# Fibrilacija atrija i arterijska hipertenzija: komplikacije i komorbiditeti

# Atrial Fibrillation and Hypertension: Complications and Comorbidities

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**RECEIVED:** September 6, 2023
**UPDATED:** September 29, 2023
**ACCEPTED:** October 10, 2023

**SAŽETAK:** *Cilj:* Utvrditi odnos između arterijske hipertenzije (AH) i fibrilacije atrija (AF), kao i učestalost komorbiditeta i komplikacija AF-a.

*Bolesnici i metode:* U ovo retrospektivno kohortno istraživanje uključili smo 43 bolesnika s AF-om koji su se od siječnja do ožujka 2023. godine javili na redoviti pregled u Službu obiteljske medicine Doma zdravlja Lukavac. Podatci o povijesti njihove bolesti prikupljeni su anamnezom, a ostale informacije poput komorbiditeta i komplikacija preuzete su iz medicinske dokumentacije. U statističkoj je analizi primijenjen Studentov t-test.

*Rezultati:* Prema dobnoj strukturi, najveći broj ispitanika pripada skupini osoba u dobi većoj od 65 godina (81,4 %). Arterijska hipertenzija kao glavni čimbenik rizika prisutna je u 93,0 % uključenih u istraživanje. Većina uključenih imala je očuvanu ejekcijsku frakciju (51,4 %), a učestalost ishemijskoga moždanog udara iznosila je 30,2 %. Najveći broj ispitanika s registriranim moždanim udarom, njih 84,2 %, već je bilo na antikoagulantnoj terapiji.

*Zaključak:* Ovo istraživanje pokazuje da je AH najčešći i najveći čimbenik rizika za nastanak AF-a. Uz AH, visoka je učestalost i povezanost s dijabetesom, što zahtijeva daljnja istraživanja. Učestalost je veća u bolesnika s očuvanom ejekcijskom frakcijom. Velik postotak bolesnika s ishemijskim moždanim udarom kardioembolijskog je podrijetla, kao i invalidnost i smrtnost bolesnika. Sveobuhvatni cilj trebao bi biti izradba nacionalnog registra FA koji bi služio kao referenca za sve daljnje aktivnosti u liječenju te u praćenju komplikacija i komorbiditeta.

**SUMMARY:** *Aim:* To determine the relationship between hypertension and atrial fibrillation (AF) as well as the frequency of other comorbidities and complications of AF.

*Patients and Methods*: In this retrospective cohort study, we included 43 patients with AF who attended a regular check-up at the Family Medicine Service of the Lukavac Health Center in the period from January to March 2023. Information on their disease history was collected from the patients, and other information such as comorbidities and complications was extracted from medical records. Student t-test was used in statistical analysis.

*Results*: According to the age structure, the largest number of respondents belonged to the group of people over 65 years of age (81.4%). Hypertension as the main risk factor was present in 93.0% of respondents. Most of the subjects had a preserved ejection fraction (51.4%), and the frequency of ischemic stroke was 30.2%. The largest number of respondents with a registered stroke, 84.2% of them, were already on anticoagulant therapy.

*Conclusion*: This study showed that the most common and greatest risk factor for AF was hypertension. In addition to hypertension, the frequency and association with diabetes mellitus was high, which requires further research. The frequency was higher in patients with preserved ejection fraction. Ischemic stroke, as well as disability and mortality, had a cardioembolic origin in a large percentage of patients. The overarching goal should be to develop a national registry of atrial fibrillation that would serve as a reference for all further activities in the management of atrial fibrillation, complications, and comorbidities.

**KLJUČNE RIJEČI:** fibrilacija atrija, hipertenzija, dob, spol, komorbiditeti, komplikacije.

**KEYWORDS:** atrial fibrillation, hypertension, age, gender, comorbidities, complications.

**CITATION:** Cardiol Croat. 2024;19(1-2):65-70. | https://doi.org/10.15836/ccar2024.65

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**TO CITE THIS ARTICLE:** Bajrić Čusto E, Ćemalović S, Bajrić S, Ćemalović N. Atrial Fibrillation and Hypertension: Complications and Comorbidities. Cardiol Croat. 2024;19(1-2):65-70.| https://doi.org/10.15836/ccar2024.65

