally used in throat infections or as a precaution against infections. Such sprays are sold in pharmacies without a prescription. Many people buy these types of sprays and use them for various purposes such as eliminating smoke smell. As such widespread use sometimes causes false positive results in the measurement of breath alcohol level, a confirmation of blood alcohol level measurement may be required. In case of an objection to the breath alcohol level measured in traffic, following an appeal to the court, alcohol can be eliminated from the body to a significant extent in the intervening period. In studies, the effects of mouthwashes containing alcohol and various foods and beverages on alcohol levels have been investigated[2,3].

In this study, we aim to determine whether BAC values are higher than the legal upper limit and the rate of elimination with the help of alcoholmeter following the use of OAS in patients with tonsillopharyngitis who did not consume alcohol. We also investigate the relationship between BAC values and body mass index (BMI).

Materials and Methods

A total of 130 patients who presented to the Emergency Department of Health Sciences University Bursa Yüksek İhtisas Training and Research Hospital between 15 April 2021

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Received: 04.03.2022 • **Revision:** 16.04.2022 • **Accepted:** 21.04.2022
DOI: 10.55994/ejcc.1082771

Cite this article as: Isler Y, Kaya H, Yuksel M, Ay MO, Bulut M. Detection of breath alcohol after oral anti-inflammatory spray use. Eurasian Journal of Critical Care. 2022;4(1): 12-15

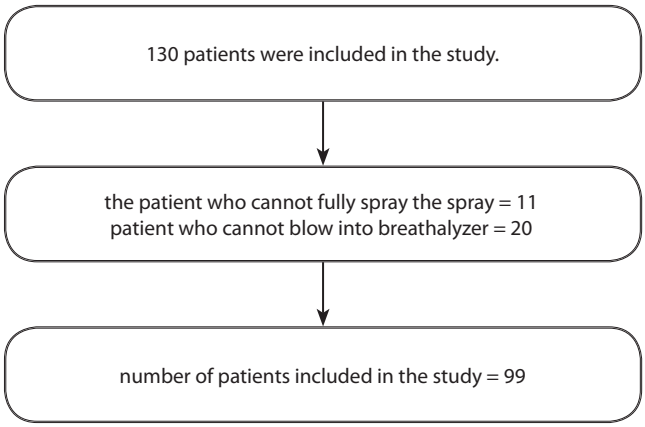

Figure 1: Flowchart on the study

and 31 April 2021 with complaints of tonsillopharyngitis were included. Since 11 of the patients could not spray fully and 20 could not blow into the alcometer, they were excluded from the study. A total of 99 patients participated in the study (Figure 1). Written approval was obtained from the ethics committee of our hospital during the planning phase of our study (2011-KAEK-25 2021/03-04).

Age, gender, height, weight, and BAC values of the patients were recorded. Inclusion criteria of the study were being selected randomly among individuals with tonsillopharyngitis complaints, being over the age of 18, not having a chronic disease, and being volunteered to participate in the study. On the other hand, the exclusion criteria were smoking at least one hour before, using alcohol the day before, having a piercing in the mouth, being pregnant, having oral or dental treatment, and having an oral prosthesis. In the study, a mouth spray (Tanflex) known to contain methyl parahydroxybenzoate 30 mg, ethanol 95% (3 mL), sodium bicarbonate 3.3 mg was used.

BAC values were measured with a Four Season Alcoholmeter and disposable mouthpieces were used. The device sensor is an advanced semiconductor oxide alcohol and the measuring range is 0.05 % - 0.50 % bac (0.0-5g/l). Alcoholmeters are based on the principle that the current passing through the instrument sensor electrodes during the oxidation of ethanol is proportional to the amount of ethanol.

The environment where the mouth spray was applied to the volunteers and the measurements were made with the alcoholmeters was ventilated, taking into account the indoor air quality in a way that it would not cause any contamination. Each volunteer was taken to the environment one by one, ethics committee consent forms were signed, information was given about the study, and height, weight, and age measurements were recorded. Before applying the mouth spray to the volunteers, breath alcohol levels, called passive alcohol test (blind), were measured. The result of all volunteers was negative. Participants were asked to squeeze and swallow 8 puffs of the Spray. Then, breath measurements were taken with an alcoholmeter device at the 0th, 3rd, 5th, and 10th minutes.

Statistical Analysis

IBM SPSS Statistics for Windows, Version21.0 (IBM Corp. Armonk, NY: USA. Released 2012) was used for statistical analysis. Descriptive statistics were expressed as mean ± standard deviation (minimum – maximum), median to range and/or interquartile range (IQR) for numerical variables, while they were expressed as number of cases and (%) for categorical variables. The Kolmogorov-Smirnov test was used for the normality distribution of the data. While the Pearson correlation analysis was used to evaluate the relationships between the variables with parametric distribution, the spearman correlation analysis was used to evaluate the relationship between the variables with nonparametric distribution. The Friedman test was used to investigate whether there was a systematic difference between the rankings of three or more dependent groups showing a nonparametric distribution.

Results

A total of 99 patients were included in the study. The median age of the patients was 34 (IQR 25-75: 28-42). While 55 (55.6%) of the patients were male, 44 (44.4%) were female. The mean alcohol level measured at the 0th minute was 0.075 ± 0.013 promil whereas the mean alcohol level measured at the 10th minute was 0.001 ± 0.004 promil (Table 1).

