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„Ne da budemo važni i slavni, već da budemo dorasli vremenu u kome smo i na mestu na kome smo.“

Patrijarh Pavle

Časopis je registrovan kao sredstvo javnog informisanja rešenjem Republičkog ministarstva za informisanje broj 2206 od 22.07.1996. godine. Na zajedničkoj sednici Saveta i Stručnog odbora (SO) Sistema biomedicinskih naučnih informacija Srbije (SBMNIS) održanoj 20.12.1996. godine na Medicinskom fakultetu u Beogradu doneta je lmedeća odluka: Prihvata se časopis „Halo 94“ kao časopis od značaja za sistem BMNI Srbije i kao takav biće indeksiran u domaćoj bazi podataka „Biomedicina Serbica“. Na osnovu mišljenja Ministarstva za nauku i tehnologiju, broj 413-00-430/98-01, Naučni časopis urgentne medicine „Halo 94“ je publikacija od posebnog interesa za nauku i na nju se ne plaća opšti porez na promet.

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Reč urednika

Poštovane koleginice i kolege,

U naučnom i uređivačkom odboru Naučnog časopisa urgentne medicine „Halo 194“ preovladava hijerarhija znanja i ideja, a ne zvanja, što može objasniti raznovrstan spektar tema objavljenih radova. Naša želja je da autori radova ne budu samo eminentni akademici ili profesori, već i mladi eksperti ili vodeći stručnjaci u regionalnim zdravstvenim ustanovama širom Srbije. Zbrinjavanje urgentih stanja je apsolutni prioritet u svim sistemima zdravstvene zaštite. Urgentna medicina nije skup urgentnih stanja iz raznih oblasti medicine, već je urgentni pristup stanjima koja prete da ugroze život bolesnika.

Specijalizacija iz urgentne medicine ima burnu prošlost: od borbe da se teorija pretoči u praksu, da balansira između preventivne i interventne medicine, da implementira najnovije svetske standarde i da produži liniju života bolesnika. Svi mi, deca urgentne medicine, naučeni smo trima stvarima: da budemo zadovoljni malim a da uvek težimo velikim uspesima i da umemo da zahtevamo ono što želimo. Ipak u besomučnoj borbi za prestižnim mestom na lepezi postojećih specijalizacija, ponekad je potrebno osvrnuti se unazad...Može nas neočenivano dotaći, u besmislenosti naše svirepe svakodnevice, Hipokratova zakletva i, makar na tren, vratiti na zanosni početak, gde smo bili oni pravi mi – doktori medicine...

Poziv koji smo odabrali slomiće neke od nas, i istovremeno primorati ostale da se suoče sa svojim najskrivenijim tajnama, starhovima i snovima. U areni svakodnevne borbe između života i smrti, najbriljantniji doktori hitnih medicinskih pomoći se utrkuju očajnički za najveću profesionalnu nagradu a to je spasen ljudski život.

Moto svih nas je da ljudski život nema cenu.

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ORIGINAL ARTICLE

M-MODE IN GRADE 3 DYSPNEIC PATIENTS ASSESSMENT

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ABSTRACT

Introduction/Objective Respiratory distress is a serious condition that can develop in the critically ill or those who have significant injuries. It is often fatal, and the risk of fatality increases with age and the severity of the illness. Therefore, an early diagnosis of the conditions that cause respiratory distress is an important factor. However, it is very challenging to make an accurate diagnosis in this domain. To clinically achieve higher accuracy during the diagnostic process, our study uses motion-mode (M-MODE) echo parameters. It aims to evaluate the accuracy of the M-MODE as a rapid assessment tool for grade 3 dyspneic patients in the Emergency Department when the physician is in a dilemma regarding the causes of respiratory distress.

Methods This is a retrospective observational study. The following parameters were taken into consideration: the mitral annular plane systolic excursion (MAPSE), the tricuspid annular plane systolic excursion (TAPSE), and the E-Point to Septal Separation (EPSS) for the admitted patients. The sensitivity, specificity, and accuracy of the M-mode model were analyzed, implementing the final diagnosis as the control. For analysis, this study considered 75 patients. The M-Mode parameter, along with the emergency physician clinical gestalt (M-Mode model), was compared with the final diagnosis at discharge or death of the patient.

Results For all patients, the mean values calculated for MAPSE, TAPSE, and EPSS were 13.463mm, 15.132 mm, and 9.4685 mm. The M-Mode model showed a sensitivity and specificity of 71.43 and 88.46%, respectively. The positive predictive value and negative predictive value were 92.11 and 62.16, respectively. The accuracy of the M-Mode model was 79.95%.

Conclusion The M-Mode Model can be utilized as a rapid assessment tool in the Emergency Department to initiate appropriate interventions in situations when a physician is in a dilemma regarding the cause of respiratory distress.

Keywords: M-mode echocardiography, mitral annular plane systolic excursion (MAPSE), tricuspid annular plane systolic excursion (TAPSE), E-Point to Septal Separation (EPSS).

INTRODUCTION

Dyspnea is the subjective experience of feeling unable to breathe comfortably, which may involve a strong desire for oxygen, a sensation of exertion when breathing, or a feeling of tightness in the chest [1]. Causes of dyspnea are various and can involve more than just the cardiovascular and respiratory systems [2,3]. Acute dyspnea is one of the main reasons for admission to the Emergency Department (ED). Physicians working in the ED often need to make a rapid diagnosis and devise a treatment plan based on limited clinical information [4] (**Figure 1**). Thus, the emergency physician (EP) is often forced to initiate treatment before the aetiology of the patient's respiratory distress can be clearly defined [5]. In diagnosing dyspnea, echocardiography has proven itself to be most helpful [6]. Echocardiography is increasingly recommended for the diagnosis and assessment of patients with severe cardiac disease, including heart failure (HF), where it provides information about myocardial structure, function, and valvular disease [7]. It can also identify causes of hemodynamic instability and quickly guide therapy. Its advantages are that it is a non-invasive risk-free method, capable of being performed serially, and in real-time [8].

For the diagnosis of heart disease, left ventricular and right ventricular function measurements are important parameters. Left ventricular (LV) longitudinal shortening plays an important role in cardiac pump function and can be evaluated by measuring the long axis M-mode-derived mitral annular plane systolic excursion (MAPSE) [9], also referred to as mitral annulus excursion (MAE). Other LV function parameters, such as EPSS [10], LV fractional shortening (FS), and transmitral propagation velocity can also be measured.

The right ventricular (RV) parameters that are measured are the tricuspid annular plane systolic excursion (TAPSE) [11,12], the subcostal echocardiographic assessment of tricuspid annulus kick (SEATAK) [13,14], RV outflow tract (RVOT) [15], FS motion of the ventricular septum (VS), RV wall thickness, and RVOT obstruction.

Different echocardiography modes can be used to analyse those parameters: standard two-dimensional echocardiography, M-mode echocardiography, A-mode echocardiography, B-mode echocardiography, and Doppler echocardiography [16-18]. While the M-mode denotes motion-based ultrasonographic imaging, the A-mode represents amplitude-based imaging, the B-mode signifies brightness-based imaging, and Doppler echocardiography permits evaluation of blood flow velocity characteristics within the heart and great vessels. The M-mode echocardiography has a sharp axial resolution and a high sampling frequency compared to the slower 2-D scanning rate, which allows small, rapidly moving structures to be discerned and accurately correlated with time relative to the echocardiography.

OBJECTIVE

Our study aims to determine the usefulness of the M-MODE as a rapid assessment tool in the ED for assessing grade 3 dyspneic patients to initiate appropriate treatment in situations when the physician has a dilemma regarding the cause of respiratory distress.

MATERIALS AND METHODS

This observational study was conducted in the ED of a tertiary care centre from January 2019 to December 2019. Patients between 18 and 85 years of age, presenting with Medical Research Council (MRC) grade 3 dyspnea and a respiratory rate (RR) of more than 24 bpm, were included in the study. Patients who experienced psychogenic hyperventilation, co-morbidities of congenital heart disease or valvular heart disease, and traumatic causes of respiratory distress were excluded from the study. The primary treating doctor was in charge of gathering the data regarding the final diagnosis from the discharge summary.

The patients were evaluated in the Emergency Room by the attending emergency physician relying on the M-mode model, and the findings were tabulated on an Excel sheet.

The data for initial assessment and M-Mode parameters viz. MAPSE, TAPSE and EPSS were obtained from the initial assessment sheet and 2D Echo was performed at the bedside in the Emergency Department respectively. The cumulative initial impression by the emergency physician, taking into account the clinical findings and the M-mode parameters, was tabulated as the M-mode model impression.

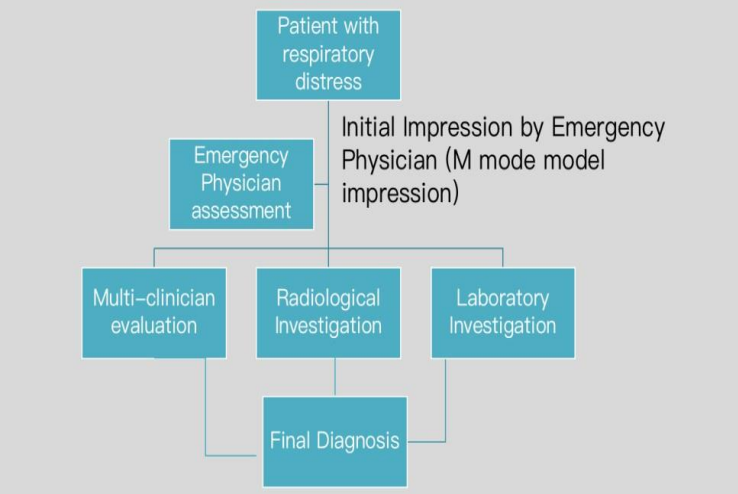

Figure 1 The study flow framework

In this study, the MAPSE and EPSS measurements were taken from the left ventricular systolic function, and the TAPSE measurement was taken from the right ventricular systolic function, which is explained in the below subsection.

MAPSE

Mitral Annular Plane Systolic Excursion (MAPSE) is a reliable marker for LV systolic function. Although MAPSE has been used as a prognostic factor for major cardiac events in patients, its application was quickly eclipsed by the introduction of Doppler imaging. MAPSE can be useful in urgent clinical decision-making settings for critical care and anaesthesia because of its limited dependence on image quality, easy acquisition, and accuracy in the prediction of LV function. Here, MAPSE is obtained by using the standard apical 4-chamber view transthoracic echocardiography (TTE). Generally, the MAPSE value is 10mm, which indicates a preserved left ventricular ejection fraction.

TAPSE

Tricuspid Annular Plane Systolic Excursion (TAPSE) is commonly recommended for estimating the right ventricular systolic function. TAPSE is simple to perform, has reproducible results, and is less dependent on optimal image quality than other measurements. It does not require complex calculations. TAPSE is measured using M-mode echocardiography in the apical four-chamber view to generate an image. The TAPSE value of less than 16mm is considered normal.

EPSS

In echocardiography, the mitral valve E-point to septal separation (EPSS) is a straightforward approach that roughly corresponds to the status of the left ventricular (LV) function. When the left ventricle relaxes during diastole, blood rushes through the mitral valve, swinging open the anterior mitral valve leaflet

toward the inter-ventricular septum. In the early stages of diastolic filling, the anterior mitral valve reaches a point of maximum excursion and, as such, comes closest to the ventricular septum (E-point). The distance in space separating the anterior mitral valve leaflet from the septal wall is referred to as the E-point septal separation or EPSS. EPSS can be thought of most simply as an estimation of left ventricle contractility and ejection fraction.

STATISTICAL ANALYSIS (table 1)

The data was collected on an Excel spreadsheet. The statistical analysis was performed using IBM SPSS software, version 23.0. To describe the data descriptive statistics frequency analysis, the percentage analysis was used for categorical variables, and the mean and S.D. were used for continuous variables. The Receiver Operator Characteristic (ROC) curve analysis was used to find the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) in comparison with the M-Mode model and final diagnosis. There was no loss of follow-up for any of the patients that were included.

RESULTS

For analysis, this study considered 75 patients, 46 of which were male and 29 female. The M-Mode model identified 38 patients with cardiogenic and 37 patients with non-cardiogenic causes of respiratory distress, whereas the final diagnosis declared 49 patients with cardiogenic and 26 with non-cardiogenic causes of respiratory distress. In this study, all the subjects were followed up until the time of discharge or death to obtain the final diagnosis.

Table 1 presents the statistical analysis of M-mode parameters regarding age, encompassing mean, median, mode, standard deviation (SD), range, minimum, and maximum values. The age range considered is between 18 and 75 years. The calculated mean values for MAPSE, TAPSE, and EPSS are 13.463 mm, 15.132 mm, and 9.4685 mm, respectively. TAPSE exhibits a range of 18.8, MAPSE of 15.6, and EPSS of 30.56. The maximum age recorded is 85, corresponding to TAPSE, MAPSE, and EPSS values of 20.0, 17.0, and 32.20, respectively. On the other end, the minimum age is 18, associated with TAPSE, MAPSE, and EPSS measurements of 1.2, 1.4, and 1.64, respectively.

Table 1 Statistical analysis

Statistical Parameters		**Age**	**TAPSE**	**MAPSE**	**EPSS**
N	Valid	75	75	75	75
Mean		53	15.132	12.023	9.4685
Median		55	16.000	13.000	6.0000
Mode		55	18.0	14.0	6.00
SD		19	4.3035	3.7777	7.04289
Range		67	18.8	15.6	30.56
Minimum		18	1.2	1.4	1.64
Maximum		85	20.0	17.0	32.20

M-mode parameters

Table 2 presents M-mode parameters in correlation with the cardiac and non-cardiac causes of dyspnea.