**TO LINK TO THIS ARTICLE:** https://doi.org/10.15836/ccar2024.65

## Uvod

Fibrilacija atrija (AF) najčešća je aritmija koja pogađa više od 33 milijuna ljudi diljem svijeta. Ona je vodeći uzrok kardiovaskularnih bolesti i smrti u svijetu. Najčešće su komplikacije tromboembolijski incidenti i krvarenja. Ishemijski moždani udar (MU) kao komplikacija AF-a čini oko 6 – 24 % svih ishemijskih MU-a. Prethodna su istraživanja pokazala da se učestalost AF-a povećava sa životnom dobi, a češće se pojavljuje u muškaraca[1,2]. Svojom povezanošću sa zatajivanjem srca (HF) i MU-om, AF ima vrlo velik utjecaj na kvalitetu i kvantitetu života milijuna ljudi[3,4].

Arterijska hipertenzija (AH) jedan je od najvažnijih čimbenika za nastanak AF-a. Povećava učestalost AF-a za 50 % u muškaraca i 40 % u žena[5]. U istraživanju *Atherosclerosis Risk in Communities* AH je bila glavni čimbenik koji pridonosi razvoju AF-a i prisutna je u oko 20 % novih slučajeva AF-a[6]. U bolesnika koji su prije toga imali AF hipertenzija je bila prisutna u 60 – 80 % ispitanih[7]. Patofiziološki mehanizmi u vezi s AH-om rezultiraju smanjenom kontraktilnošću lijeve klijetke, dijastoličkom disfunkcijom i hipertrofijom lijeve klijetke, uz povećanu napetost stijenke, povećani tlak punjenja lijeve klijetke, aktivaciju simpatičkoga živčanog sustava i renin-angiotenzin-aldosteronskog sustava (RAAS)[8]. Epidemiološka su istraživanja pokazale da je AH povezana s 1,8 puta većim rizikom od razvoja nove AF, te 1,5 puta većim rizikom od progresije AF u trajnu[5,9]. Također, rezultati provedenih istraživanja znatno su poboljšali razumijevanje AF-a i uzroka bolesti. Stoga se strukturna i električna remodelacija lijevog atrija sve više prepoznaje kao proces koji prethodi i pridonosi razvoju AF-a. Budući da povišeni sustavni tlakovi utječu na veličinu i funkciju lijevog atrija, nekontrolirana AH ključan je čimbenik koji pridonosi razvoju AF-a[10].

Brojna su istraživanja pokazala da, uz AH, postoje brojna kardiološka i nekardiološka stanja koja su povezana s rizikom od razvoja AF-a. Među strukturnim bolestima srca, valvularna bolest srca (osobito bolest mitralnog zalistka) i HF znatno povećavaju rizik od AF-a. Glavni je mehanizam remodeliranje atrija, iako drugi čimbenici imaju ulogu u bolesnika s HF-om. AF je također češća u bolesnika s koronarnom bolesti srca s očuvanom ejekcijskom frakcijom[11].

Već je poznato da je najčešća komplikacija bolesnika s AF-om ishemijski MU. Hemodinamski mehanizam odgovoran za povećan rizik od tromboembolije jest Virchowljev trijas. Vaskularni trombi uglavnom se sastoje od fibrinskih niti, crvenih krvnih stanica i trombocita[12]. Ovakvi su koncepti evoluirali tijekom godina i relevantni su za razvoj arterijske tromboze[13]. Važan dio kliničkog liječenja AF-a jest donošenje odluke o oralnoj antikoagulantnoj terapiji jer oralna antikoagulantna terapija znatno smanjuje rizik od moždanog udara (za 64 %) i smrtnost od svih uzroka (za 26 %) u usporedbi s placebom[14].

U ovo retrospektivno kohortno istraživanje uključili smo 43 bolesnika s AF-om koji su dolazili na redovite kontrole u Službu obiteljske medicine Doma zdravlja Lukavac od siječnja do ožujka 2023. Podatci o povijesti njihove bolesti prikupljeni su anamnezom. Ostali podaci kao što su ejekcijska frakcija lijeve klijetke (EF), komorbiditeti, antikoagulantna terapija i komplikacije preuzeti su iz medicinske dokumentacije.