Table 1: Clinical Data

	BMI*	0. Min.	3. Min.	5. Min.	10. Min.
Mean	27.21	0.075	0.041	0.013	0.001
Std. Deviation	4.57	0.013	0.017	0.017	0.004
Minimum	17.69	0.03	0.01	0.00	0.00
Maximum	38.42	0.11	0.08	0.06	0.02

*. Body Mass Index

In the Spearman correlation analysis performed to determine whether there was a correlation between the alcohol levels measured at the 0th, 3th, 5th, and 10th minutes with the BMI, a slightly positive correlation was found between the alcohol level measured at the 10th minute and the BMI ($p<0.05$, $r=0.239$) (Table 2).

A statistically significant difference was found in the Friedman test performed to investigate whether there was a difference between the alcohol levels measured at the 0th, 3th, 5th, and 10th minutes (χ^2 :288,762, $p<0.001$) (Table 3).

Table 2: Spearman Analysis of Variables

			BMI	0.Min.	3. Min.	5. Min.	10. Min.
Spearman's rho	BMI	r	1.000	0.026	0.083	0.070	**0.239***
		p		0.800	0.417	0.490	**0.017**
	0. Min.	r	0.026	1.000	0.700 **	0.514 **	0.323 **
		p	0.800		0.000	0.000	0.001
	3. Min.	r	0.083	0.700 **	1.000	0.723 **	0.366 **
		p	0.417	0.000		0.000	0.000
	5. Min.	r	0.070	0.514 **	0.723 **	1.000	0.474 **
		p	0.490	0.000	0.000		0.000
	10. Min.	r	0.239*	0.323 **	0.366 **	0.474 **	1.000
		p	0.017	0.001	0.000	0.000	

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 3: Analysis Table of Measurements

	Median IQR(25-75)	Friedman test
0. Min.	0.08 (0.07-0.08)	χ^2 :288.762, p<0.001
3. Min.	0.04 (0.03-0.06)	
5. Min.	0(0-0.02)	
10. Min.	0 (0-0)	

Discussion

In this study, we aimed to investigate the effect of oral antiseptic spray use on breath alcohol level and its relationship with time in patients with tonsillopharyngitis complaints. We needed to conduct this study because there was no clear time period in previous studies. We also increased the study group and aimed to investigate the effect of BMI on BAC value.

Driving under the influence of alcohol causes traffic accidents and deaths. In order to prevent alcohol-related traffic accidents, countries have enacted traffic laws that set alcohol limits. Drink-driving roadside screening is a common practice performed by police officers throughout the world. In many countries, the BAC is accepted as evidence for prosecuting drivers. The breath alcohol test is based on the ratio between blood alcohol and alveolar air alcohol. The ratio of blood alcohol to breath alcohol is 1:2100. Many alcoholmeter devices use this ratio to convert the amount of alcohol in the breath to the amount of alcohol in the blood. In order to determine the alcohol in the blood, the value obtained by the alcoholmeter is multiplied by 2100 and it reflects the amount of alcohol in the blood in mg/L[4].

Ethyl alcohol is the most commonly used form of alcohol as an excipient in pharmaceutical formulations. It is the second most commonly used solvent after water in liquid formulations. Ethyl alcohol is also an antimicrobial agent with bacteriostatic, bactericidal and fungicidal activity[5]. It is a substance used in oral care products, sprays, and mouthwashes due to its antibacterial activity. Ethanol remaining in the mouth after the use of aforementioned products may cause false positive results in the breath alcohol test.

In a study conducted by Bonda F. et al. in Italy, breath alcohol levels were measured after the use of mouthwashes known to contain ethyl alcohol. Since the legal limit for ethyl alcohol in traffic in Italy is 0.5 promil, evaluations were made based on this value. It was observed that the measurements made at the 10th minute were significantly different from the ones made at the 0th minute and the alcohol was eliminated from the breath within 10 minutes. In that study, there was no significant difference between the measurements made after mouthwash use between men and women[6]. Additionally, they concluded that there was no significant difference between the measurements made after spray use between men and women, which is similar to our results.

Karabulut D. Y. et al. found no significant correlation between the BAC with the BMI and age in the breath alcohol test performed with shaving cologne, mouthwash and mouth spray. They observed that the BAC value was higher at the 5th minute in mouthwash and at the 3rd minute in mouth spray and cologne6. In our study, BAC values were not dependent on the patient's BMI, indicating that the BMI did not affect the BAC value after use of the mouth spray.

In another study with energy drinks, breath alcohol levels immediately after consumption was observed to cause positive results with the effect of alcohol accumulated in the mouth, this positive result was temporary and disappeared after a 15-minute observation period[7].

In their study, Wigmore and Leslie applied 10 mL of a beverage containing 20% alcohol into the mouth of 9 women and 21 men. Subjects either rinsed and spit out or swallowed the alcohol after 10 seconds. The level of alcohol in the mouth was found to be higher in people who spit out by rinsing than in people who swallowed[8].

Fessler et al emphasized that a 15-minute period was needed so that alcohol-based substances such as cough suppressants, mouthwash, and respiratory spray could not leave residual alcohol in the mouth and could not affect the concentration of breath alcohol[9].

Garcia et al. conducted a study to examine the effect of asthma inhalers on breath alcohol and found that all inhalers gave positive results in the breath alcohol test at the first minute, but all of them decreased to zero after 10 minutes[10].