Table 2 M-mode parameters in correlation with the cardiac and non-cardiac causes of dyspnea

TAPSE	MAPSE	EPSS	Clinical Impression	M Mode diagnosis	Final Diagnosis
7	7.4	6.9	Cardiogenic	Cardiogenic	Cardiogenic
7	14	7	Cardiogenic	Cardiogenic	Cardiogenic
15	12	11.3	Cardiogenic	Cardiogenic	Cardiogenic
9	14	7	Cardiogenic	Cardiogenic	Cardiogenic
13	7	22	Cardiogenic	Cardiogenic	Cardiogenic
14	9	24.7	Cardiogenic	Cardiogenic	Cardiogenic
18	8.2	20	Non-cardiogenic	Cardiogenic	Cardiogenic
18	7	15	Non-cardiogenic	Cardiogenic	Cardiogenic
15	10	22.4	Cardiogenic	Cardiogenic	Cardiogenic
18	5.3	32.2	Non-cardiogenic	Cardiogenic	Cardiogenic
17	7.5	13	Non-cardiogenic	Cardiogenic	Cardiogenic
15	4.4	26.7	Cardiogenic	Cardiogenic	Cardiogenic

10	9.4	32	Cardiogenic	Cardiogenic	Cardiogenic
8	13	8	Cardiogenic	Cardiogenic	Cardiogenic
15	8	15	Cardiogenic	Cardiogenic	Cardiogenic
17	9.4	18.1	Cardiogenic	Cardiogenic	Cardiogenic
16	8	10	Non-cardiogenic	Cardiogenic	Cardiogenic
10	5.4	15.4	Cardiogenic	Cardiogenic	Cardiogenic
13	10	12	Non-cardiogenic	Cardiogenic	Cardiogenic
13	16	6	Cardiogenic	Cardiogenic	Cardiogenic
1.2	7.6	14	Cardiogenic	Cardiogenic	Cardiogenic
1.6	8	10	Cardiogenic	Cardiogenic	Cardiogenic
1.6	8	21.2	Cardiogenic	Cardiogenic	Cardiogenic
12	9	11	Non-cardiogenic	Cardiogenic	Cardiogenic
1.5	10	24	Cardiogenic	Cardiogenic	Cardiogenic
17	14	13	Non-cardiogenic	Cardiogenic	Cardiogenic
18	14	6	Non-cardiogenic	Non-cardiogenic	Cardiogenic
18	10	6	Non-cardiogenic	Cardiogenic	Cardiogenic
18	14	6	Non-cardiogenic	Non-cardiogenic	Cardiogenic
18	16	6	Non-cardiogenic	Non-cardiogenic	Cardiogenic
18	14	6	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
18	13	5	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
18	17	6	Non-cardiogenic	Non-cardiogenic	Cardiogenic
15	13	6	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
19	120	5.4	Non-cardiogenic	Cardiogenic	Non-cardiogenic
18	16	3	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
18	16	2	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
15	15.1	5.3	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
17	17	4	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
20	16	3	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
16	13	6	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
18	14	5	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
18	13	6	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
20	16	4	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
20	14	6	Non-cardiogenic	Non-cardiogenic	Cardiogenic
16	14	5	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
16	17	3	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
15	13	6	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
18	17	4	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
15	14	10	Non-cardiogenic	Cardiogenic	Cardiogenic
16	16	6	Non-cardiogenic	Non-cardiogenic	Cardiogenic
15	13	5	Cardiogenic	Non-cardiogenic	Cardiogenic
14	13	4	Non-cardiogenic	Cardiogenic	Non-cardiogenic
18	14	2	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
18	14	5	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
18	16	6	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
19	16	3	Cardiogenic	Non-cardiogenic	Non-cardiogenic
19	16	4	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
19	14	5	Cardiogenic	Non-cardiogenic	Cardiogenic
17	16	5	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic

18	14	6	Non-cardiogenic	Non-cardiogenic	Non-cardiogenic
18	16	5	Cardiogenic	Non-cardiogenic	Cardiogenic
16	17	4	Non-cardiogenic	Non-cardiogenic	Cardiogenic
17	14	6	Non-cardiogenic	Non-cardiogenic	Cardiogenic
16	16.8	10	Non-cardiogenic	Cardiogenic	Non-cardiogenic
16	12.4	8	Non-cardiogenic	Cardiogenic	Cardiogenic
15	13	7	Cardiogenic	Non-cardiogenic	Cardiogenic
15	8	13.4	Cardiogenic	Cardiogenic	Cardiogenic
15	7	17	Cardiogenic	Cardiogenic	Cardiogenic
16	4.6	1.64	Non-cardiogenic	Cardiogenic	Cardiogenic
16	6.2	10	Non-cardiogenic	Cardiogenic	Cardiogenic
15	8.6	17	Non-cardiogenic	Cardiogenic	Cardiogenic
15	12	5.6	Cardiogenic	Cardiogenic	Cardiogenic
16	1.4	6	Cardiogenic	Non-cardiogenic	Cardiogenic
15	13	6	Cardiogenic	Non-cardiogenic	Cardiogenic

Performance Analysis

Figure 2 shows the clinical impression analysis of patients with cardiogenic vs non-cardiogenic causes of respiratory distress at the time of patient presentation. The frequency is shown in the form of a graph. The frequency value for the patients with cardiogenic causes is 28, and for the patients with non-cardiogenic causes 47, with a total count of 75. Percentage-wise, the percentage of patients with cardiogenic causes is 37.3%, and the percentage of patients with non-cardiogenic causes is 62.7%.

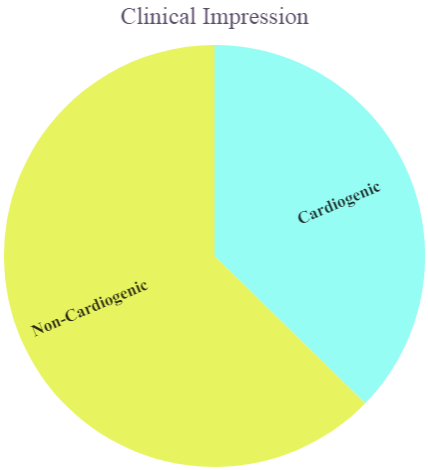

Figure 2 Clinical impression analysis

Figure 3 shows the frequency percentage of the M-mode diagnosis of cardiogenic vs non-cardiogenic causes of respiratory distress. The M-mode diagnosis uncovered 50.7% of patients with cardiogenic causes and 49.3% with non-cardiogenic causes.

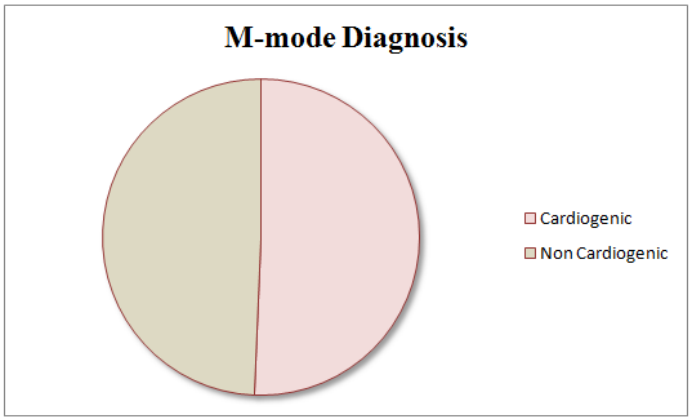

Figure 3: Analysis of the output of the M-mode model diagnosis

Figure 4 analyzes the final diagnosis. At the end of their treatment, 65.3% of the patients were thought to have been affected by cardiogenic disease, and 34.7% were not.

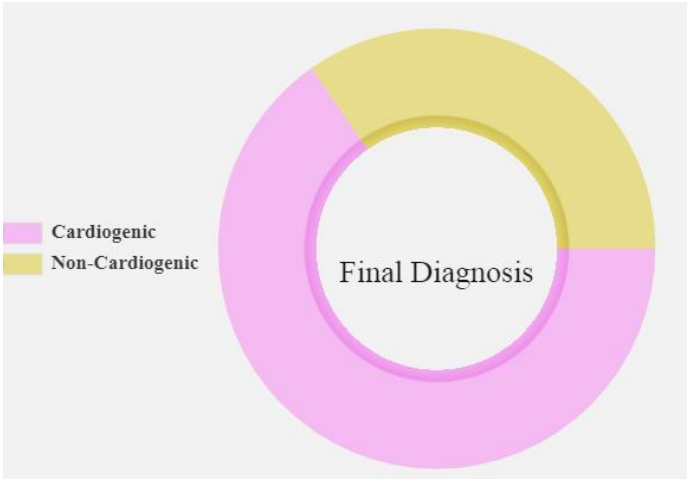

Figure 4: Final diagnosis analysis

COMPARATIVE ANALYSIS

The M-mode model diagnosis was compared with the final diagnosis, and the parameters of accuracy like sensitivity, specificity, PPV, and NPV were calculated. The M-Mode model showed a sensitivity and specificity of 71.43 and 88.46%, respectively. The positive predictive value and negative predictive value were 92.11 and 62.16, respectively. The accuracy of the M-Mode model was 79.95% (**figure 5**).

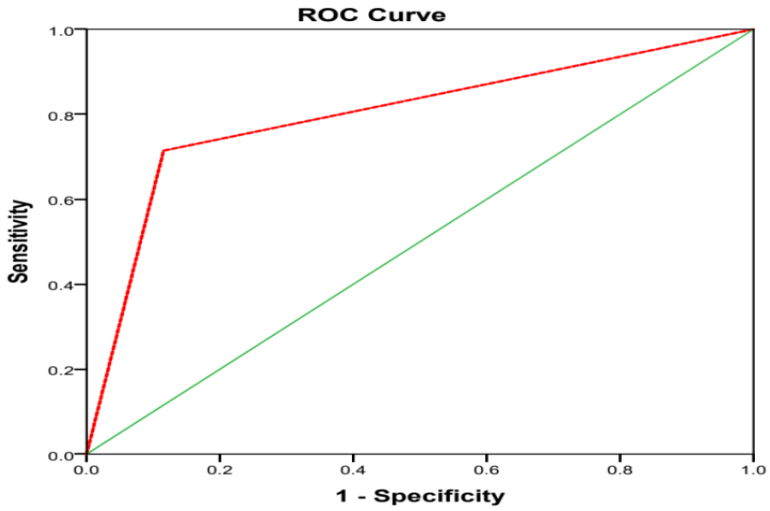

Figure 5: ROC curve analysis of the M-mode echocardiography

Table 3 shows the area under the curve of the presented study. Here, the area is 0.799 and the standard error is 0.54. In this, the term 'a' denotes the non-parametric assumption. Then, the asymptotic sig is 0005, and the term b indicates the null hypothesis. The lower bound and upper bound confidence intervals of the AUC are 0.694 and 0.905.

Table 3 AUC analysis

Area	Standard error [a]	Asymptotic Sig [b]	Asymptotic 95% Confidence Interval	
			Lower Bound	Upper Bound
0.799	0.54	0.0005	0.694	0.905

DISCUSSION

Dyspnea, or shortness of breath, is a common symptom encountered in emergency departments (EDs). The broad range of potential underlying conditions necessitates timely and accurate diagnostic approaches. Echocardiography with M-mode has emerged as a valuable tool for rapid assessment, aiding in early diagnosis and management by providing a one-dimensional view of the cardiac structures [4]. In this discussion, we explore the role of M-mode USG in evaluating dyspnea, caused by cardiac or non-cardiac conditions, and its credibility in comparison to the patient's final diagnosis.

As illustrated in the results of this study, with the sensitivity being 71.43% and the specificity being 88.46%, it is interesting to note that the positive predictive value is 92.1%. That means that for a patient with a high pretest probability for cardiogenic dyspnea, there is a 92.1% chance that the M-mode diagnosis will show a positive result. Further studies regarding the implementation of M-mode for diagnosing cardiac vs. non-cardiac dyspnea must be done to solidify the use of M-mode USG in clinical practice. Additionally, exploring the limitations and potential sources of error in M-mode USG could provide valuable insights into improving its accuracy and reliability as a diagnostic tool for dyspnea. Overall, the promising results of this study suggest that M-mode USG has the potential to play a significant role in the evaluation and management of patients presenting with dyspnea, particularly in distinguishing between cardiac and non-cardiac causes. Further research and validation studies are warranted to confirm these findings and establish M-mode USG as a valuable tool in the diagnostic workup of dyspnea.

Although no other studies are exploring M-mode and grade 3 dyspnea yet, a few noteworthy studies relevant to the topic were reviewed, and the salient findings have been described as follows: Ikuo Hashimoto and Kazuhiro Watanabe evaluated the left ventricular (LV) function in patients with Kawasaki disease (KD) during the acute phase [19].

The investigation uses the MAPSE z-scores, which were calculated based on the standard MAPSE data. The MAPSE z-score decreased in the acute phase (median value, -1.4) and increased in the convalescent phase (median value, 0.18; P<0.0001). However, there was no significant difference in the MAPSE z-score between patients in the convalescent phase and the control patients (0.18 vs. 0.02, P = 0.199). The MAPSE z-score was a useful index to evaluate LV function, and the cutoff value of -0.9 was an indicator to judge LV dysfunction in patients with acute-phase KD. These findings suggest that monitoring MAPSE z-scores can be valuable in assessing left ventricular function in patients with acute-phase KD. The increase in MAPSE z-scores during the convalescent phase indicates an improvement in cardiac function over time. Additionally, the comparison with control patients highlights the importance of utilizing the MAPSE z-score as a tool for early detection of left ventricular dysfunction in patients with KD. Overall, maintaining a cutoff value of -0.9 for the MAPSE z-score can aid in timely intervention and management of cardiac complications in this patient population. Another study by Yazdan Ghandi et al. looked at both full-term and early-term babies and calculated TAPSE and MAPSE at the lateral and septal (LAT/SEP) mitral [20]. The study groups were divided into three classes based on birth age: two preterm groups, 30–33 weeks and 34–37 weeks, and one full-term group, 38–40 weeks. The study included 21 full-term neonates and 31 preterm neonates. The mean LAT MAPSE was 0.63±0.11 cm for gestational age (GA) of 30–33 weeks, 0.76±0.03 cm for GA of 34–36 weeks, and 0.84±0.08 cm for GA of 37–40 weeks; the mean SEP MAPSE was 0.39±0.14 cm, 0.51±0.06 cm, and 0.65±0.09 cm, respectively; and the mean TAPSE was 0.47±0.13 cm, 0.62±0.07 cm, and 0.88 ± 0.15 cm, respectively. These findings suggest that there is a gradual increase in left atrial longitudinal function, and septal and tricuspid annular plane systolic excursion (MAPSE) with advancing gestational age. The full-term neonates demonstrated significantly higher MAPSE values compared to preterm neonates in all three parameters measured. This indicates that cardiac function in neonates improves as they approach full-term gestation. Further research is needed to explore the clinical implications of these findings and whether they have any long-term effects on cardiovascular health. Kai O. Hensel et al. looked at how reproducible M-mode and B-mode acquired mitral annular plane systolic excursion (MAPSE) was between observers and how it changed depending on the quality of the echocardiogram images in children [21]. The investigation analyzed 284 transthoracic echocardiograms performed on consecutive normotensive children without structural heart disease (mean age 12.6±3.1 years, 50.4% female). Overall, MAPSE measurements were highly reproducible with only minor bias. Both inter- and intra-observer reliability were significantly better for M-mode-derived MAPSE (P=0.235). However, the study also found that the reproducibility of B-mode-derived MAPSE was still acceptable, with a slight decrease in reliability compared to M-mode. The researchers noted that echocardiographic image quality did have an impact on the reproducibility of MAPSE measurements, with clearer images resulting in more consistent results. Despite this, overall, the study concluded that both M-mode and B-mode are reliable methods for assessing MAPSE in children without structural heart disease.

