Incidence of Unrecognized Myocardial Infarction in Patients with Schizophrenia

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Uvod
Shizofrenija kao psihijatrijska bolest pogada oko 0,5 % populacije, a povezana je s povećanom smrtnošću. Stoga je životni vijek bolesnika sa shizofrenijom smanjen za dvadeset godina.1

Introduction
As a psychiatric illness, schizophrenia affects approximately 0.5% of the population and is associated with increased mortality. The lifespan of a patient with schizophrenia is thus reduced by twenty years.2

Summary: Introduction: About 0.5% of the population have schizophrenia and are thus at increased risk of death. The consequences of disordered physiological processes in the body lead to a reduction in life span of up to twenty years. Poor eating habits and lifestyles lead to more frequent occurrence of metabolic syndrome, and antipsychotics are one of the main causes of diabetes and hyperlipidemia. Psychiatric patients are often exposed to discrimination, resulting in poorer social acceptance and poorer health care. These people often have low or no income and are unemployed and socially excluded. The aim of our study was to determine the incidence of unrecognized myocardial infarction in patients with schizophrenia and whether the patients have been treated with appropriate medication among patients with schizophrenia and whether the patients have been treated with appropriate medication such as acetylsalicylic acid, beta-blockers, ace inhibitors, statins, etc. Patients and Methods: The study included patients diagnosed with schizophrenia hospitalized at the Psychiatric Hospital of Canton Sarajevo. A total of 605 patients were treated. Results: Scarring was indicated on electrocardiogram examination in 11.85% patients, 56.25% of whom were men and 43.75% women. The youngest patient with ECG- indicated scarring was a man aged 37, while the oldest was also a man aged 67. The average life expectancy of patients with scarring indicated on the electrocardiogram was 53 years. Conclusion: In order to prevent cardiac incidents, it is necessary to raise awareness in patients with schizophrenia regarding to lifestyle and dietary habits and to perform regular health examinations in this population.

Keywords: unrecognized myocardial infarction, schizophrenia, metabolic syndrome.

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The most common risk factor for the development of myocardial infarction (MI) in patients with schizophrenia is metabolic syndrome, which is present in more than 60% of patients. Furthermore, poor dietary habits and lacking or practically absent physical activity are the basis for the development of cardiac events. Heart rhythm disorders such as torsades de pointes develop as a consequence of prolonged QT-interval caused by antipsychotics. Antipsychotics can also exert a negative influence on the individual's metabolic profile, leading to frequent morbidity from diabetes and hyperlipidemia.

Due to the nature of the illness, persons with schizophrenia, especially if they are not supervised by family or professionals, are more prone to disease since they are not under appropriate healthcare. Over the past few decades, mortality from MI has increased in these patients due to ignored symptoms, inadequate provision of medical assistance, and especially due to reperfusion therapy.

Diabetes is an entity that represents an additional hazard in these patients since it reduces the pain threshold. Increased risk of MI can also be associated with arterial hypertension, which is more prevalent in patients with schizophrenia.

There is still a distinction between psychiatric and somatic illnesses, which has negative consequences in the context of stigma and discrimination of patients with mental illnesses. Emotions, fear, and other external factors have an important role in the development of cardiological diseases such as MI and arterial hypertension. The presence of somatic and mental conditions greatly reduces the quality of life and ultimately leads to poorer prognosis and outcomes.

Unhealthy lifestyle habits are often present, such as an overly sedentary lifestyle, lack of physical activity, and consumption of alcohol or narcotics. Such persons often have low or no income and are unemployed as well as socially isolated.

The aim of this study was to describe the prevalence of unrecognized MI in patients suffering from schizophrenia as well as the prevalence of the application of appropriate pharmacological treatment (acetylsalicylic acid, beta-blockers, ACE inhibitors, and statins).

**Patients and methods**

This study included patients with the diagnosis of schizophrenia hospitalized at Psychiatric Hospital of Canton Sarajevo. The inclusion criterion for this study was diagnosis of schizophrenia. Exclusion criteria for this study were patients who knew they had already suffered from MI and those with other psychiatric illnesses.

All patients underwent an internal medicine exam, an electrocardiogram (ECG) test, routine laboratory diagnostics, and anthropometric measurements. The authors of the study personally interpreted the ECG results. The following values were considered pathological: Q-wave duration above 0.04 seconds, an amplitude less than 1/3 of the R wave in the same QRS complex, triglyceride values above 1.7 mmol/L, LDL cholesterol above 3.4 mmol/L, glycemia above 6.2 mmol/L, arterial pressure above 140/90 mmHg, and body-mass index (BMI) above 25.