In our Turkey, according to the Highway Traffic Regulation, the measurement should be done by taking

blood samples in traffic accidents resulting in injury and death if measurement with a technical device is not possible due to reasons such as the urgency of the injured person's condition11. For this reason, alcoholmeter may result in erroneous measurements as possible residual alcohol in the mouth affects the measured level. In our study in which oral antiseptic spray was used, the breath alcohol level was below the legal limit in the measurements made after the 3 and 5th minute. On the other hand, the breath alcohol concentration decreased below the legal limit in the measurements made after 10-15 minutes in other studies studying other substances that could affect the measurement of breath alcohol[9,10]. According to the Highway Traffic Regulation (Art. 97/f), in case of objection to the measurement result made with the technical device, no re-measurement is made, objections to the actions taken are made to the relevant courts within the scope of Article 27 of the Misdemeanor Law No. 5326 dated 30/3/2005[12]. Changing this regulation to make measurements at 5-minute intervals in case of objection will prevent possible wrong evaluations. It is clear that two consecutive positive test results are possible only if there is ethanol in the bloodstream.

Limitations

Our study has several limitations. It was a single-center study with a limited number of patients. Multinational studies with more patients are needed on this subject.

Conclusion

BAC values are only affected by alcohol remaining in the oral cavity from the mouth spray, which explains why the rate of BAC decline is really important. Even if a mouth spray can change the result of a single alcoholmeter test, a simple protocol based on two samples with 5 minutes intervals can eliminate this disadvantage.

The results of the current study suggest that mouth spray containing a significant amount of alcohol will justify a positive alcohol test. Therefore, the use of alcohol-containing drugs at traffic controls should be questioned and a waiting period should be defined in order to prevent the unjust treatment in cases of use.

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Case Report
Eurasian Journal of Critical Care

A Rare Heart Valve Involvement in Adult Polycystic Kidney Disease: A Case Report

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Abstract

In adult polycystic kidney patients, heart involvement is frequently observed in the progressing process of the disease, as well as the pathologies created in various other organs. Among others, left ventricular hypertrophy and mitral valve prolapse are generally observed. A 42-year-old female patient, receiving dialysis due to chronic renal failure resulting from autosomal dominant polycystic kidney disease, was admitted to the cardiology outpatient clinic with complaints of high blood pressure, dyspnea and abdominal pain. During clinical examinations, a cyst was detected in the tricuspid valve on echocardiography. In this case study, we aimed to present a patient with a cyst on the tricuspid valve, which has not been previously encountered in adult polycystic kidney patients.

Keywords: adult polycystic kidney disease, left ventricular hypertrophy, tricuspid valve, giant hepatic cyst, dyspnea, heart failure

Introduction

Autosomal dominant polycystic kidney disease is a disease characterized by the development of widespread cysts in the kidneys[1,2]. Cysts usually develop due to a genetic anomaly associated with epithelial cell differentiation and extracellular matrix dysfunction[3]. Apart from kidney involvement, liver, pancreas, lung and cardiovascular involvements are also present. Cardiovascular disorders are the main complication contributing to both morbidity and mortality[4]. In this case study, we aimed to present a patient with a cyst on the tricuspid valve, which has not been previously encountered in adult polycystic kidney patients.

Case Reports

A 42-year-old female patient, receiving dialysis due to chronic renal failure resulting from autosomal dominant polycystic kidney disease, was admitted to the cardiology outpatient clinic with complaints of high blood pressure, dyspnea and abdominal pain. In contrast-enhanced computed tomography of the whole abdomen, both kidney sizes were observed to be larger than normal and extend to the pelvis level. Multiple cortical and parenchymal cysts were detected on the right and the left kidneys the largest ones were of 62mm and 82mm in diameter, respectively. (see Figure 1)

At this level, densities of millimetric stones were detected between the cysts. There were many cysts in the pancreatic body and tail, and intestinal segments and colon were compressed due to the significant increases in the size of both kidneys. (see Figure 2) A 3cm diameter cyst was observed in the left ovary. When evaluated together with the other findings, it was interpreted as an autosomal dominant type 2 polycystic kidney disease.

In the echocardiography of the patient with shortness of breath, the cystic structure, which was not encountered in any other cases in the related literature, was observed under the tricuspid valve (see Figure 3,4). Although the aortotubular junction was slightly enlarged, left ventricular hypertrophy was observed (Figure 5). Despite the attempts to control the patient's blood pressure by regulating her medical treatment, she passed away two months later due to intracranial hemorrhage.

Discussion

Cardiovascular problems are among the main causes of death in patients with Autosomal dominant polycystic kidney disease (ADPKD)[4]. Hypertension is one of the early symptoms[5]. Left ventricular hypertrophy is the most

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Received: 08.09.2021 • **Accepted:** 29.11.2021
DOI: 10.55994/ejcc.992812

Cite this article as: Gunlu S, Duyan M, Saridas A, Yildizhan S, Cander B. A rare heart valve involvement in adult polycystic kidney disease: a case report. Eurasian Journal of Critical Care. 2022;4(1): 16-19

common cardiac finding. Intracranial and extracranial aneurysms and heart valve defects are other potential problems. Our patient had hypertension and left ventricular hypertrophy[6]. The cause of our patient's death was bleeding from an intracranial aneurysm.

Histological analysis of heart valve tissue obtained from lesions obtained from numerous published case series and case reports suggests that it is caused by myxomatous degeneration associated with collagen loss and degeneration[3]. As a matter of fact, in our patient, cystic formation was observed with the degeneration of the tricuspid valve. This histological structural disorder is expected to be multisystemic and involve organs such as lung, liver, pancreas, ovary, kidney, and heart. In line with the literature, our patient had other organ involvements other than kidney.