Hongmin Zhang et al. intended to investigate the relationship between the TAPSE and central venous pressure (CVP) in mechanically ventilated critically ill patients [22]. From October 1 to December 31, 2017, patients admitted to the intensive care unit with CVP monitoring and controlled mechanical ventilation were screened for enrollment. Many heart-related measurements were gathered, such as the TAPSE, MAPSE, LVEF, and internal diameter of the inferior vena cava (dIVC). In addition, blood flow measurements, such as the CVP, were also recorded. The TAPSE was inversely correlated with the CVP in mechanically ventilated critically ill patients who had an LVEF of less than 55%. This suggests that lower TAPSE values may be indicative of higher CVP levels in this subset of patients. Additionally, the MAPSE and dIVC did not show any significant correlation with CVP levels in this study. These findings highlight the importance of monitoring TAPSE as a potential marker for hemodynamic instability in mechanically ventilated patients with impaired cardiac function. Further research is needed to explore the clinical implications of these correlations and potential interventions to optimize patient outcomes.

To find out how much the right and left ventricles depend on each other, Steven R. Bruhl et al. compared their systolic functions directly using echocardiographic markers to show the functions of the right and left ventricles [23]. The study prospectively evaluated '51' healthy participants (mean age, 41±17 years) by echocardiography. In addition, the standard measurement was measured by M-mode and pulsed-

wave Doppler-issue echocardiography and further evaluated for variance across age, gender, and body surface area. The result analysis showed good surrogates of systolic-ventricular relationships and interdependence. Parameters such as MAPSE and TAPSE were used to compare the interventricular function. The study found that both MAPSE and TAPSE were reliable indicators of interventricular function, with no significant variation across age, gender, or body surface area. These parameters provided valuable information about the systolic function of both the right and left ventricles. Overall, the use of echocardiographic surrogates proved to be an effective method for assessing ventricular systolic function in healthy individuals.

Huang et al. looked at how the left ventricular longitudinal strain (LVLS), the mitral annular plane systolic excursion (MAPSE), and the M-mode-derived fractional shortening are related [24]. A review of old transthoracic echocardiographic records was done and 80 studies were chosen that could be used to measure strain and M-mode in the apical 4-chamber view. The longitudinal wall fractional shortening (LWFS) was found by using both the standard M-mode (LWFS) and the curved anatomical M-mode (CAMMFS). Patients who were critically ill had their longitudinal wall fractional shortening (LWFS) measured to estimate their LVLS. It provided a fast and accurate prediction of the LVLS. The results showed a strong correlation between MAPSE, fractional shortening, and LWFS, indicating that these parameters are closely related when assessing cardiac function. The use of both standard M-mode and CAMMFS allowed for a more comprehensive evaluation of longitudinal wall function. By measuring LWFS in critically ill patients, healthcare providers were able to quickly estimate LVLS and make timely treatment decisions based on this important parameter. Overall, this study highlights the importance of utilizing multiple echocardiographic measurements to provide a more thorough assessment of cardiac function in patients.

To summarize the key results of our study with the primary objectives, the M-Mode model had comparable accuracy to the final diagnosis. The limitation of the study is the non-inclusion of BNP levels in the patients, which is considered to have a high sensitivity to identifying cardiac failure. No bias of any sort was identified throughout the study. The results obtained did not deviate significantly from the studies mentioned above. However, considering the sample size of 75, the M-Mode model requires further validation with a larger sample size, multicentric trials, and comparison with biomarkers.

CONCLUSION

The M-Mode Model can be used as a rapid assessment tool in the Emergency Department to initiate appropriate interventions in situations where the physician is in a dilemma regarding the causes of respiratory distress. Further, the study highlights the advantage of using parameters with low interobserver variability over using parameters with observer subjective findings.

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ORIGINALNI RAD

M-MOD ULTRAZVUK U EVALUACIJI DISPNOIČNIH PACIJENATA GRADUSA 3

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SAŽETAK

Uvod/Cilj Respiratorni distres je ozbiljno stanje, koje se može razviti kod kritično obolelih ili teško povređenih pacijenata. Ishod je često fatalan, a rizik od smrti raste sa godinama života i težinom bolesti. Postavljanje rane dijagnoze, kao i prepoznavanje stanja koja mogu dovesti do respiratornog distresa, je važan, ali istovremeno i veoma izazovan proces. Da bi se klinički postigla veća tačnost tokom dijagnostičkog procesa, naša studija koristi eho parametre u režimu pokreta (M-MODE). Cilj je da proceni tačnost ultrasonografskog M-MODE-a, kao alata 1. izbora, za brzu dijagnostiku pacijenata sa dispnejom 3. stepena (na hitnom prijemu), u diferencijalnoj dijagnozi respiratornog distresa.

Metodologija Sprovedena je retrospektivno opservaciona studija. Razmatrani su sledeći parametri: sistolno pomeranje ravni mitralnog prstena (MAPSE), sistolno pomeranje ravni trikuspidalnog prstena (TAPSE) i septalna separacija u E-tački (EPSS) za hospitalizovane pacijente. Analizirana je osetljivost, specifičnost i tačnost M-mode modela, pri čemu je konačna dijagnoza implementirana kao kontrola. Za analizu, ova studija je razmatrala 75 pacijenata. Parametar M-Mode, zajedno sa kliničkim geštaltom (opšti klinički utisak) lekara hitne pomoći (M-Mode model), upoređen je sa konačnom dijagnozom pri otpustu ili smrti pacijenta.

Rezultati Za sve pacijente, izračunate srednje vrednosti za MAPSE, TAPSE i EPSS bile su 13,463 mm, 15,132 mm i 9,4685 mm. M-Mode model je rezultirao osetljivošću od 71,43% i specifičnošću od 88,46%. Pozitivna prediktivna vrednost bila je 92,11, a negativna prediktivna vrednost 62,16. Tačnost M-Mode modela bila je 79,95%.

Zaključak M-Mode model, se može koristiti kao dijagnostičko sredstvo za brzu procenu na hitnim prijemima bolnica. Korišćenje ovog ultrasonografskog modela, bi olakšalo lekarima iniciranje tačnih postupaka, koji bi precizno utvrdili uzrok respiratornog distresa.

Ključne reči: M-mod ehokardiografija, sistolno pomeranje ravni mitralnog prstena (MAPSE), sistolno pomeranje ravni trikuspidalnog prstena (TAPSE), septalna separacija u E- tački (EPSS).

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PRIKAZI BOLESNIKA

REAKCIONO VREME KAO JEDAN OD PREDUSLOVA USPEHA KARDIOPULMONALNE REANIMACIJE

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SAŽETAK

Uvod/Cilj Reakciono vreme je vremenski interval od trenutka predaje poziva lekarskoj ekipi od strane dispečera kol centra, do dolaska ekipe do pacijenta. Cilj rada je da ukaže na značaj kraćeg reakcionog vremena i rano započete kardiopulmonalne reanimacije (KPR) komparacijom dva prikazana slučaja uz osvrt na relevantne podatke iz dostupne literature. **Prikazi bolesnika**: Prikazana su dva starija pacijenta sa bolom u grudima koji je doveo do akutnog zastoja srca (AZS) u vanbolničkim uslovima. Kod jednog od njih AZS je nastao pred ekipom hitne medicinske pomoći (HMP) koja je odmah započela sa merama profesionalne KPR (reakciono vreme je 0 min). Pacijent je uspešno reanimiran i prevezen u dežurnu bolničku ustanovu. Ličnim interesovanjem saznaje se da je nakon petodnevne hospitalizacije otpušten kući. Kod drugog pacijenta, AZS je nastao na javnom mestu, ali zbog needukovanosti očevidaca nisu primenjene mere osnovne životne potpore, tako da je KPR započeta tek po dolasku ekipe HMP, nakon 9 minuta od prijema poziva na centrali 194. Reanimacija je i nakon svih primenjenih mera KPR bila bezuspešna, te je nakon 30 minuta konstatovana smrt. **Zaključak**: Kraće reakciono vreme i rano započeta KPR, doprinose preživljavanju vanhospitalnog AZS. Treba insistirati na edukaciji laika u ranoj primeni osnovne životne potpore.

Ključne reči: reanimacija, reakciono vreme, defibrilacija, zastoj srca

UVOD

Prema Utstein definiciji akutni zastoj srca (AZS) je prestanak mehaničke aktivnosti srca, potvrđen odsustvom svesti, palpabilnog pulsa, i apnejom ili agonalnim disanjem. Procenjuje se da svakodnevno samo u Evropi umre najmanje 1.000 ljudi od AZS, zbog nezapočetih ili neuspešnih mera kardiopulmonalne reanimacije (KPR) [1]. U ekonomski razvijenim zemljama, vanbolnički AZS je treći uzrok mortaliteta (odmah posle kardiovaskularnih bolesti i karcinoma), a stopa preživljavanja je manja od 10% [1].

KPR je prva linija lečenja i osnova za spasavanje života ovakvih bolesnika. KPR možemo definisati kao skup mera i postupaka koji se sprovode kod bolesnika u AZS, sa ciljem da se ponovo uspostave srčana funkcija i respiracije [2]. KPR na vanhospitalnom nivou ima svoje specifičnosti u zavisnosti od toga u kom delu radnog prostora se izvodi – na terenu, ambulantnom vozilu, ili reanimacionoj ambulanti.

Primena reanimacionih mera definisana je jedinstvenim smernicama za KPR odraslih iz 2021. godinu [3], koje potvrđuju značaj kompresija grudnog koša visokog kvaliteta čije su karakteristike odgovarajuća dubina (5-6cm), odgovarajuća frekvenca (100-120/min) i odgovarajući stepen relaksacije zida grudnog koša. Kompletna relaksacija zida grudnog koša posle kompresije, je neophodna jer dovodi do stvaranja negativnog pritiska u grudnom košu, povratka venske krvi u srce, i povećanja efikasnosti KPR [2]. Prema navedenim preporukama bolji hemodinamski odgovor se postiže kada se kompresije grudnog koša izvode na donjoj polovini sternuma. U najvećem broju kliničkih vodiča o KPR, se pretpostavlja da je pacijent u ležećem položaju na leđima, na tvrdoj i stabilnoj podlozi [1]. Defibrilacija čini sastavni deo više životne potpore (ALS) za one pacijente sa inicijalnim ritmom kardijalnog aresta koji se može defibrilirati [4]. Za uspešan ishod ili povratak spontane cirkulacije (ROSC) akcentuju se efikasna kompresija grudnog koša, odgovarajuća ventilacija i rana defibrilacija [5].

Hitna medicinska pomoć (HMP) je ključna karika u lancu zbrinjavanja AZS. Vremenski kontinuitet u radu HMP sastoji se od prijema poziva na telefonskoj centrali 194, otpremanja poziva ekipi, stizanja ekipe na mesto intervencije, zbrinjavanja i transporta u bolnicu [6]. Prema Pravilniku o pokazateljima kvaliteta zdravstvene zaštite o proveri kvaliteta stručnog rada objavljenom u "Sl. glasnik RS" br. 123/2021. [7] Zavod za urgentnu medicinu prikuplja podatke za izračunavanje, i prati sledeće pokazatelje kvaliteta u oblasti HMP: 1) Aktivaciono vreme - vreme koje je proteklo od prijema poziva za prvi red hitnosti u dispečerskom centru do predaje poziva ekipi za intervenciju, 2) Reakciono vreme je vreme koje je proteklo od predaje poziva ekipi za intervenciju do stizanja ekipe na mesto događaja, i 3) Vreme prehospitalne intervencije - zbir svih vremenskih intervala, koji se računaju od momenta stizanja ekipe na mesto događaja do oslobađanja ekipe ili predaje pacijenta na dalje zbrinjavanje (Figura 1).

Figura 1. Algoritam aktivacionog i reakcionog vremena kod bola u grudima

CILJ RADA

Cilj rada je ukaže na značaj kraćeg reakcionog vremena i rano započete KPR komparacijom dva prikazana slučaja uz osvrt na relevantne podatke iz dostupne literature.

PRIKAZI BOLESNIKA

Pacijent 1

Nakon prijema poziva prvog reda hitnosti u 23 časa, odmah je aktivirana najbliža slobodna lekarska ekipa (aktivaciono vreme je bilo manje od 1 minuta). Pri dolasku na lice mesta nakon 1 minuta (reakciono vreme), ekipa HMP zatiče pacijentkinju starosti 80 godina svesnu, u sedećem položaju na krevetu, koja se žali se na bolove u grudima koji traju sat unazad sat vremena i nisu prošli nakon sublingvalne primene tri nitroglicerina u intervalima od po deset minuta. Bol je jačine 6/10, bez propagacije, praćen hladnim preznojavanjem. Navodi da se leči od angine pectoris stabilis, i da su bolovi sada nastali u miru. Pri pregledu normalno prebojene kože i vidljivih sluzokoža, tahipnoična (broj respiracija 24/min), auskultatorno normalannog disajnog šuma bez propratnog nalaza, srčana radnja ritmična, frekvence 77/minuti i vrednosti arterijskog pritiska 160/90mmHg. U toku plasiranja intravenske (iv) kanile, pre izvedene elektrokardiografije (EKG), pacijentkinja iznenada gubi svest. Lekar brzim inicijalnim ABC (airway, breathing, circulation) pregledom konstatuje AZS: izostanak spontanog disanja i palpabilnog pulsa nad karotidnom arterijom. Započete su kompresije grudnog koša od strane medicinskog tehničara, simultano lekar postavlja papučice manuelnog defibrilatora za analizu ritma. Na monitoru registrovana ventrikularna fibrilacija. Nakon punjenja defibrilatora pacijent defibriliran DC šokom energije 150J sa minimalnim prekidom u kompresijama grudnog koša kraćim od 5 sekundi. Nakon dva minuta KPR i ponovne provere ritma, pacijent defibriliran drugim DC šokom energije 200 J, kada se evidentira povratak spontanog disanja i srčanog rada verifikovano i elektrokardiografski (Figura 2).