Bolesnici su, s obzirom na dob, podijeljeni u tri kategorije: mladi (0 – 14 godina), radno sposobne osobe (15 – 64 godine)

## Introduction

Atrial fibrillation (AF) is the most common cardiac arrhythmia, affecting more than 33 million people worldwide. It is the leading cause of cardiovascular disease and death in the world. The most common complications are thromboembolic incidents and bleeding. Ischemic stroke as a complication of AF represents about 6-24% of all ischemic strokes. Previous studies have shown that the frequency of AF increases with age and that it occurs more often in men[1,2]. Through its association with heart failure (HF) and stroke, AF has a very large impact on the quality and duration of life for millions of people[3,4].

Hypertension is one of the most important factors for the occurrence of AF. It increases the incidence of AF by 50% in men and 40% in women[5]. In the Atherosclerosis Risk in Communities study, hypertension was the main factor contributing to the development of AF and was present in about 20% of new AF cases[6], whereas in patients who have previously had AF, hypertension was present in 60-80% of cases[7]. Pathophysiological mechanisms due to hypertension result in reduced left ventricular contractility, diastolic dysfunction, and left ventricular hypertrophy, in addition to increased cardiac wall tension, increased left ventricular filling pressure, and activation of the sympathetic nervous system and the renin-angiotensin-aldosterone system (RAAS)[8]. Epidemiological studies have shown that hypertension is associated with a ×1.8 higher risk of developing new-onset AF and a ×1.5 increased risk of AF progression to a permanent form[5,9]. Additionally, studies have significantly improved our understanding of AF and its causes. Structural and electrical remodeling of the left atrium has therefore been increasingly recognized as a process that precedes and contributes to the development of AF. Since elevated systemic pressures affect the size and function of the left atrium, uncontrolled hypertension is a key factor contributing to the development of AF[10].

Numerous studies have shown that, in addition to hypertension, there are numerous cardiac and non-cardiac conditions that are associated with the risk of developing AF. Among structural heart diseases, valvular heart disease (especially mitral valve disease) and HF significantly increase the risk of AF. The main mechanism is atrial remodeling, although other factors play a role in patients with HF. AF is also more common in patients with coronary artery disease with preserved ejection fraction[11].

It is well-known that ischemic stroke is the most common complication in patients with AF. The hemodynamic mechanism responsible for increased thromboembolic risk is Virchow's triad. Vascular thrombi are mainly composed of fibrin strands, red blood cells, and platelets[12]. These concepts have evolved over the years and are relevant to the development of arterial thrombosis[13]. An important part of the clinical treatment of AF includes making a decision on oral anticoagulant therapy, given that oral anticoagulant therapy significantly reduces the risk of stroke (by 64%) and mortality from all causes (by 26%) compared with placebo[14].

In this retrospective cohort study, we included 43 patients with AF who attended a regular check-up at the Family Medicine Service of the Lukavac Health Center in the period from January to March 2023. Information on their disease history was collected from the patients. Other data such as left ventricular ejection fraction (EF), comorbidities, anticoagulant therapy, and complications were extracted from their medical records.

i starije osobe (>65 godina). Sljedeći su podatci iskorišteni za klasifikaciju EF-a: HF s očuvanom ejekcijskom frakcijom – HFpEF (≥50 %), HF sa srednjim rasponom EF-a – HFmrEF (41 – 49 %) i HF sa smanjenom EF – HFrEF (≤40 %).

Opisni podatci prikazani su u postotcima. U obradbi podataka primijenjen je Studentov t-test. Statistička značajnost razlike smatrana je relevantnom ako je p <0,05.

Svi su pacijenti dobrovoljno pristali biti uključeni u ovo istraživanje i potpisali su informirani pristanak. Protokol ispitivanja odobrilo je Etičko povjerenstvo Doma zdravlja Lukavac.

## Rezultati

Ispitivanu skupinu činila su 43 bolesnika, 21 muškarac (48,8 %) i 22 žene (51,2 %). Prema dobnoj strukturi, najveći broj ispitanika pripada skupini osoba životne dobi većom od 65 godina (81,4 %), a ostatak čine osobe u radnoj dobi od 15 do 64 godine (18,6 %).

Arterijsku je hipertenziju imalo 40 uključenih (93,0 %), a njih 18 (41,9 %), uz AH, imalo je i dijabetes tipa 2.