ADPKD is a systemic disease associated with a variety of extrarenal manifestations, including aortic root enlargement and cardiac valve abnormalities, mostly mitral valve prolapses[7]. In a combined retrospective and prospective study of 11 autosomal dominant polycystic patients, multiple cardiac and aortic lesions were found. Aortic root width was detected in 7 patients with aortic valve insufficiency. Two of them required valve replacement due to severe insufficiency. 3 patients had mitral valve insufficiency and two of them had chordae tendinea rupture[8].

Another study examined echocardiography findings to evaluate the prevalence of cardiac anomalies with 163 patients diagnosed with ADPKD, 130 unaffected family members, and 100 control subjects. The prevalence of mitral valve prolapse was observed as 26%, 14%, and 2% in these three groups, respectively. In addition, tricuspid valve prolapses, along with valvular insufficiencies, were also detected in ADPKD patients[9]. To the knowledge of the researchers, the cystic structure detected in the tricuspid valve in our patient with ADPKD was not previous reported in any cases in the related literature.

Conclusion

The overall cardiac involvement of ADPKD supports the hypothesis that the disease contains a defect in the extracellular matrix, and that cardiac abnormalities are caused by this defect. Therefore, it can be concluded that the cyst development in the tricuspid valve might be suspected in patients with ADPKD.

Figure 1: Bilateral Renal Polycystic

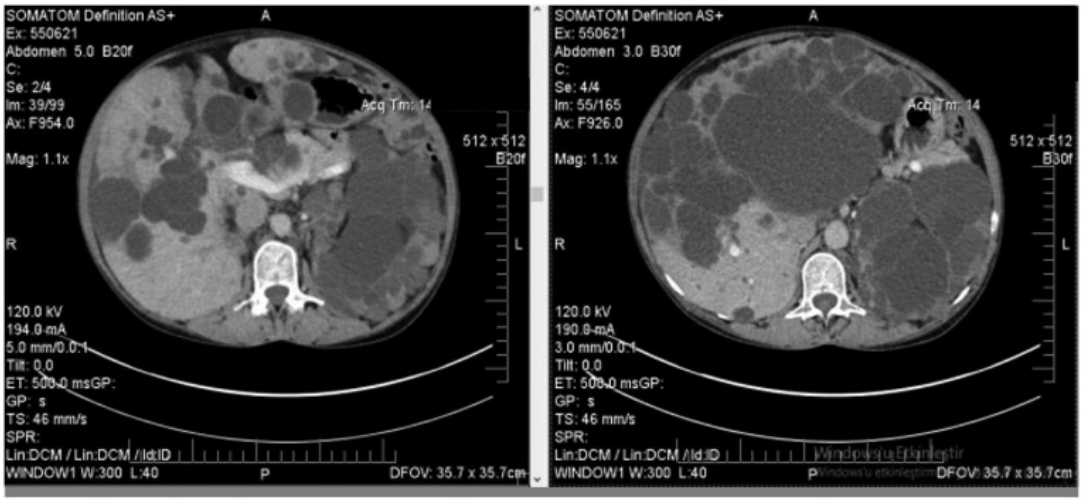

Figure 2: CT image of ADPK disease

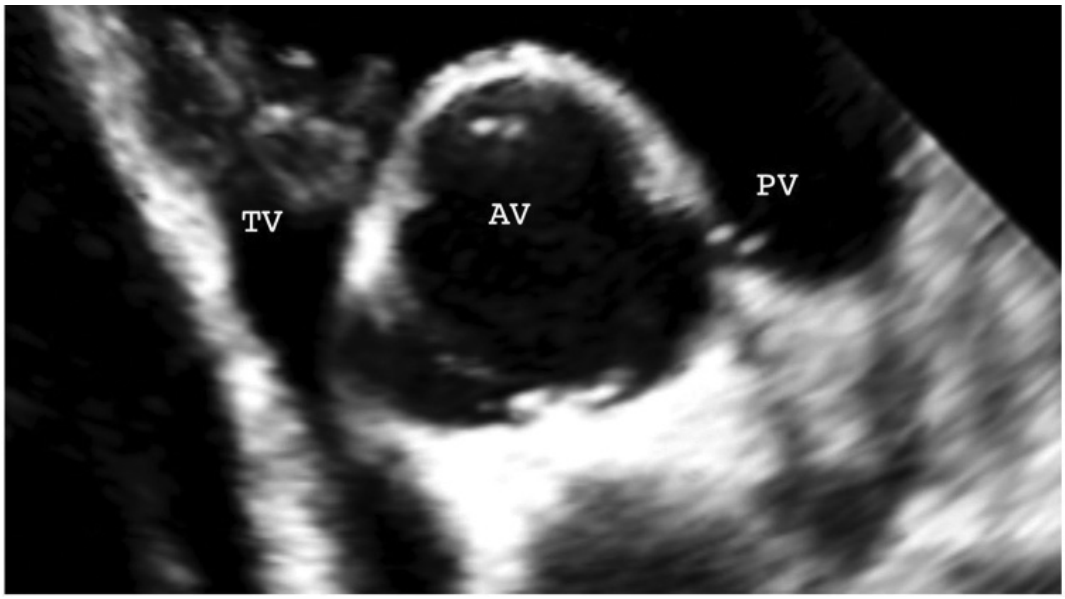

Figure 3: Short axis echocardiography image: involvement of tricuspid valve. (TV is Tricuspid Valve, AV Aorta Valve and PV Pulmonary Valve)