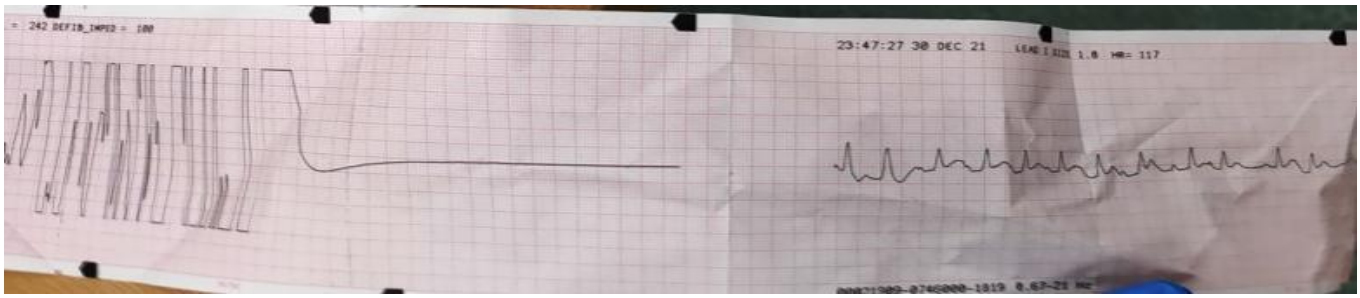

Figura 2. Elektrokardiogram nakon defibrilacije

Pacijentkinja je svesna, ne komunikativna, otvara oči na poziv i prati pogledom. Saturacija arterijske krvi kiseonikom (SaO2) izmerena pulsnim oksimetrom 92%, spontane respiracije frekvence oko 14/min. Preduzimaju se mere za hitan medicinski transport u dežurnu bolničku ustanovu, uz kontinuirani monitoring vitalnih funkcija. Ličnim interesovanjem saznaje se da je pacijentkinja otpuštena iz postkoronarne jedinice nakon petodnevne hospitalizacije, hemodinamski stabilna i zadovoljavajućeg opšteg stanja.

Pacijent 2

Operater na telefonskoj centrali HMP primio je poziv prvog reda hitnosti 9. decembra u 13 časova. Pozivalac navodi da se muškarac starosti oko 70 godina „srušio na ulici" i da ne daje znakove života. Ekipa HMP najbliža licu mesta aktivirana odmah po prijemu poziva, dolazi na lokaciju događaja nakon 9 minuta od prijema poziva gde zatiče pacijenta u ležećem položaju bez svesti, bez spontanog disanja i bez palpabilnog pulsa nad arterijom karotis. Prema naknadno dobijenim heteroanamnestičkim podacima od supruge, pacijent se od prethodne noći žalio na bol u grudima, koji je postao „nepodnošljiv", iz kog razloga je krenuo kod kardiologa. Niko od očevidaca događaja nije započeo osnovne mere oživljavanja, niti prihvatao telefonsku asistenciju od strane dispečera, pri pozivanju HMP. Ekipa HMP, započinje manuelne kompresije grudnog koša uz ventilaciju ambu balonom u odnosu 30:2. Lekar postavlja

papučice manuelnog defibrilatora na grudni koš, na monitoru konstatuje asistoliju. Simultano medicinski tehničar plasira iv kanilu, i za manje od 1 minuta daje prvi adrenalin intravenski. ALS mere su nastavljene po algoritmu za nešokabilni ritam aresta. KPR je i nakon svih primenjenih reanimacionih mera bila bezuspešna, te je nakon 30 minuta konstatovana smrt.

Rad je napisan u skladu sa etičkim standardima časopisa i etičkim principima Helšinske deklaracije.

DISKUSIJA

Vanbolnički srčani zastoj (OHCA) je globalni zdravstveni problem, čija godišnja incidenca u Evropi varira između 67 do 170/100.000 stanovnika [1]. OHCA je visoke incidence ne samo u evropskim gradovima već i u Beogradu, koja je prema podacima dostupnim na sajtu Gradskog zavoda za javno zdravlje (GZJZ) u 2022. iznosila 1.007/1.197.714 stanovnika [8]. Rizik od iznenadne srčane smrti (ISS) kod odraslih je direktno proporcionalan starosti bolesnika. U 80% svih slučajeva uzrok je akutni koronarni sindrom [9] (kao kod naših pacijenata), dok preostalih 10-15% bolesnika ima kardiomiopatiju neishemijske etiologije. Mnogobrojni faktori mogu uticati na ishod OHCA: lokacija događaja, osvedočeni AZS, BLS započeo očevidac, upotreba automatskog spoljašnjeg defibrilatora (AED), inicijalni srčani ritam, i nivo postreanimacionog zbrinjavanja [10].

Očevici AZS su krucijalna karika u prvoj i drugoj karici u lancu preživljavanja nakon AZS, sa ulogom da prepoznaju simptome AZS, pozovu broj 194, započnu i sprovode mere osnovne životne potpore (BLS) do dolaska ekipe HMP. Rana primena BMS mera uz ranu defibrilaciju upotrebom spoljašnjih automatskih defibrilatora (AED) od strane očevidaca AZS, neizostavna su za povećanje stope preživljavanja čak za 40-75%. Učestalost započinjanja KPR-a od strane laika, očevidaca AZS, u Srbiji je izuzetno niska. Podaci iz studije pod nazivom EURECA ONE 2014 SRBIJA [11], sugerišu da je u praćenom periodu u Srbiji svega 13,6% očevidaca događaja sprovodilo BLS do dolaska ekipe HMP. Ovaj procenat je znatno manji nego u Holandiji (59%) ili Švedskoj (47%). Dobijeni rezultati su protumačeni kao posledica nedovoljne utreniranosti očevidaca u prepoznavanju AZS i primeni BLS. Novi koncept vanhospitalne KPR, je reanimacija vođena telefonskim uputstvima dispečera HMP (eng. DA-CPR) uvedena 2010. kako bi se očevici ohrabrili u prepoznavanju znakova AZS, započinjanju i sprovođenju BLS. U slučaju našeg drugog prikazanog pacijenta, očevidac je prepoznao AZS ali nije započeo KPR, niti prihvatao telefonsku asistenciju dispečera HMP. U studiji Eberhard i saradnika je procenjivan neurološki ishod OHCA, ukoliko je sprovedena DA-CPR, u komparaciji sa BLS započetom od strane edukovanih očevidaca (eng. bystander CPR) i OHCA nastalog bez svedoka. Zaključeno je da je DA-CPR inferiornija od bystander CPR, ali da obe utiču na bolji neurološki ishod i veće preživljavanje u odnosu na OHCA bez svedoka [12]. Hvaljen, ali i osporavan, DA-CPR još uvek kontraverzan uticaj na definitivni ishod vanhospitalne KPR. Zhang L. i saradnici su naveli kao najčešće barijere u DA-CPR: zauzetost broja 194, prekid telefonske veze između HMP i pozivaoca, histerija, strah od započinjanja BLS, pozivalac nije uz pacijenta [13]. Važnost rano započetih mera KPR podržana je činjenicom da u periodu od 3-5 min nakon nastanka AZS može doći do ireverzibinog oštećenja na centralnom nervnom sistemu, kada je svaka KPR iluzorna, jer je već došlo do moždane smrti. Rano započinjanje BLS, dva do četiri puta povećava šanse za preživljavanjem [14].

Ekipe HMP su u svakodnevnoj trci sa vremenom. U slučaju OHCA, ovu trku za životom pacijenta započinje operater na telefonskoj centrali 194, koji iz razgovora sa pozivaocem prepoznaje ovo stanje, prima poziv kao poziv prvog reda hitnosti i prosledi ga dispečeru. Dispečer ga po mogućstvu odmah predaje na realizaciju prvoj slobodnoj i teritorijalno najbližoj ekipi. Ovo su sekvence aktivacionog vremena koje prema podacima GZJZ iz 2022. na nivou službi HMP u Beogradu prosečno iznosi 1 minut [8], što je podržano i našim prikazanim slučajevima. Druge, ranije sprovedene studije, pokazale su da je aktivaciono vreme u Lakiški okrugu iznosilo 2,4±4,7 minuta [15], a u studiji iz Ankare 2,49±10,54 min [16]. Aktivaciono vreme od 3,40±1,92 min. pre i 1,95±0,92 min. posle obuke dispečera HMP dobijeno je u studiji sprovedenoj u Maleziji [17]. Prema Bogunović i saradnicima [6] aktivaciono vreme je kraće za pozive koji su se desili na javnom mestu, u odnosu na one u stanu. U našim prikazima nije evidentirana razlika u odnosu na mesto nastanka AZS.

Reakciono veme HMP je ključni prognostički faktor za OHCA, kraće vreme je udruženo sa većom verovatnoćom preživljavanja do otpusta iz bolnice i povoljnim neurološkim ishodima. Na reakciono vreme, vreme stizanja do pacijenta, mogu dodatno uticati faktori kao što su: visoke zgrade, saobraćajni špicevi, gužva u saobraćaju, veliki trgovinski centri, neobeležene ulice, potreba obezbeđivanja bezbednosti mesta događaja od strane policije, fizičke barijere (liftovi, stepenište, vrata), ometanje od strane posmatrača, loši vremenski uslovi [6]. Kod našeg prvog pacijenta, AZS je nastao pred ekipom HMP, te je je reakciono vreme iznosilo manje od 1 minuta. Reakciono vreme od 7,9 minuta prikazano je u izveštaju GZJZ iz 2022 [8]. Nešto bolje reakciono vreme od 7,2 minuta je dobijeno u tajvanskoj studiji [18]. Kod našeg drugog pacijenta reakciono vreme je iznosilo 9 minuta. U radu autora iz naše ustanove reakciono vreme za 2011. god., je u proseku iznosilo 9,07±6,05 minuta (medijana 7,85, IKO (4,88; 11,87) min.) [6]. Međutim, iako aktivaciono i reakciono vreme kod drugog pacijenta ne odstupaju od prikazanih standarda, došlo je do letalnog ishoda.

ZAKLJUČAK

I pored mnogobrojnih pokušaja da se predefinišu prehospitalne varijable urgentnog odgovora, dovoljne senzitivnosti i specifičnosti u proceni stope preživljavanja nakon AZS, vreme je ostalo mistična komponenta preživljavanja nakon vanbolničke KPR.

Rezultati dobijeni prikazom samo dva pacijenta doprinose limitiranosti naših zaključaka. Međutim, poređenjem naših prosečnih vremena (aktivaciono i reakciono vreme) sa onima dobijenim u mnogim svetskim istraživanjima, ne možemo biti nezadovoljni dobijenim rezultatima, ali bi i dalje trebalo raditi na njihovom unapređenju.

Reakciono vreme HMP treba razmotriti kao značajnu performansu ishoda vanhospitalne KPR.

Sukob interesa: Autor izjavljuje da nema sukoba interesa.

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CASE REPORTS

CARDIOPULMONARY RESUSCITATION SUCCESS MEASURED BY A SHORT REACTION TIME

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ABSTRACT

Introduction/Objective The Emergency Medical Service reaction time is the interval between the moment the Emergency Medical Team is dispatched and the moment they arrive at the patient's side. This paper stresses the importance of a short reaction time and early cardiopulmonary resuscitation (CPR) by comparing two medical cases and data from available literature.

Case reports: We are presenting the cases of two elderly patients who had both acquired chest pain that led to acute cardiac arrest (ACA) in outpatient settings. One patient suffered ACA in the presence of the Emergency Medical Team (EMT), who immediately initiated CPR and Advanced Life Support (ALS) measures. Their reaction time was 0 min. The patient was successfully resuscitated and transported to the hospital. Five days later, he had recovered and was discharged to go home. In the second patient's case, ACA occurred in a public place, but the witnesses were not educated to perform Basic Life Support (BLS), so no CPR was initiated before the EMT arrived. Their reaction time was 9 minutes. The CPR measures that they initiated were unsuccessful and the patient was pronounced dead 30 minutes later.

Conclusion: A short reaction time and early CPR are crucial for surviving out-of-hospital ACA. The education of non-medical personnel in the early initiation of BLS measures should be insisted upon.

Keywords: cardiopulmonary resuscitation, reaction time, defibrillation, cardiac arrest

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PRIKAZI BOLESNIKA

NAGLO NASTALA PROMUKLOST U TEŠKOJ SRČANOJ INSUFICIJENCIJI – ORTNEROV SINDROM

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SAŽETAK

Uvod/Cilj Sva kardiološka stanja koja mogu dovesti do paralize leve ili desne polovine grkljana spadaju u Ortnerov sindrom. Cilj ovog rada je da naglasimo da jednostrana nepokretnost grkljana, može predstavljati komplikaciju prethodno stabilnog kardiološkog oboljenja, i biti znak životno ugrožavajućeg stanja u medicini.

Prikaz slučaja: Pacijent starosti 57 godina, hitno je primljen na Odeljenje kardiologije zbog otežanog disanja, i kliničke sumnje na srčanu insuficijenciju. Zbog osećaja gušenja i promuklosti, tražena je hitna otorinolaringološka konsultacija. Fiberoptičkom nazofaringolaringoskopijom, konstatovano, da je leva polovina larinksa ograničeno pokretna. Na EKG-u uočene su promene koji odgovaraju hroničnoj srčanoj slabosti. Kompjuterizovana tomografija vrata i grudnog koša sa intravenskim kontrastom, potvrdila je da se radi o kardiomegaliji sa pomeranjem struktura medijastinuma. Ordinirani su beta-blokatori, diuretici, sartani i alupurinol, koji su doveli do poboljšanja disanja.