**Results**

The study included a total of 605 patients, of which 46.66% were men and 53.33% were women. Smoking was reported by...
23,70 %, povišen LDL kolesterol u 49,62 %, dok je ITM bio povišen u 65,92 % bolesnika. Na slici 1 navedena je zastupljenost čimbenika rizika s obzirom na spol.

Ožiljne promjene na EKG-u pronađene su u 11,85 % bolesnika, od toga u 56,25 % muškaraca i 43,75 % žena. Najmliđi bolesnik s ožiljnim promjenama na EKG-u bio je muškarac u dobi od 37 godina, dok je najstariji također muškarac u dobi od 67 godina. Prosječna životna doba bolesnika u kojih su pronađene ožiljne promjene na EKG-u jest 53 godine.

U bolesnika s ožiljnim promjenama na EKG-u (slika 2), povišene vrijednosti LDL kolesterolja kao čimbenika rizika za nastanak IM-a bile su prisutne u 43,80 % muškaraca i 56,30 % žena. Vrijednost ITM-a bila je povišena u 37,50 % muškaraca i 50 % žena, dok su pušači zastupljeni podjednako u objema spolnim skupinama. Hipertenziju ima 12,50 % muškaraca i 31,30 % žena, dok je 12,50 % muškaraca i 31,30 % žena imalo dijabetes. Metabolički sindrom prisutan je u ukupno 43,75 % bolesnika, od toga 28,57 % muškaraca i 71,42 % žena.

Najveći broj ožiljnih promjena na EKG-u u žena zabilježen je u bolesnica dobi između 50 i 59 godina, dok su ožiljne promjene u muškaraca najviše zastupljene u životnoj dobi između 60 i 69 godina (slika 3). U 50 % bolesnika ožiljne su promjene bile prisutne na inferiornim odvodima EKG-a, 25 % promjena na prednjoj stijenci srčanog mišića, dok je septum pogoden u 25 % slučajeva (slika 4).

Prikupljanjem anamnestičkih podataka u bolesnika u kojih su utvrđene ožiljne promjene na EKG-u došlo se do zaključka da je 60 % bolesnika u prethodnim dvjema godinama osjetio jaku bol u prsimu, ali da nisu zatražili medicinsku pomoć. Samo je jedan bolesnik bio na terapiji acetilsalicilatnom kise-
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**FIGURE 2.** Prevalence of risk factors in patients with ECG results indicating myocardial scarring.

LDL = low-density lipoprotein; BMI = body mass index.

- Elevated LDL cholesterol
- Elevated BMI
- Smokers
- Hypertension
- Diabetes mellitus

**FIGURE 3.** The prevalence of scarring-related ECG characteristics in different age groups.

Linom koja mu je obiteljski liječnik uključio kao preventivnu terapiju zbog životne dobi. Nijedan bolesnik nije u terapiji imao statine. Dva su bolesnika dobivala beta-blokatore kao terapiju, dok je pet bolesnika imalo antihipertenzivnu terapiju koju nisu uzimali redovito.

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Siccin as preventive treatment due to advanced age. None of the patients were being treated by statins. Two patients were receiving beta-blockers, and five patients were prescribed antihypertensive therapy but were not taking the medication regularly.
Diskusija

Psihijatrijski bolesnici zbog prirode svoje bolesti u velikoj su mjeri podložni razvoju somatskih bolesti. \textsuperscript{14,15} Ovim je istraživanjem potvrđeno da oboljeli od shizofrenije pripadaju visokorizičnoj skupini za nastanak IM-a. \textsuperscript{14,15}

Loša socioekonomска situacija, stigma društva, vezivanje realne kardijalne simptomatologije sa psihijatrijskim stanjem bolesnika razlog su velikoga broja kardijalnih događaja u ovoj populaciji. \textsuperscript{14,15}

Velik broj čimbenika rizika koji su prisutni u bolesnika sa shizofrenijom razlog su sve veće učestalosti akutnog IM-a. \textsuperscript{14,15} Ovim je istraživanjem potvrđeno da oboljeli od shizofrenije pripadaju višekorizičnoj skupini za nastanak IM-a. \textsuperscript{14,15}