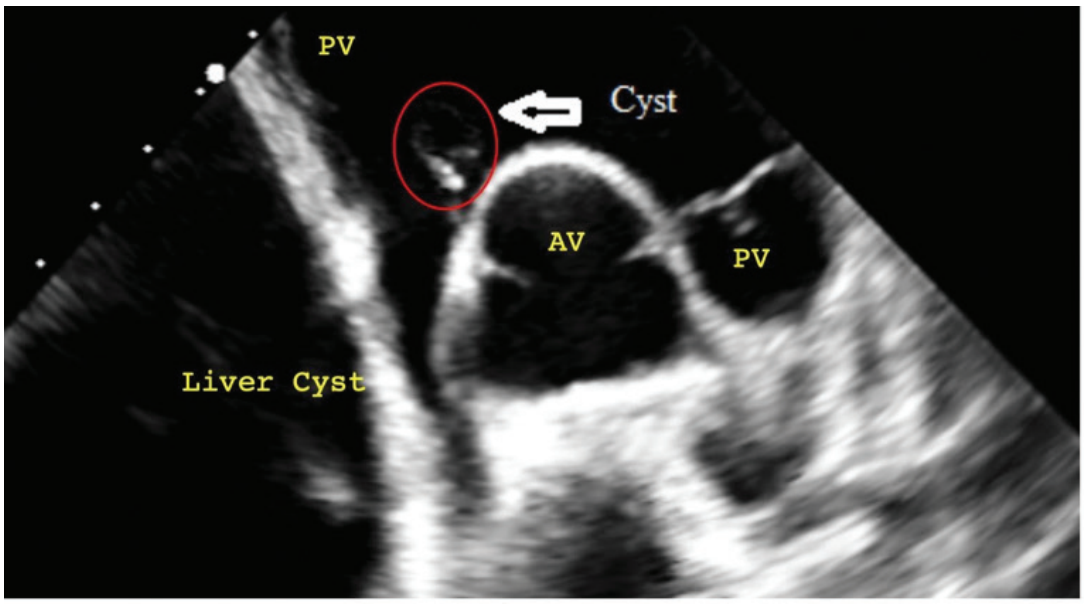

Figure 4: Tricuspid valve opening image (PV is Pulmonary Valve, AV Aorta Valve and PV Pulmonary Valve)

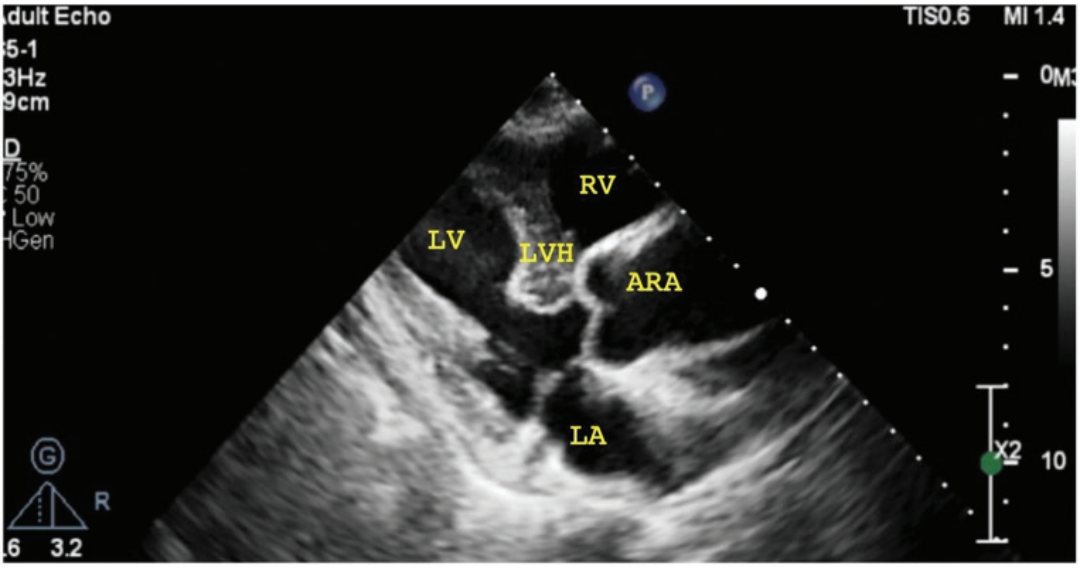

Figure 5: LVH and annular aortic dilatation image
(LV is Left Ventricle, LVH Left Ventricle Hypertrophy, LA Left Atrium, RV Right Ventricle and ARA Aorta Root Annular

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Case Report
Eurasian Journal of Critical Care

A Rare Injury Due to Blunt Trauma: Rupture of Subclavian Artery Branch

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Abstract

Subclavian artery injury is an extremely rare and life-threatening condition. In this case, we discussed the diagnosis and treatment of the subclavian artery branch injury due to chronic blunt trauma caused by inappropriate traditional physical therapy. A 72-year-old male patient was admitted to the emergency department with sudden onset of pain and swelling in the left chest wall after inappropriate traditional physical therapy. He had a medical history of hemorrhagic stroke causing paralysis in his right arm and right leg. Muscle tension exercises were given to the patient by his relatives with the mechanism they built. Pulses were normal in the left upper extremity, and there was no difference in temperature and diameter between both upper extremities. The patient diagnosed with left subclavian artery branch rupture with computed tomography angiography was followed up with compression therapy without any surgical intervention and discharged with full recovery.