Zaključak: Promuklost može biti početni znak potencijalno letalne bolesti. Ranoprepoznavanje i lečenje osnovnog kardiovaskularnog oboljenja, ključno je za oporavak pacijenta. Neophodno je naglasiti da dispnoični pacijent sa disfonijom, zahteva ne samo pregled otorinolaringologa, već i detaljan kardiološki pregled.

Ključne reči: srčana insuficijencija, promuklost, Ortner Sindrom, rekurentni laringealni nerv

UVOD

Ortnerov sindrom je prvi definisao dr Norbert Ortner 1897. godine. Opisana je paraliza leve polovine grkljana, u sklopu dilatacije leve srčane pretkomore izazvane mitralnom stenozom. Prema savremenim shvatanjima, sva kardiološka stanja koja mogu dovesti do paralize leve ili desne polovine grkljana spadaju u Ortnerov sindrom [1]. Najveća učestalost zabeležena je kod pacijenata sa plućnim srcem, srčanim anomalijama, aneurizmom aorte, slabošću leve komore i rekurentim plućnim embolijama (PE) [2]. Posebno treba obratiti pažnju na PE jer se zbog nespecifične prezentacije, često ne dijagnostikuje na vreme, što može životno da ugrozi bolesnika [3]. Patogeneza je jednostavna, bilo koje oboljenje srca ili velikih krvnih sudova, kompresijom na rekurentni laringealni nerv, mogu dovesti do nepokretnosti jedne polovine larinksa. Novonastala promuklost, otežano disanje i gutanje, zatim kašalj, prvi su simptomi ovog sindroma [2,4].

CILJ RADA

Ovim radom želimo da naglasimo da jednostrana nepokretnost grkljana, može predstavljati komplikaciju prethodno stabilnog kardiološkog oboljenja, i biti znak životno ugrožavajućeg stanja u medicini.

PRIKAZ BOLESNIKA

Pacijent starosti 57 godina, hitno je primljen na Odeljenje kardiologije zbog otežanog disanja, izrazite malaksalosti, i kliničke sumnje na srčanu insuficijenciju. Svestan, orjentisan u sva tri pravca, normalne prebojenosti kože i vidljivih sluznica. Pri prijemu vrednost krvnog pritiska (TA) od 145/80 mmHg i srčane frekvencije (SF) 111/min. Auskultacijom je na plućima verifikovan bibazalno oslabljen disajni šum, sa respiratornom frekvencom (RF) od 18/minuti. Zbog osećaja gušenja i promuklosti, tražena je hitna otorinolaringološka konsultacija. U ciljanoj otorinolaringološkoj anamnezi, pacijent navodi da je unazad deset dana promukao, i da se zagrcnjava prilikom gutanja vode. Takođe se žali na suv kašalj, i negira operacije vrata i štitaste žlezde. Boluje od hipertenzije (HTA) i redovno uzima terapiju.

U toku otorinolaringološkog pregleda pacijent je dispnoičan, sa saturacijom kiseonika od 86% na sobnom vazduhu. Indirektnim pregledom larinksa, a zatim i hitnom fiberoptičkom nazofaringolaringoskopijom, konstatovano je da je njegova leva polovina larinksa ograničeno pokretna, kao i da je leva glasnica u paramedijalnom položaju. Desna polovina larinksa je bila uredne pokretljivosti, dok je disajni prostor u trenutku pregleda bio redukovan, ali suficijentan (**Figura 1**).

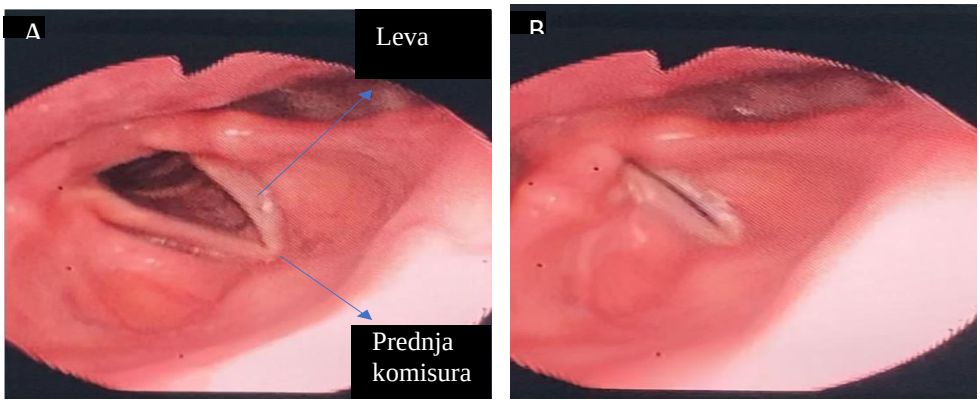

Figura 1. Nazofaringolaringoskopija
A. Leva glasnica u paramedijanom položaju tokom respiracije; *B*. Insuficijentna glotična okluzija za vreme fonacije.

Na vratu se ne palpiraju tumefakcije, niti uvećanje štitaste žlezde. Ostali otorinolaringološki nalaz je bio uredan.

U toku hospitalizacije sprovedena je kompletna dijagnostika, i primenjen multidisciplinaran pristup u lečenju. Pregledan je od strane više specijalista (neurologa, gastroenterologa, nefrologa, pulmologa i endokrinologa), radi isključivanja drugih stanja, koja bi mogla dovesti do paralize hemilarinksa. Na EKG-u su uočene promene koji odgovaraju hroničnoj srčanoj slabosti. U laboratorijskim vrednostima registrovan je izrazito visok pro BNP (B tip natriuretrički peptid, biohemijski marker srčane insuficijencije) sa vrednostima do 31925.

Ehokardiografski opisana je teška disfunkcija obe komore, kao i teška mitralna regurgitacija. Na radiografiji srca i pluća, opisana je kardiomegalija sa zastojnim promenama (**Figura 2**).

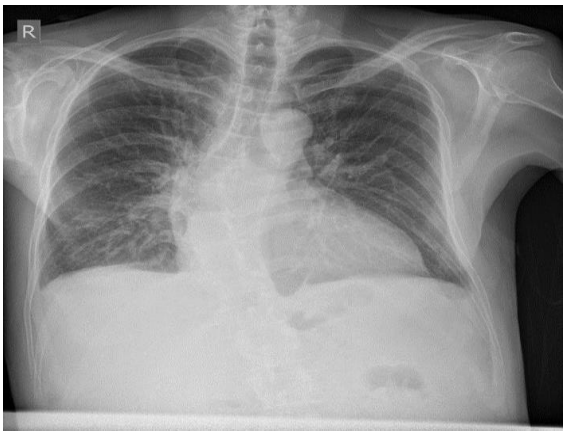

Figura 2. RTG pluća i srca: uvećana srčanosudovna senka sa zastojnim promenama

Kompjuterizovana tomografija vrata i grudnog koša, sa intravenskim kontrastom, potvrdila je da se radi o kardiomegaliji sa pomeranjem struktura medijastinuma, dok kompresivne i infiltrativne tumorske promene na putu živca nisu pronađene (**Figura 3**).

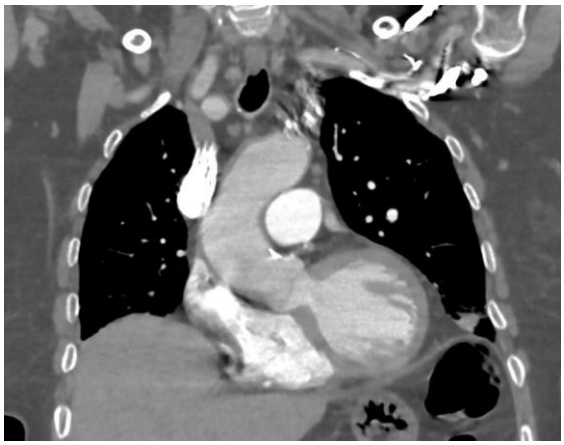

Figura 3. CT grudnog koša u koronalnoj ravni

Konsultativni pregledi neurologa, gastroenterologa i endokrinologa nisu našli specifičan supstrat paralize rekurensa. Obzirom na anamnezu i simptome, urednim nalazima ordiniranim od navedenih specijalista kao i vizuelizovanje kardiomegalije, dedukcijom se postavlja dijagnoza Ortnerovog sindroma.

Pacijentu je ordinirana kardiološka terapija (beta-blokatori, diuretici, sartani) koja je dovela do poboljšanja disanja i opšteg stanja kao i alupurinol, zbog akutne bubrežne slabosti koja je nastala kao posledica srčane insuficijencije. Nažalost, promuklost se zadržala i na otpustu, te je bolesnik upućen na fonijatrijsku rehabilitaciju.

Rad je napisan u skladu sa etičkim standardima časopisa i etičkim principima Helšinske deklaracije.

DISKUSIJA

Pregled literature i prikaz slučajeva iz kardiološke prakse Ohija i saradnika iz 2022. godine, izdvajaju Ortnerov sindrom kao izuzetno redak uzrok jednostrane paralize rekurentnog laringealnog nerva, svega 1% svih publikovanih slučajeva [5]. Najčešći uzroci jednostrane paralize su jatrogene povrede živca tokom operacija vrata i grudnog koša (u prvom redu tireoidektomija), neoplazme i traume vrata i grudnog koša, virusne infekcije kao i centralne lezije. Dijagnoza se postavlja isključivanjem svih drugih organskih uzroka, idiopatske paralize rekurensa [6]. Multidisciplinarni pristup lečenju našeg pacijenta, omogućio nam je brz uvid u etiologiju. Prema revijalnoj studiji Verma i saradnika iz 2023.godine, prosečna starost pacijenata sa Ortnerovim sindromom je iznosila 53 godine. Od ukupno 117 pacijenata koji su učestvovali u studiji, 66 (56%) su bili muškog pola a 50 (44%) ženskog pola. Najčešći simptomi su promuklost (n=101, 86%), otežano disanje (n=47, 40.1%), kašalj (n=15, 12.8%) i otežano gutanje (n=15, 12.8%). Komorbiditeti pacijenata su bili aortna aneurizma (n = 48, 41%), plućna hipertenzija (n = 41, 35%), mitralna stenoza (n = 20, 17%) i hipertenzija (n = 14, 12%) [7]. Naš pacijent nije raritet po godinama, simptomima i komorbiditetima u odnosu na dostupnu medicinsku literaturu.

Levi rekurentni laringealni živac je 1.75 puta češće zahvaćen od desnog, zbog njegovih anatomskih odnosa i dužine puta. Desni rekurentni laringealni živac se odvaja od n.vagusa u vratu, a levi u grudnom košu. Desni pravi luk oko potključne arterije, i penje se uz žleb između traheje i jednjaka, dok se levi vraća oko aortnog luka [8,9].

Politano i saradnici su u retrospektivnoj studiji iz 2021. godine, istraživali nalaze kompjuterske tomografije kod jednostrane paralize hemilarinksa nepoznatog porekla.

Zaključili su da je levostrana paraliza, češće povezana sa patološkim nalazom u grudnom košu, a desnostrana sa patološkim nalazom u vratu, što je slučaj i kod našeg bolesnika [10].

Svaka promuklost koja traje duže od četiri nedelje, zahteva ciljanu anamnezu i pregled ORL specijaliste, sa posebnim osvrtom na indirektoskopski nalaz, kao i na nalaz fiber nazofaringolaringoskopije [11]. U slučaju unilateralne slabije pokretnosti ili nepokretnosti larinksa, i postojanje endolaringealna promene, indikovana je laringomikroskopija sa biopsijom, dok kod iste kliničke slike ali bez vidljivog patološkog supstrata, neophodna je detaljna radiološka dijagnostika, celog puta levog rekurentnog laringealnog živca, (od baze lobanje do grudnog koša) [12]. Simptomi paralize hemilarinksa, pogotovo otežano disanje i suv kašalj, mogu da imitiraju simptome srčane insuficijencije. Neretko tim pacijentima, bez pregleda ORL specijaliste, bude pogrešno postavljena dijagnoza srčane insuficijencije. Prepoznavanje kardiovaskularne patologije, kao uzroka paralize je važno, kao i isključivanje malignih i benignih tumora vrata, grudnog koša i larinksa. Za dijagnozu Ortnerovog sindroma, neophodno je sprovesti laringoskopiju, rendgenski snimak grudnog koša, kompjutersku tomografiju vrata i grudnog koša, kako bi se isključili svi drugi uzroci [13]. Kod bolesnika kod kojih se paraliza rekurentnog laringealnog živca, održava I nakon konzervativnog lečenja i fonijatrijske rehabilitacije, a zbog opasnosti od aspiracione pneumonije, savetuje se hirurško lečenje (medijalizacija paralizovane glasnice) [1].

ZAKLJUČAK

Ortnerov sindrom, je redak uzrok jednostrane paralize larinksa. Kod nekih pacijenata, promuklost može biti početni znak potencijalno letalne bolesti, pa je neophodno hitno, multidisciplinarno medicinsko ispitivanje. Rano prepoznavanje i lečenje osnovnog kardiovaskularnog oboljenja, ključno je za oporavak pacijenta. Neophodno je naglasiti da dispnoični pacijent, zahteva ne samo pregled otorinolaringologa, već i detaljan kardiološki pregled.

Sukob interesa: Autor izjavljuje da nema sukoba interesa.

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CASE REPORTS

ACUTE HOARSENESS IN SEVERE HEART FAILURE – ORTNER'S SYNDROME

Jelena GAVRIĆ[1], *Svetlana VALJAREVIĆ*[1,2], *Anđelina JOVANOVIĆ*[1], *Milan B. JOVANOVIĆ*[1,2]

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ABSTRACT

Introduction: All cardiac conditions that cause the left or right hemilarynx palsy can be defined as Ortner's syndrome.

Case Presentation: A 57-year-old man was urgently admitted to the Cardiology Department for laboured breathing and a clinical suspicion of heart failure. An emergency consultation by an otorhinolaryngologist was sought because he was complaining of a choking sensation in addition to hoarseness. Fiberoptic nasopharyngolaryngoscopy revealed restricted mobility of his left hemilarynx. His ECG tracing showed signs of chronic heart failure. Computed tomography of the neck and chest with intravenous contrast confirmed cardiomegaly with mediastinal structure displacement. Beta-blockers, diuretics, angiotensin receptor blockers, and allopurinol were prescribed, resulting in improved breathing.