Čak 83 % oboljelih pripadaju višekorizičnoj skupini za nastanak IM-a. \textsuperscript{14,15} Ovim je istraživanjem potvrđeno da oboljeli od shizofrenije pripadaju višekorizičnoj skupini za nastanak IM-a. \textsuperscript{14,15}

Zbog loših životnih i prehrambenih navika, pretilost i povećana vrijednost ITM-a zastupljeni su u 65 % bolesnika, a najvažnije čimbenik za razvoj metaboličkog sindroma smatraju se abdominalna pretilost i rezistencija stanica perifernoga tkiva na učinak inzulina. Za razliku od supkutanoga masnog tkiva, abdominalno masno tkivo jest metabolički aktivan organ, koji u suvišku otpušta povećanu količinu slobodnih masnih kiselina i upalnih faktora kao što su TNF-alfa, IL 6, koji interfejeraju s inzulinskom signalizacijom, što naposjetku ima za posljedicu smanjeno preuzimanje glukoze u mišićima, pretparan sintezu triglicerida i pojačanu gluconeogenesu u jetri. \textsuperscript{14,15}

Atherosklerotske promjene na krvnim žilama izraženije su u ovakvim bolesnikama. Istraživanjem smo utvrdili da su vrijednosti LDL kolesterola povišene u polovice ispitanika. Attar \textit{et al.}\textsuperscript{16} found elevated cholesterol in 35.7% and elevated BMI in 6.7% of patients with schizophrenia. That study reported a smoking prevalence of 73.8%, hypertension in 36.6% of patients, and 11.6% patients with diabetes. Non-significant Q-wave peaks were not considered during ECG analysis in our study. Although the specificity for dis-
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Covering previous MI is between 64% and 99%, most studies reported a precision of over 95%. Scarring indicated by ECG was found in 11.85% of patients, of which 56.25% were men and 43.75% women. In a study by different authors, the prevalence of MI in patients suffering from schizophrenia was between 25% and 33%, up to 75%.

Cardiac events in the psychiatric patient population happen at a younger age, and these patients do not receive adequate care according to the healthcare protocols for acute MI. In patients with schizophrenia and ECG-indicated scarring, clinical cardiologists suggest exercise stress test and echocardiography as additional diagnostic tests. Coronary angiography was not considered for these patients. We found similar data in other studies. The results of the present study indicated inadequate treatment in patients with schizophrenia. Many studies have shown that these patients have elevated blood glucose levels and higher prevalence of type 2 diabetes and hypercholesterolemia; in comparison with the general population.

Discrimination and stigmatization of mentally ill patients is present not only in society in general but in the healthcare system as well. It can be intentional and unintentional and can result in failure to adequately diagnose and treat these patients. Other authors have reported the case of three patients with schizophrenia who presented at the hospital complaining of typical angina-related chest pain, but they were not taken seriously and were returned home without any examination. Furthermore, studies by the same authors have shown that these patients receive medical care only when their symptoms become life-threatening, and that physicians do not take chest pain-related symptoms seriously in this group of patients.

In a study on secondary prevention in patients with schizophrenia and previous MI, the authors found that every sixth patient suffering from schizophrenia was not under cardiovascular protection and that the mortality rate for this group was extremely high in comparison with the general population. In line with this study, other authors found reduced use of antiaggregation medication, beta-blockers, ACE inhibitors, and statins in patients with schizophrenia in comparison with the general population.

Kugathasan et al. showed that poor quality of medical care can result in increased cardiovascular mortality in the general population. Using the National Registry in Denmark, the authors examined the prescription of medication and mortality records for all patients hospitalized for MI in Denmark between 1995 and 2015. The mortality rate in the study period was alarmingly high for patients with schizophrenia. As many as 45% of patients with a prior diagnosis of schizophrenia died during the study period, in comparison with only 27% of the other patients. Two thirds of total deaths in both groups were due to cardiovascular diseases.

It is important to perform a careful examination of psychiatric patients and take their reports of somatic symptoms seriously without immediately assuming they are due to the patient's mental condition. The patients themselves can also be the source of the problem, however, if they associate their symptoms with their current mental condition and perceive them in their own idiosyncratic way as part of their clinical picture.

Conclusion

In order to prevent cardiac events, it is necessary to raise awareness in patients with schizophrenia regarding lifestyle and dietary habits, perform periodic examinations that include laboratory diagnostics and ECG tests, and prescribe adequate medication therapy based on the somatic condition of the patient.
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