Keywords: Subclavian artery, branch, rupture, physical therapy, blunt injuries

Introduction

The subclavian artery that lies in a groove on the first rib is well protected by the clavicle, first rib, and scapula. Subclavian artery injuries are extremely rare among artery injuries due to their location on the chest wall. Clavicle, scapula, first rib fractures, hemothorax, pneumothorax, and brachial plexus injuries may see in the injuries of the chest wall and 90-95% of injuries are due to penetrating trauma and 5% of injuries are due to blunt trauma. Most penetrating injuries are due to gunshot wounds[1,2]. In the mechanism of blunt trauma, the subclavian arteries are injured after the first rib is broken after the force from the top to the bottom and the artery is squeezed between the clavicle and the rib. The other mechanism is deceleration type injury[3-8]. In some cases, the trigger factors are sneezing, severe cough. Surgical repair of the subclavian artery is very difficult due to the anatomical location of the artery. Although open surgery is the classical method of treatment, it is associated with high morbidity and includes clavicular resection, thoracotomy, and median sternotomy[5].

Case Report

A 72-year-old male patient was admitted to our emergency department with sudden swelling and pain in the left chest. In his history, he had right hemiplegia due to hemorrhagic stroke and diabetes mellitus and there were no triggering factors such as sudden sneezing and severe cough. The patient was exercised suspended from the armpits with a mechanism set up by the patient's relatives without any physician's recommendation. (Figure 1) They have been doing this exercise 2 or/and 3 times a week for the last 2 months. The patient is not under follow-up and does not use any medication. In physical examination, her vital signs were stable: blood pressure was 120/80 mm/Hg, heart rate was 80 beats per minute, oxygen saturation was 98%, and body temperature was 36.5 degrees Celsius. There was extensive subcutaneous edema in the left hemithorax extending from the top first rib to the bottom 6th rib, the sternum on the right, and the posterior axillary line on the left. (Figure 2) Left upper extremity pulses and capillary refill time was normal. There was no difference in pulse, temperature, and diameter between both upper extremities. Computed tomography (CT) angiography examination was performed because of

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Received: 03.11.2021 • **Revision:** 06.12.2021 • **Accepted:** 06.12.2021
DOI: 10.55994/ejcc.1018434

Cite this article as: Sonmez C, Turgut K, Yavuz E, Gulacti U, Lok U, Aydin I. A rare injury due to blunt trauma: rupture of subclavian artery branch. Eurasian Journal of Critical Care. 2022;4(1): 20-23

Figure 1: Demonstration of the mechanism set up by the patient's relatives for physical therapy

Figure 2: Ecchymotic area in the posterior axillary line on the left. B) Extensive subcutaneous edema in the left hemithorax

the localization of the hematoma caused by the rupture of the subclavian artery branch. (Figure 3) The Patient was not taken to surgical treatment during his hospitalization. He was discharged with uncomplicated recovery after conservative treatment.

Discussion

Rupture of the subclavian artery is a rare injury that can be life-threatening. The mechanism of injury to the artery is through strain and penetrating injury. Penetrating injuries are most commonly caused by fractures of the first rib and clavicle, which occur after a gunshot, sharp piercing device. Subclavian artery rupture caused by blunt trauma is rarely seen. Subclavian artery injuries are seen in thoracic and neck traumas. Patients present to the emergency department with complaints of weakness in the arm due to brachial plexus damage, pain due to fracture of the first rib and clavicle, and shortness of breath due to lung damage. Most of the cases die at the scene. Rulliat et al. (7) conducted a retrospective study involving 1181 heavy traffic victims in France. Only 0.4% (5 patients) were diagnosed with subclavian artery rupture. Four of them died before reaching the hospital. In the present case, there was a chronic blunt trauma in the history given by the patient and his relatives.

In the physical examination findings of subclavian artery rupture, there may be findings such as the presence of an enlarged and fixed hematoma in the subclavian artery localization, the presence of a murmur in the hematoma region, and the absence of a pulse in the distal part. However, it should be noted that there might not be any clink signs[1-4]. In the present case, there was ecchymosis in the posterior axillary line on the left and, extensive subcutaneous edema and hematoma without a murmur that does not cause an absence in pulse.