Conclusion: Hoarseness can be an initial sign of a potentially lethal illness. Early recognition and treatment of the underlying cardiovascular condition are crucial for the patient's recovery. It is essential to emphasize that a dyspneic patient requires a thorough cardiac assessment as well as an examination by an otorhinolaryngologist.

Keywords: heart failure, hoarseness, Ortner's Syndrome, recurrent laryngeal nerve

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PRIKAZI BOLESNIKA

OD ALERGIJSKE REAKCIJE DO SINDROMA GORNJE ŠUPLJE VENE

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Milutinović V.& Milutinović V. Sindrom gornje šuplje vena. Halo 194. 2024; 30(1):26-30.

SAŽETAK

Uvod/Cilj Sindrom gornje šuplje vene (SVCS) je skup kliničkih znakova i simptoma koji su rezultat delimične ili potpune opstrukcije krvotoka kroz gornju šuplju venu (VCS). Venska opstrukcija može biti posledica kompresije, invazije, tromboze ili fibroze VCS. Prezentujući je simptom prethodno nedijagnostikovanog tumora u 60% slučajeva. Prikazujemo bolesnika sa SVCS čija je inicijalna manifestacija bolesti protumačena alergijskom rekacijom.

Prikaz slučaja: Pacijent starosti 80 godina upućen je iz doma zdravlja pod dijagnozom alergije u hitnu internističku ambulantu dežurne bolničke ustanove. Prethodno je zbog otoka i crvenila lica, danima lečen antihistaminicima, koji nisu doveli do poboljšanja. Na rendgenskom snimku pluća uočena je proširena senka gornjeg medijastinuma desno, što je uz klinički izgled pacijenta pobudilo sumnju na sindrom gornje šuplje vene. Pacijent se hospitalizuje na odeljenju pulmologije. CT pregledom grudnog koša uočava se infiltrativna promena i značajno komprimovana gornja šuplja vena medijastinalnom adenopatijom, i indikuje hitna radioterapija.

Zaključak: Ukoliko se primarno manifestuje kožnim manifestacijama, dijagnoza sindroma gornje šuplje vene može se lako prevideti. Često se klinička slika inicijalno tumači kao alergijska reakcija, astma ili opstrukcija disajnog puta. U prikazanom slučaju ovaj redak sindrom bio je prva manifestacija intratorakalnog maligniteta.

Ključne reči: sindrom gornje šuplje vene, alergija, hitna radioterapija

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Prihvaćen: 28.03.2024.

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UVOD

Sindrom gornje šuplje vene (SVCS) je skup kliničkih znakova i simptoma, nastalih kao rezultat delimične ili potpune opstrukcije krvotoka kroz gornju šuplju venu (VCS) [1]. Venska opstrukcija može biti posledica kompresije, invazije, tromboze ili fibroze VCS [2]. Sindrom je prvi put opisan 1757. godine od strane Vilijama Hantera kod pacijenta sa sifilitičnom aneurizmom aorte [3]. Pre nego što su antibiotici ušli u široku kliničku upotrebu, SVCS je obično bio infektivnog porekla, sa aneurizmom aorte usled tercijarnog sifilisa i medijastinalnom adenopatijom zbog tuberkuloze [4]. Sa razvojem medicinske tehnologije, glavna etiologija SVCS se promenila, od infektivnih faktora do malignih tumora i nekih benignih etiologija, uključujući trombozu i stenozu centralnih venskih katetera i katetera pejsmejkera [5]. U današnje vreme najčešća etiologija sindroma gornje šuplje vene je malignitet [6].

Opstrukcija VCS može biti uzrokovana neoplastičnom invazijom na venski zid, udruženom sa intravaskularnom trombozom ili spoljašnjim pritiskom tumorske mase na VCS relativno tankih zidova. Potpuna opstrukcija VCS je rezultat intravaskularne tromboze u kombinaciji sa spoljašnjim pritiskom [3]. U poslednje vreme incidencija SVCS povezanog sa uređajem. je u porastu zbog savremene upotrebe katetera, pejsmejkera i defibrilatora [3,7,8].

Prikazujemo bolesnika sa SVCS čija je inicijalna manifestacija bolesti protumačena alergijskom rekacijom.

PRIKAZ BOLESNIKA

Pacijent starosti 80 godina, upućen je iz doma zdravlja pod dijagnozom alergije u hitnu internističku ambulantu dežurne bolničke ustanove. Prethodno je danima u domu zdravlja bezuspešno lečen antihistaminicima.

Anamnestički se saznaje da su se pre 10 dana po prvi put u životu javili crvenilo i otok lica i otok obe ruke, povremeno praćeni glavoboljom i zujanjem u ušima. Leči se od hipertenzije i hiperplazije prostate. Negira alergije, višegodišnji pušač.

Pri pregledu svestan, orijentisan, eupnoičan, mrko crvene prebojenosti i otečene kože lica naročito na nosu i ušima. Pažljivim kliničkim pregledom uočavaju se i proširene vene vrata i grudnog koša.

Nad plućima normalan disajni šum, SaO2 98%, srčana radnja ritmična, tonovi jasni, bez šumova, frekvencije 80/min. EKG nalaz: sinusni ritam, blok desne grane, pojedinačne SVES.

Na osnovu anamneze i fizikalnog nalaza postavljena je sumnja na SVCS, te je pacijent upućen na radiografiju pluća i srca, koja je pokazala proširenu senku gornjeg medijastinuma desno, kao i manji pleuralni izliv iste strane (**Figura 1**).

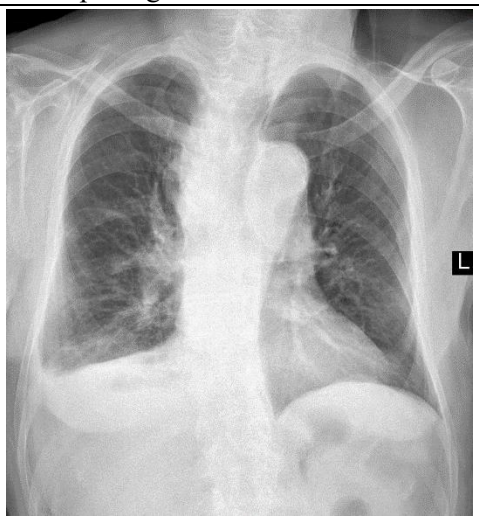

Figura 1. RTG pluća i srca u PA (postero-anteriornom) položaju: Homogena zasenčenost desnog kostofreničnog sinusa (KFS) kao i donjeg plućnog polja epidijafragmalno desno, senkom pleuralnog izliva. Desni hilus voluminozniji sa naglašenim vaskularnim strukturama. Proširena senka gornjeg medijastinuma, konveksna desno ka plućnom parenhimu, uz dislokaciju vazdušnog stuba traheje u levo.

Pacijent se hospitalizuje na odeljenje pulmologije. Laboratorijske analize: gasne analize: pH 7.38, pO2 10.5kPa, pCO2 4.9kPa, HCO3 21.5mmol/l, laktat 1.2 mmol/l. KKS: leukociti 8.4, eritrociti 4.7, hemoglobin 152g/l, trombociti 263, neutrofili 78%, CRP 12.5mg/l, urea 7.1mmol/l, kreatinin 100umol/l, glukoza 6.1mmol/l, BID 2.1umol/l, AST 19U/l, ALT 10U/l, ALP 93U/l, LDH 676U/l, gamaGT 40U/l, kalijum 4,1mmol/l, natrijum 140mmol/l, hloridi 100mmol/l, proteini 73g/l, albumini 43g/l, sedimentacija 39, D-dimer 6540ng/ml.

Ehokardiografski nalaz: Aorta u korenu 3,9 cm u ascedentnom delu 4,0. Aortna valvula trolisna, registruje se umereno teška AR. Leva pretkomora normalnih dimenzija, mitralni kuspisi tanki, blaga MR. Leva komora normalnih dimenzija, očuvane globalne i segmentne kontraktilnosti. Šupljine desnog srca nisu uvećane. Tr 2+. SPDK 50 mmHg. Iza desne pretkomore izliv 3-4mm.

CT pregledom grudnog koša uočava se infiltrativna promena (**Figura 2**) i značajno komprimovana gornja šuplja vena medijastinalnom adenopatijom (**Figura 3**).

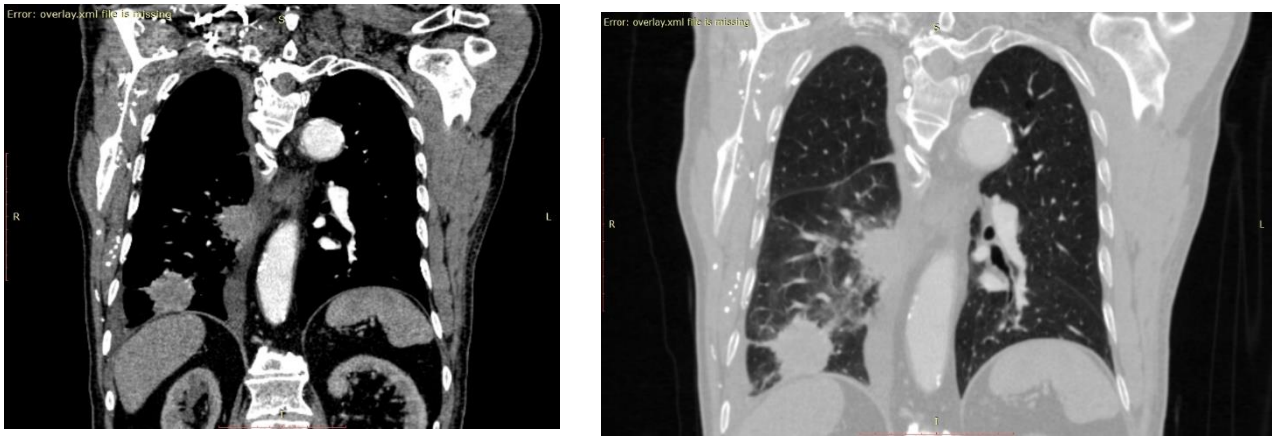

Figura 2. Kompjuterizovana tomografija grudnog koša - koronalni presek: u lateralnom segmentu donjeg režnja desnog plućnog krila lobulirana spikulirana, ekspanzivna mekotkivna promena do koje se prate pripadajući segmentni bronh i grana plućne arterije, i koja najpre odgovara primarnom ekspanzivnom neoplastičnom procesu, sa zonom perilezionog pneumonita.

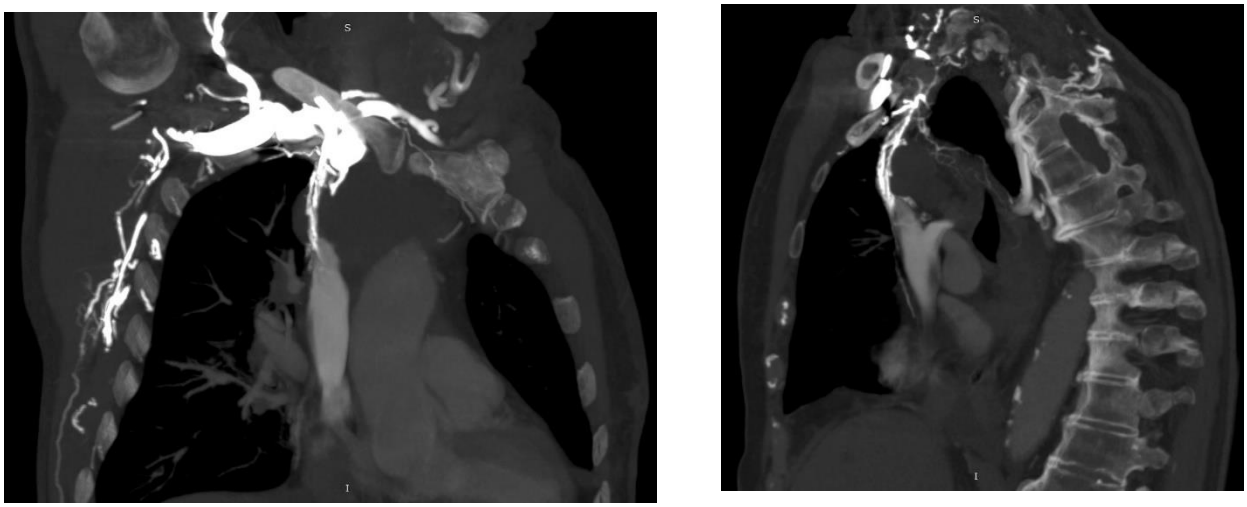

Figura 3. Kompjuterizovana tomografija grudnog koša: a) koronalni presek i b) sagitalni presek: U nivou gornjeg i srednjeg medijastinuma uočava se velika ekspanzivna promena koja odgovara konglomeratu patološki izmenjenih limfnih nodusa (LN). Značajno komprimuje VCS, dislocira je anteriorno i lateralno, svodi lumen iste na nivo pukotine uz evidentne znake izražene posledične kolateralne cirkulacije preko desne vene subclaviae, unutrašnje torakalne vene, gornje desne interkostalne vene i vene azigos.

Pacijent je prikazan Onkološkom konzilijumu koji je doneo odluku o primeni palijativnog lečenja zračnom terapijom po hitnom režimu.

Rad je napisan u skladu sa etičkim standardima časopisa i etičkim principima Helšinske deklaracije.

DISKUSIJA

Prema navodima iz literature, intratorakalni maligniteti su u 60–85% slučajeva odgovorni za nastanak SVCS [7, 9]. Najčešći uzrok SVCS povezanog sa malignitetom je u približno 80% slučajeva bronhogeni karcinom, a u 15% limfom [6]. Prezentujući simptom, prethodno nedijagnostikovanog tumora kod 60% pacijenata je opstrukcija SVC [4,9]. U prikazanom slučaju, ovaj redak sindrom bio je prva manifestacija karcinoma pluća sa izraženom medijastinalnom limfadenopatijom.

Dijagnoza SVCS se uglavnom zasniva na istoriji bolesti i fizikalnom nalazu, koji se uglavnom razvijaju u periodu od nekoliko dana do nedelja. Klinički nalazi, su usko povezani sa venskom kongestijom i rezultirajućim povećanjem venskog pritiska u gornjem delu tela. Iskusnom kliničaru detaljan fizički pregled je često dovoljan da isključi kardiogeno poreklo simptoma pacijenta [1]. Klinička slika varira u zavisnosti od težine, lokacije i brzine početka opstrukcije i uspostavljanja kolateralnih vena [7]. Iako se dispneja kao najčešći simptom, evidentira kod 63% pacijenata sa SVCS [3], u slučaju našeg pacijenta je izostao. Ostali uobičajeni znaci i simptomi uključuju oticanje lica ili vrata, oticanje gornjih ekstremiteta, pletoru, proširene vene na vratu i grudnom košu, kašalj [1,4,6]. Manje česti znaci i simptomi su cijanoza gornjeg dela tela, promuklost, disfagija, stridor i neurološke manifestacije tipa glavobolje, vrtoglavice, promene vida, konfuzije ili čak gubitak svesti [1,4]. Efuzija pleure se javlja u 60% slučajeva [10].

Od pomenutih simptoma, naš pacijent je imao crvenilo i otok lica, otok obe ruke, proširene vene vrata i grudnog koša, kao i glavobolju. Žalio se i na zujanje u ušima, simptom koji je neuobičajen za SVCS. Pacijenti obično opisuju pogoršanje simptoma u ležećem položaju i naginjanju napred [3,7] što kod našeg pacijenta nije bio slučaj. Pojedini pacijenti sa malignim SVCS mogu imati po život opasne simptome cerebralnog, laringealnog i faringealnog edema nastale zbog naglog povećanja venskog pritiska, usled brze okluzije VCS [7]. Neretko se, klinička slika inicijalno protumači alergijskom reakcijom, astmom ili opstrukcijom disajnog puta [11-14]. Naš pacijent je danima bezuspešno lečen antihistaminicima pod dijagnozom alergije.

U prošlosti se terapija zračenjem (RT) smatrala prvom linijom lečenja SVCS, posebno kod pacijenata sa opstrukcijom disajnih puteva. Međutim, poslednjih godina, endovaskularna terapija se češće koristi kao prva, sama ili u kombinaciji sa radioterapijom, kako bi se obezbedilo brzo olakšanje kliničkih simptoma i predupredile komplikacije [7]. U prikazanom slučaju, onkološki konzilijum je doneo odluku, o primeni palijativne radioterapije po hitnom režimu.

ZAKLJUČAK

Kod primarno ispoljenih kožnih manifestacija bolesti, dijagnoza SVCS može se lako prevideti. Ovo naglašava značaj detaljnog uzimanja anamnestičkih podataka i kliničkog pregleda kako bi se izbeglo postavljanje pogrešne dijagnoze kao što su alergijska reakcija, astma ili opstrukcija disajnog puta. U prikazanom slučaju ovaj redak sindrom bio je prva manifestacija karcinoma bronha. SVCS u bolesnika sa karcinomom bronha predstavlja komplikaciju koja značajno utiče na uspeh inicijalno primenjenog lečenja i dužinu preživljavanja bolesnika.

Sukob interesa: autori izjavljuju da nema sukoba interesa.

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CASE REPORTS

FROM AN ALLERGIC REACTION TO A SUPERIOR VENA CAVA SYNDROME

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ABSTRACT

Introduction/Objective: Superior vena cava syndrome (SVCS) is a collection of clinical signs and symptoms resulting from partial or complete obstruction of blood flow through the SVC. The venous obstruction may be due to compression, invasion, thrombosis, or fibrosis of the SVC. SVCS can be the initial presentation of a previously undiagnosed tumor in up to 60% of cases. We are presenting the case of a patient with SVC syndrome who was initially diagnosed with an allergic reaction.

Case report: An eighty-year-old patient with an allergy diagnosis was referred from the Community Health Centre to the Internal Medicine Clinic. The patient had previously been treated with antihistamines for days due to swelling and facial redness, which showed no signs of improvement. During the chest x-ray, a widened shadow of the upper side of the mediastinum on the right side was noticed. Along with the clinical appearance of the patient, this raised doubts of the superior vena cava syndrome. Hence, the patient was hospitalised to the Department of Pulmonology. A CT chest scan showed an infiltrative change and a significantly compressed upper vena cava due to the mediastinal adenopathy. Urgent radiotherapy was prescribed to the patient.

Conclusion: If primarily manifested by skin symptoms, the diagnosis of superior vena cava syndrome can be easily overlooked. It is often that the clinical picture is initially interpreted as an allergic reaction, asthma or airway obstruction. In the presented case, this rare syndrome was the first symptom of intrathoracic malignancy.

Key words: superior vena cava syndrome, allergy, urgent radiotherapy

UPUTSTVO AUTORIMA ZA PRIPREMANJE RADA

Naučni časopis urgentne medicine - Halo 194 medicine je časopis Zavoda za urgentnu medicinu Beograd, registrovan kao sredstvo javnog informisanja 1996. godine. Uredništvo u saradnji sa Medicinskim fakultetom u Beogradu, Katedra urgentne medicine, objavljuje radove iz svih oblasti urgentne medicne, i srodnih struka. Časopis objavljuje: originalne radove, saopštenja, prikaze bolesnika, preglede iz literature, aktuelne teme, izveštaje s kongresa i stručnih sastanaka, stručne vesti, prikaze knjiga, kao i komentare i pisma Uredništvu u vezi s objavljenim radovima. Tematske oblasti časopisa su urgentna medicina, opšta medicina, preventivna medicina, biomedicina, interna medicina, kardiologija, alergo-logija, pulmologija, endokrinologija, gastroenterologija, nefrologija, reanimatologija, anesteziologija, neuro-logija, neurohirurgija, hirurgija, traumatologija, transfu-ziologija, klinička farmakologija, farmakoterapija, toksi-kologija, sudska medicina, stomatologija, medicinsko pravo, istorija medicine, vodiči kliničke prakse, u sećanju, itd.

Svi prispeli rukopisi šalju se na stručnu, autonomnu recenziju. Autori predlažu kategoriju svojih radova a recenzent i Uredništvo je određuju. Štampaće se samo oni radovi koji nisu prethodno nigde objavljivani. Konačnu odluku o prihvatanju rada za štampu donosi glavni i odgovorni urednik.

Časopis se štampa na srpskom jeziku, sa kratkim sadržajem prevedenim na engleski jezik. Radovi stranih autora se štampaju na engleskom jeziku sa kratkim sadržajem na srpskom i engleskom jeziku.

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Nakon prijema, rukopisi prolaze preliminarnu proveru u redakciji kako bi se utvrdilo da li ispunjavaju osnovne kriterijume i standarde. Pored toga, proverava se da li su rad ili njegovi delovi plagirani.

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UPUTSTVO ZA PRIPREMU RUKOPISA

Autori su dužni da se pridržavaju uputstva za pripremu radova. Rukopisi u kojima ova uputstva nisu poštovana biće odbijeni bez recenzije.

Za obradu teksta koristiti program Word for Windows. Rukopis se piše latinicom, sa dvostrukim proredom, isključivo fontom Times New Roman i veličinom slova 12 tačaka (12 pt). Sve margine podesiti na 25 mm, veličinu stranice na A4, a tekst kucati sa levim poravnanjem i uvlačenjem svakog pasusa za 10 mm, bez deljenja reči (hifenacije). Izbegavati upotrebu tabulatora i uzastopnih praznih karaktera (spejsova) radi poravnanja teksta, već za to koristiti alatke za kontrolu poravnanja na lenjiru i Toolbars. Ako se u tekstu koriste specijalni znaci (simboli), koristiti font Symbol.

Za izradu grafičkih priloga koristiti standardne grafičke programe za Windows, poželjno iz programskog paketa Microsoft Office (Excel, Word Graph). Kod kompjuterske izrade grafika izbegavati upotrebu boja i senčenja pozadine.

Podaci o korišćenoj literaturi u tekstu označavaju se arapskim brojevima u uglastim zagradama – npr. [1, 2], i to onim redosledom kojim se pojavljuju u tekstu.

PRIPREMA RUKOPISA

Rukopis treba da sadrži: naslovnu stranu, apstrakt i ključne reči, tekst rukopisa, zahvalnost, reference, spisak tabela, spisak ilustracija.

1. Naslovna strana

a) Naslov treba da bude kratak, jasan i informativan, bez skraćenica i da odgovara sadržaju rada. Podnaslove treba izbegavati.

b) Ispisuju se puna imena i prezimena autora sa godinama rođenja.

v) Zvaničan naziv ustanova u kojima autori rade i mesto, i to redosledom koji odgovara indeksiranim brojevima autora;

g) Simbolima: [1], [2]… itd. identifikuje se koji je autor iz koje ustanove/organizacijske jedinice.

d) Ime, adresa i telefonski brojevi (fiksni, mobilni, faks) i e-mail adresa za kontakt autora zaduženog za korespondenciju u vezi sa rukopisom.

đ) Ime i adresa autora kome se mogu slati zahtevi za separate.

e) Kratak naslov rada (do 40 znakova) na dnu naslovne strane.

2. Apstrakt i ključne reči

Na drugoj stranici se nalazi strukturisani apstrakt, koji se piše na srpskom i engleskom jeziku. Apstrakt se piše kratkim rečenicama. Iznosi se cilj rada, osnovne procedure (izbor ispitanika ili laboratorijskih životinja; metode posmatranja i analize), glavni nalazi (kon-kretni podaci i njihova statistička značajnost) i glavni zaključak. Naglasiti nove i značajne aspekte studije ili zapažanja. Strukturisani apstrakt ima podnaslove: cilj(evi), metode, rezultati i zaključak. Apstrakt za originalne članke i maetanalize piše se u 250 reči, a za apstrakte na engleskom dozvoljeno je i do 450 reči. Za kazuistiku strukturisani apstrakt ima do 150 reči, sa podnaslovima: uvod, prikaz slučaja i zaključak. Ispod apstrakta, pod podnaslovom „Ključne reči“ dati 3–6 ključnih reči ili kratkih izraza koji oslikavaju sadržinu članka.

Na sledećoj (trećoj) stranici priložiti kratak sadržaj na engleskom jeziku (Abstract) sa ključnim rečima (Key words), i to za radove u kojima je obavezan kratak sadržaj na srpskom jeziku, koji treba da ima 200-300 reči. Apstrakt na engleskom treba da ima istu strukturu kao i kratak sadržaj na srpskom.

Tekst članka

Originalni rad treba da ima sledeće podnaslove: uvod, cilj rada, metod rada, rezultati, diskusija, zaključak, literatura.

Prikaz bolesnika čine: uvod, prikaz bolesnika, diskusija, zaključak, literatura. Ne treba koristiti imena bolesnika, inicijale ili brojeve istorija bolesti, naročito u ilustracijama.

Pregled iz literature čine: uvod, odgovarajući podnaslovi, zaključak, literatura. Prvoimenovani autor metaanalize i preglednog rada mora da navede bar pet autocitata (kao autor ili koautor) radova publikovanih u časopisima s recenzijom. Koautori, ukoliko ih ima, moraju da navedu bar jedan autocitat radova takođe publikovanih u časopisima s recenzijom.

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Obim rukopisa. Celokupni rukopis rada – koji čine naslovna strana, kratak sadržaj, tekst rada, spisak literature, svi prilozi, odnosno potpisi za njih i legenda (tabele, fotografije, grafikoni, sheme, crteži), naslovna strana i kratak sadržaj na engleskom jeziku – mora iznositi za originalni rad, saopštenje, pregled iz literature i vodič kliničke prakse do 5.000 reči, za prikaz bolesnika do 2.000 reči, za rad iz istorije medicine do 3.000 reči, za rad za praksu do 1.500 reči; radovi za ostale rubrike moraju imati do 1.000 reči.

Provera broja reči u dokumentu može se izvršiti u programu Word kroz podmeni Tools–Word Count ili File–Properties–Statistics.

Uvod. Navesti hipotezu (ukoliko postoji) i ciljeve rada koji iz nje proističu. Ukratko izneti razloge za studiju ili posmatranje.

Navesti samo strogo relevantne podatke iz literature i ne iznositi opširna razmatranja o predmetu rada. Ne iznositi podatke ili zaključke iz rada o kome se izveštava.

Metode. Jasno opisati kako ćete i na koji način sprovesti istraživanje (intervju, anketni upitnik, itd), mesto sprovođenja veličinu uzorka i u kom vremenskom periodu je istraživanje ssprovedeno. Opišite način izbora metoda posmatranja ili eksperimentnih metoda (ispitanici ili eksperimentne životinje, uključujući kontrolne). Odrediti uključujuće i isključujuće kriterijume za odabir ispitanika. Identifikovati metode, aparaturu (ime i adresa proizvođača u zagradi) i proceduru dovoljno detaljno da bi se drugim autorima omogućilo ponavljanje rezultata. Za uhodane metode, uključujući i statističke, navesti samo podatke iz literature. Dati podatak iz literature i kratak opis za metode koje su publikovane, ali nisu dovoljno poznate. Opisati nove ili značajno modifikovane metode, izneti razlog za njihovo korišćenje i proceniti njihova ograničenja. Tačno identifikovati sve primenjene lekove i hemikalije, uključujući generičko ime, doze i načine primene (im, per os, iv, sc, ip, itd). Ne koristiti komercijalna imena lekova i drugih preparata.

Etika. Kada se izveštava o eksperimentu na ljudima, naglasiti da li je procedura sprovedena u skladu sa etičkim standardima Komiteta za eksperimente na ljudima ili sa Helsinškom deklaracijom iz 1975., revidiranom 1983. Obavezna je i saglasnost nadležnog etičkog komiteta. Ne iznositi imena, inicijale ili bolničke brojeve ispitanika, naročito ukoliko je materijal ilustrovan. Kod eksperimenata naznačiti da li su poštovani principi o zaštiti životinja po propisima i zakonu.

Statistika. Detaljno opisati statističke metode da se dobro informisanom čitaocu omogući da proveri iznesene rezultate. Kada je moguće, kvantifikovati nalaze i prikazati ih uz odgovarajuće pokazatelje greške (kao npr. SD, SE ili granice poverenja). Izbegavati oslanjanje samo na statističko testiranje hipoteze, kao što je vrednost p, što ne daje značajne kvantitativne informacije.