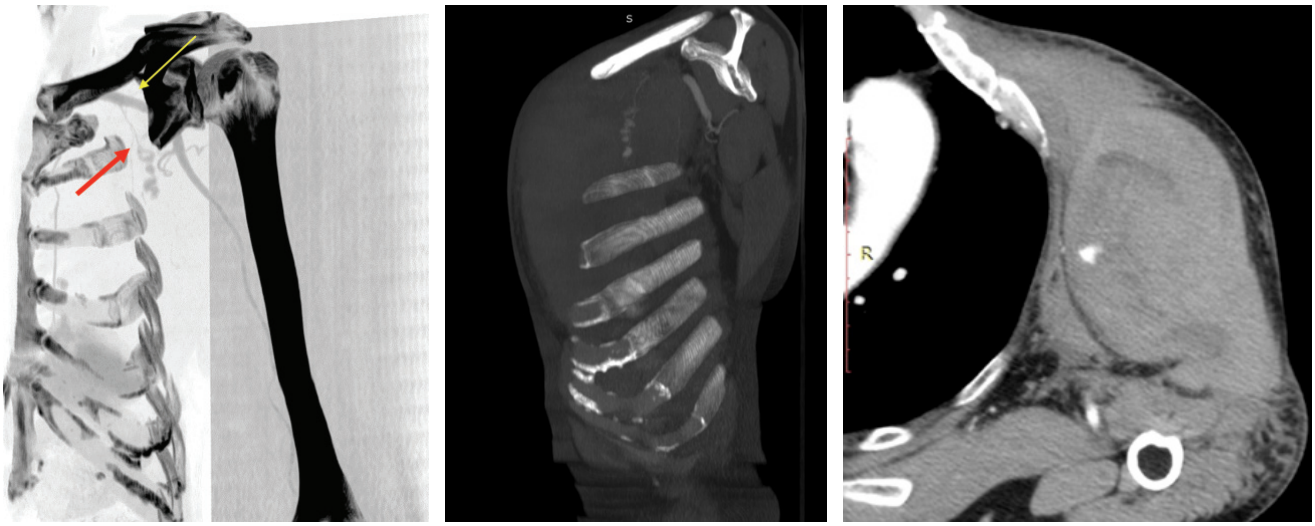

Figure 3: CT angiogram showing rupture of subclavian artery branch. 3A. Contrast leakage due to rupture of the branch (red arrow) originating from the subclavian artery (yellow arrow). 3B and 3C. Bleeding area of the left subclavian artery branch. Hypodense heterogeneous appearance with dimensions of 12x8 cm is observed at the widest point. There are necrotic areas in the center of the lesion in the left axillary area.

Ultrasound (US), CT angiography, and MR angiography can be used in the diagnosis of subclavian artery injury. The US can show indirect signs of subclavian artery injury. It is difficult to view the entire subclavian artery in the US due to its anatomical location. CT angiography is the most commonly used method in emergency conditions. MR angiography can be diagnosed in patients with stable vital signs. The gold standard method in diagnosis is CTA[1,2]. In the present case, upon the presence of extrapleural hematoma in the anterior chest wall, we performed a CT angiography upon suspicion of injury to the subclavian artery and its branches and diagnosed an injury to one of the subclavian artery branches. The hematoma was the extrapleural area did not expand. The main subclavian artery was not injured.

Endovascular and open surgery options are available for treatment[6]. In recent years, endovascular surgery with stenting has become widespread and successful results have been obtained. Its morbidity is lower than open surgery.[5,6,8] Barao et al.[5] conducted a retrospective study involving 15 patients from a single center. They repaired the traumatic subclavian artery rupture with endovascular surgery. In a case report, a patient with a traumatic subclavian artery injury that cause large extrapleural hematoma was conservatively followed and was discharged with full recovery. Authors recommended conservative treatment in hematoma with stable vital signs and non–extrapleural expansion in selected cases[6]. Baikoussis et al.[8] achieved survival by endovascular surgery in the management of hemothorax after traumatic subclavian artery rupture. We achieved uncomplicated survival with conservative treatment because the patient's vital signs were stable in the present case.

Conclusion

This case is interesting because of the scarce of a similar case in the literature, and its occurrence with blunt trauma after the application of inappropriate physical therapy. Subclavian artery branch injury should be kept in mind in patients with clinical neurovascular anomalies in the ipsilateral extremity and edema in the ipsilateral chest wall in blunt traumas. The conservative approach without surgery can be preferred as an alternative option for such patients.

Acknowledgments

We would like to thank Associate prof. Dr. Ali Haydar Baykan, Radiology Department of Adiyaman University Medical Faculty, who arranged the radiological images.

This paper was presented as a poster presentation at XVI. National Emergency Medicine Congress & 7. Intercontinental Emergency Medicine ve 7. International Critical Care Congress

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Case Report
Eurasian Journal of Critical Care

Sports-Related High-Grade Renal Injury: A Case Report

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Abstract

Sport is defined as a set of movements that improve an individual's health status, physical ability and performance. While sports-related injuries mostly affect the musculoskeletal system, soft tissue, bone and nerve tissue elements are also injured in different forms and degrees. It has been found that sports injuries often cause muscle tendon injuries in the lower extremities. In this paper we report a case of sports-related high-grade renal injury because of that he did not have a solitary kidney and was during football makes it unusual among sports-related renal injuries, which are rare.

Keywords: Athletic injuries, kidney, injury

Introduction

Sport is defined as a set of movements that improve an individual's health status, physical ability and performance[1]. In the literature, it has been shown that regular sports activities of moderate intensity increase physiological, psychological and social capacity. On the other hand, sports are intensively applied in the prevention, treatment and rehabilitation of diseases in the direction of preventive medicine[1]. Football is the most common sports branch in the world and in our country for professional, amateur and health purposes[2]. Sports injuries include damage caused by exceeding the endurance limits as a result of the whole or a part of the body encountering a force greater than normal.

It is reported that the probability of being injured in sports is one in 4,000 people, the death rate is one in 40,000 people, and the rate of encountering a major accident is one in 40 people. While sports-related injuries mostly affect the musculoskeletal system, soft tissue, bone and nerve tissue elements are also injured in different forms and degrees[1]. It has been found that sports injuries often cause muscle tendon injuries in the lower extremities[2].

In this report we aimed to present the case of severe renal injury that occurs during amateur football game.