Prodiskutovati prihvatljivost subjekata eksperimenta. Izneti detalje o randomizovanju (metodi slučajnog izbora). Opisati metode za slepo ispitivanje, izneti broj zapažanja. Izvestiti o gubicima kod zapažanja (kao npr. bolesnici koji otpadnu iz kliničkog ispitivanja). Podaci iz literature za dizajn studije i statističke metode treba, ako i kada je moguće, da budu standardni radovi radije nego članci u kojima je to prvi put objavljeno.

Naglasiti ako je primenjen neki kompjuterski program koji je u opštoj upotrebi. Opis statističkih metoda treba smestiti u poglavlje Metode. Kada se sumiraju rezultati u poglavlju Rezultati, naglasiti kojom statističkom metodom su analizovani. Tabele i slike ograničiti na one koje su neophodne da bi se objasnili i podržali stavovi u radu. Grafikone treba koristiti umesto tabela sa mnogo podataka. Ne duplirati prikazivanje podataka grafikonom i tabelom. Definisati statističke termine, skraćenice i većinu simbola.

Rezultati. Rezultate prikazati logičkim redosledom u tekstu, tabelama i ilustracijama. U tekstu ne ponavljati sve podatke iz tabela ili ilustracija; naglasiti ili sumirati samo značajna zapažanja.

Diskusija. Naglasiti nove i značajne aspekte studije i zaključke koji iz njih slede. Ne ponavljati detaljno podatke ili drugi materijal koji je već prikazan u uvodu ili rezultatima. U diskusiju uključiti implikacije nalaza i njihova ograničenja uključujući i one za buduća istraživanja. Posmatranja dovesti u vezu sa drugim relevantnim studijama, u načelu iz poslednje tri godine, a samo izuzetno i starijim. Povezati zaključke sa ciljevima rada, ali izbegavati kategorične tvrdnje i zaključke koje podaci iz rada ne podržavaju u potpunosti. Izbegavati isticanje primata u nečemu i aluzije na rad koji nije dovršen. Izneti nove hipoteze kada je to opravdano, ali ih jasno naznačiti kao takve. Kada je to primereno, mogu se uključiti i preporuke.

4. Zahvalnost

Iza diskusije, a ispred literature, kada je to potrebno, izneti u jednoj ili više rečenica (a) doprinos osobe kojoj treba odati priznanje, ali koja ne zaslužuje koautorstvo, kao npr. podrška šefa odeljenja; (b) zahvalnost za tehničku pomoć; (v) zahvalnost za finansijsku i materijalnu pomoć, uz naznačavanje vrste pomoći itd.

5. Literatura

Spisak referenci je odgovornost autora, a citirani članci treba da budu lako pristupačni čitaocima časopisa. Stoga uz svaku referencu obavezno treba navesti DOI broj članka (jedinstvenu nisku karaktera koja mu je dodeljena) i PMID broj ukoliko je članak indeksiran u bazi PubMed/MEDLINE. Podatke iz literature treba numerisati onim redosledom kojim se pojavljuju u tekstu. Broj reference ne bi trebao da bude veći od 30 osim u pregledu literature u kojem je dozvoljeno da ih bude do 50. Većina citiranih naučnih članaka ne treba da bude starija od 5 godina. Izbegavati korišćenje apstrakta kao reference, a apstrakte od dve godine ne citirati. Identifikovati reference u tekstu, tabelama i legendama arapskim brojevima u zagradi [1]. Svi podaci o citiranoj literaturi moraju biti tačni. Preporuka je da se ne citiraju radovi iz časopisa koje ne indeksiraju Current Contents, Index Medicus (Medline) ili Excerpta Medica.

Svi radovi, bez obzira na jezik izvora, citiraju se na engleskom jeziku, uz navođenje izvornog jezika u zagradi iza naslova (npr. In Serbian, In Russian, In German, in French, itd.) Koristiti stil citiranja, kao u navedenim primerima, koji se koristi u Index Medicus-u. Ne prihvata se citiranje apstrakata, sekundarnih publikacija, usmenih saopštenja, nepublikovanih radova, službenih i poverljivih dokumenata. Mogu se prihvatiti citati radova koji su prihvaćeni za štampu, ali još nisu objavljeni. Naznačuje se časopis i dodaje „in press“.

Primeri ispravnog oblika referenci:

Članci u časopisima

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(12) Urednik (editor) kao autor

Balint B, editor. Transfusiology. Beograd: Zavod za udţbenike i nastavna sredstva; 2004 (In Serbian).

(13) Poglavlje u knjizi

Mladenović T, Kandolf L, Mijušković ŢP. Lasers in dermatology. In: Karadaglić Đ, editor. Dermatology (In Serbian). Beograd: Vojnoizdavački zavod & Verzal Press; 2000. p. 1437–49.

(14) Zbornik radova sa kongresa

Kimura J, Shibasaki H, editors. Recent advances in clinical neurophysiology. Proceedings of the 10th International Congress of EMG and Clinical Neurophysiology; 1995 Oct 15–19; Kyoto, Japan. Amsterdam: Elsevier; 1996.

(15) Rad iz zbornika

Bengtsson S, Solheim BG. Enforcement of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Rienhoff O, editors. MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics; 1992 Sep 6–10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. p. 1561–5.

(16) Disertacija

Knežević D. The importance of decontamination as an element of complex therapy of poisoning with organophosphorous compounds [dissertation]. Belgrade: School of Veterinary Medicine; 1988 (In Serbian).

Ostali publikovani materijali

(17) Novinski članak

Vujadinović J. The inconsistency between federal and republican regulation about pharmacies. In between double standards (In Serbian). Borba 2002 February 28; p. 5.

(18) Rečnici i slične reference

Kostić AĐ. Multilingual Medical Dictionary. 4th Edition. Beograd: Nolit; 1976. Erythrophobia; p. 173–4.

Neobjavljeni materijal

(19) U štampi (in press)

Pantović V, Jarebinski M, Pekmezović T, Knežević A, Kisić D. Mortality caused by endometrial cancer in female population of Belgrade. Vojnosanit Pregl. 2004; 61 (2): in press. (In Serbian)

Elektronski materijal

(20) Članak u elektronskom formatu

Morse SS. Factors in the emergence of infectious disease. Emerg Infect Dis [5serial online].1995 Jan–Mar. Dostupno na URL: http://www.cdc.gov/ncidod/EID/eid/htm

(21) Monografija u elektronskom formatu

CDI, clinical dermatology illustrated [monograph on CD-ROM]. Reeves JRT, Maibach H. CMEA Multimedia Group, producers. 2nd ed. Version 2.0. San Diego: CMEA; 1995.

(22) Kompjuterska datoteka

Hemodynamics III: the ups and downs of hemodynamics [computer program]. Version 2.2. Orlando (FL): Computerized Educational Systems; 1993.

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Tabele. Tabele se označavaju arapskim brojevima po redosledu navođenja u tekstu, sa nazivom na srpskom ili engleskom jeziku. Naslo v treba o tkucati iznad tabele, a objašnjenj a ispod nje. Tabele crtati isključivo u programu Word, kroz meni Table–Insert–Table, uz definisanje tačnog broja kolona i redova koji će činiti mrežu tabele. Desnim klikom na mišu – pomoću opcija Merge Cells i Split Cells – spajati, odnosno deliti ćelije. Koristiti font Times New Roman, veličina slova 12 pt, sa jednostrukim proredom i bez uvlačenja teksta. Korišćene skraćenice u tabeli treba objasniti u legendi ispod tabele.

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a) The title should be short, clear and informative, should not contain abbreviations and should correspond to the content of the paper. Subtitles should be avoided.
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An original work should have the following subtitles: Introduction, Objective, Method, Results, Discussion, Conclusion, References. A case report should consist of: Introduction (objective is to be stated in the final paragraph of the Introduction), Case Report, Discussion, References. No names of patients, initials or numbers of medical records, particularly in illustrations, should be mentioned. Case reports cannot have more than five authors.

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published, especially if the material is illustrated. You should also state if the principles of animal protection according to laws and regulations were followed in experiments.

Statistics. A detailed account of statistical methods used should be given in order to enable a well informed reader to check the results. Whenever possible, quantify the results and also state the corresponding statistical flaw index (e.g. SD, SE or credibility borders). Avoid relying only on statistical testing of the hypothesis, such as r value, which does not provide relevant quantitative data. Always discuss the plausibility of experiment subjects. Give details on randomization (random choice method). Describe the methods used in blind experiments, specify the number of observations. Report on the number of failed observations (such as when patients drop out of clinical research). If and whenever possible, reference literature data for study design and statistical methods should be standard works rather than articles in which these data were first published.

The use of standard computer programs should be noted. Statistical methods description should be given under Methods. When summarizing the results under Results, you should also specify which statistical method was used for the analysis. Tables and pictures should be restricted to those necessary for explaining and supporting the hypothesis of the paper. Graphs should be used to replace tables with excess data. Do not repeat data presentation in graphs and tables. Define statistical terminology, abbreviations and most of the symbols.

Results. Results should be reported in logical sequence throughout the text as well as in tables and illustrations. Do not repeat all the data from the tables or illustrations in the text; emphasize or summarize only significant observations.

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4. Acknowledgments

After Discussion and before Reference, when needed, the following acknowledgments can be added in one or more sentences (a) contribution of an individual who needs to be recognized and awarded but does not deserve co- authorship, e.g. support of the head of department; (b) acknowledgment for technical support; (c) acknowledgment for financial and material support, underlying type of support etc.

5. References

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Jurhar-Pavlova M, Petlichkovski A, TrajkovD, Efinska-Mladenovska O, Arsov T, Strezova A, et al. Influence of the elevated ambient temperature on immunoglobulin G and immunoglobulin G subclasses in sera of Wistar rats. Vojnosanit Pregl. 2003; 60(6): 657–12.

(2) Organization (Institution) as author

The Cardiac Society of Australia and New Zealand. Clinical exercise stress testing. Safety and performance guidelines. Med J Aust. 1996; 164: 282–4.

(2) No author
Cancer in South Africa [editorial]. S Afr Med J. 1994; 84: 15.

(4) Volume with supplement
Tadić V, Ćetković S, Knežević D. Endogenous opioids release: an alternative mechanism of cyanide toxicity? Iugoslav Physiol Pharmacol Acta. 1989; 25 Suppl 7: 143–4.

(5) Tome with supplement
Dimitrijević J, Đukanović Lj, Kovačević Z, Bogdanović R, Maksić Đ, Hrvačević R, et al. Lupis nephritis: histopathologic features, classification and histologic scoring in renal biopsy. Vojnosanit Pregl. 2002; 59 (6 Suppl): 21–31.

6) Volume with part (Pt)
Ozben T, Nacitarhan S, Tuncer N. Plasma and urine sialic acid in non-insulin dependent diabetes mellitus. Ann Clin Biochem. 1995; 32 (Pt 3): 303–6.

(7) Tome with part
Poole GH, Mills SM. One hundred consecutive cases of flap lacerations of the leg in ageing patients. N Z Med J. 1994; 107 (986 Pt 1): 377–8.

(8) Tome without volume
Turan I, Wredmark T, Fellander-Tsai L. Arthroscopic ankle arthrodesis in rheumatoid arthritis. Clin Orthop. 1995; (320): 110–4.

(9) No volume and tome
Browell DA, Lennard TW. Immunologic status of the cancer patient and the effects of blood transfusion on antitumor responses. Curr Opin Gen Surg. 1993: 325–33.

(10) Pagination in Roman numerals
Fisher GA, Sikic BI. Drug resistance in clinical oncology and hematology. Introduction. Hematol Oncol Clin North Am. 1995 Apr; 9 (2): xi–xii.

Books and other monographs

(11) Single author
Ringsven MK, Bond D. Gerontology and leadership skills for nurses. 2nd ed. Albany (NY): Delmar Publishers; 1996.

(12) Editor as author
Balint B, editor. Transfusiology. Beograd: Zavod za udţbenike i nastavna sredstva; 2004 (In Serbian).

(13) Book chapter
Mladenović T, Kandolf L, Mijušković ŢP. Lasers in dermatology. In: Karadaglić Đ, editor. Dermatology (In Serbian). Beograd: Vojnoizdavački zavod & Verzal Press; 2000. p. 1437– 49.

(14) Congress proceedings
Kimura J, Shibasaki H, editors. Recent advances in clinical neurophysiology. Proceedings of the 10th International Congress of EMG and Clinical Neurophysiology; 1995 Oct 15–19; Kyoto, Japan. Amsterdam: Elsevier; 1996.

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(16) Dissertation
Knežević D. The importance of decontamination as an element of complex therapy of poisoning with organophosphorous compounds [dissertation]. Belgrade: School of Veterinary Medicine; 1988 (In Serbian).

Other publications

(17) Newspaper article
Vujadinović J. The inconsistency between federal and republican regulation about pharmacies. In between double standards (In Serbian). Borba 2002 February 28; p. 5.

(18) Dictionaries and similar references
Kostić AĐ. Multilingual Medical Dictionary. 4th Edition. Beograd: Nolit; 1976. Erythrophobia; p. 173–4.

Unpublished work

(19) in press
Pantović V, Jarebinski M, Pekmezović T, Knežević A, Kisić D. Mortality caused by endometrial cancer in female population of Belgrade. Vojnosanit Pregl. 2004; 61 (2): in press. (In Serbian)

Electronic references

(20) Article in electronic form
Morse SS. Factors in the emergence of infectious disease. Emerg Infect Dis [5serial online]1995 Jan–Mar. Available at URL: http://www.cdc.gov/ncidod/EID/eid/htm

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(22) Electronic database
Hemodynamics III: the ups and downs of hemodynamics [computer program]. Version 2.2. Orlando (FL): Computerized Educational Systems; 1993.

ILLUSTRATIONS

Tables. Tables are marked in Arabic numerals following the order of appearance in the text, with titles in Serbian or English. The title should be typed above the table and any explanatory information under the table. Tables should be made only in Word, through Table-Insert-Table menu, by defining the exact number of columns and rows of the table grid. Cells should be merged or split by clicking the right mouse button – using the options Merge Cells and Split Cells. Use the Times New Roman font, character size 12 pt, with single spacing and without indentation.

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