Case Report

A 23-year-old male patient was brought to our clinic with the complaint of his friend's knee hitting the flank region during amateur football game. The patient had right flank pain at the time of admission and had difficulty in breathing. His medical history was unremarkable. Among the initial vital signs, arterial blood pressure was 111/75 mmHg, heart rate was 87/min, and oxygen saturation was 98%. Thoraco-abdominal physical examination was unremarkable except for tenderness in the right flank. Bladder catheter was inserted, and gross hematuria was observed. From laboratory tests, hemoglobin 15 g/dL hematocrit was evaluated as 45.3. Other biochemical and hematological tests were unremarkable. Computed tomography with intravenous contrast was performed. It showed major vascular damage and an appearance suggesting active bleeding in the right kidney hilum and laceration and separation from the middle part of the right kidney, also there was a fragmented appearance in the cortex. Diffuse retroperitoneal and subcapsular fluid due to hematoma was observed around the right kidney. Two hours after the first test, the hemogram was 13.7 g/dL and the hematocrit was 40.2. Patient was hospitalized with the diagnosis of grade 5 renal injury for close follow-up and if necessary, right nephrectomy (figure 1). The hemoglobin and hematocrit values measured 2 hours apart after hospitalization were 13.9 g/dL and 39.2, 11.8 g/dL and 35.5, and 12 g/dL and 36.1, respectively. No hypotension or tachycardia was observed during this period. Nephrectomy was not performed because the hemodynamics was stable during the patient's hospitalization. After 11 days of hospitalization, the patient was discharged without any complications.

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Received: 05.11.2021 • **Revision:** 30.11.2021 • **Accepted:** 01.12.2021
DOI: 10.55994/ejcc.1019890

Cite this article as: Ozdemir S, Kokulu K. Sports-related high-grade renal injury: a case report. Eurasian Journal of Critical Care. 2022;4(1): 24-25

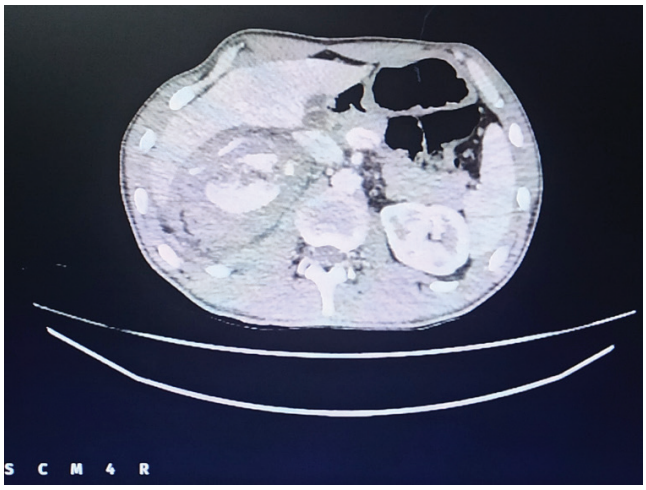

Figure 1: Grade 5 renal injury

Discussion

Sports are accepted as an integral part of a healthy life. Every day, new studies are added to the studies showing the positive effects of sports on health. A balanced exercise and diet is considered the key to a healthy life. However, sports activities can cause various injuries. The increase in the number of athletes and the spread of competitive sports activities bring about an increase in sports-related injuries[2]. Every year, sports injuries, which are expressed in millions in number, reduce the benefits of sports, but also make it debatable.

In studies conducted in Turkey, it was determined that the sports branches in which injuries are most common are football (10%), wrestling (6.0%), handball and boxing (3.0%), athletics (1.0%) and skiing (0.5%)[3]. The type and nature of the sport can affect the type and severity of the sports injury that may occur. sports injuries: It occurs in a wide spectrum ranging from bone fractures due to acute impacts, muscle, tendon or ligament ruptures to head traumas. Sports-related injuries can have serious physical, professional and financial consequences[4].

Hematuria is the most common manifestation of kidney injury. Its presence in athletes may indicate a benign presence, such as exercise-induced hematuria, or, in the presence of trauma, a more serious injury[5]. Exercise-induced hematuria can originate from the kidney, bladder, urethra, or prostate. The type of activity, duration and intensity of activity also contribute to its development. If hematuria lasts longer than 24-72 hours, a broad differential diagnosis should be considered. Trauma to the kidney may result from a direct blow or deceleration; contact and collision sports are the most common. Fortunately, most sports-related kidney injuries are mild and can be managed conservatively. A sports injury rarely results in a nephrectomy[5]. Despite the Grade 5 renal injury in our case, conservative follow-up was decided because the hemodynamics remained stable. The patient was discharged without nephrectomy.

Patel et al., in their study investigating sports-related renal injuries, showed that renal injury is isolated in sports injuries[6]. They reported that blunt kidney trauma was more likely to occur in isolation without other abdominal or thoracic injuries as in our case. They suggested that clinicians have a high suspicion of kidney injury with significant side impacts during sports activities.

In a study investigate sports-related high-grade renal injuries, conducted by Gerstenblunt et al., the most common cause was found to be cycling[7]. Solitary kidney was reported as a risk factor for high-grade renal injury. Team contact sports have been identified as a rare cause of high-grade kidney injury. The fact that our case did not have a solitary kidney and was during football makes it unusual among sports-related renal injuries, which are rare.

As a conclusion, we recommend that clinicians be careful about high-grade renal injuries in team-contact sports, especially in blunt trauma to the flank region.

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