U ovom istraživanju 35 bolesnika imalo je EF verificiranu transtorakalnom ehokardiografijom (81,4 %). Najveći broj ispitanih, njih 18 (51,4 %), imalo je HFpEF, 8 bolesnika (22,9 %) imalo je HFmrEF, a HFrEF je potvrđen u 9 bolesnika s AF-om (25,7 %).

Najvažnije komplikacije AF-a jesu tromboembolijski događaji. Više od polovice bolesnika (53,5 %) imalo je neki od tromboembolijskih događaja, njih 8 (18,6 %) imalo je u medicinskoj dokumentaciji zabilježen infarkt miokarda, dok je 13 ispitanika (30,2 %) doživjelo MU kao komplikaciju AF-a. Devet ispitanika koji su doživjeli MU (69,2 %) prethodno je bilo na antikoagulantnoj terapiji zbog verificirane AF. Nije bilo statistički značajne razlike u dobi ispitanika s prethodnim MU-om u odnosu prema ispitanicima sa zabilježenim infarktom miokarda (66,85 godina prema 72,75 godina, p = 0,92). Uz infarkt miokarda i MU, u 2 bolesnika (4,6 %) zabilježena je plućna embolija.

Uvidom u medicinsku dokumentaciju ispitanika njih 38 (88,4 %) bilo je na antikoagulantnoj terapiji. Najveći broj bolesnika primao je rivaroksaban kao antikoagulantnu terapiju, njih 26 (60,5 %), dok je 6 bolesnika bilo na varfarinu (13,9 %), a 6 na apiksabanu (13,9%). U 4 ispitanika (10,5 %) antikoagulantna je terapija uključena nakon MU-a. Uz antikoagulantnu terapiju, 11 ispitanika (25,6 %) u svojoj je terapiji imalo i antiagregacijske lijekove, acetilsalicilatnu kiselinu 8 bolesnika (18,6 %) i dvojnu antiagregacijsku terapiju (acetilsalicilatnu kiselinu i klopidogrel) 3 bolesnika (7,0%). Osam bolesnika uključenih u ovo istraživanje (18,6 %) bilo je i na antikoagulantnoj i na antiagregacijskoj terapiji.

## Rasprava

Fibrilacija atrija najčešća je aritmija u općoj populaciji koja se povećava s godinama. Bolest je povezana sa znatnim morbiditetom i mortalitetom, a, kako sve veći broj osoba ima AF, to ima velike implikacije na javno zdravlje[15-17]. Brojni su čimbenici rizika koji imaju ulogu u razvoju AF-a, kao što su životna dob, hipertenzija, pretilost, HF i dijabetes tipa 2.

Objavljena istraživanja navode da je prosječna dob bolesnika u većini izvješća između 65 i 70 godina[18,19], slično kao

Patients were divided into three categories according to age: young (0-14 years old), working age persons (15-64 years old), and the elderly (>65 years old). The following data were used to classify EF: HF with preserved ejection fraction – HFpEF (≥50%), HF with mid-range EF – HFmrEF (41-49%), and HF with reduced EF – HFrEF (≤40%).

Descriptive data were presented as percentages. Student t-test was used in data processing. The statistical significance of the difference was considered relevant if p<0.05.

All patients voluntarily agreed to be included in this study and signed an informed consent form. The study protocol was approved by the Ethics Committee of the Lukavac Health Centar.

## Results

The study group included 43 patients, 21 men (48.8%) and 22 women (51.2%). According to the age structure, the majority of respondents belonged to the group of people over 65 years of age (81.4%), while the rest were people of working age from 15 to 64 years old (18.6%).

Hypertension was present in 40 respondents (93.0%), while 18 respondents in the study (41.9%) were diagnosed with diabetes mellitus type 2 in addition to hypertension.

In this study, 35 patients had verified EF using transthoracic echocardiography (81.4%). The majority, 18 of them (51.4%), had HFpEF, while 8 patients (22.9%) had HFmrEF, and HFrEF was verified in 9 patients with AF (25.7%).

The most significant complications of AF were thromboembolic events. More than half of the patients (53.5%) had some thromboembolic event; 8 of them (18.6%) had a myocardial infarction noted in their medical records, while 13 subjects (30.2%) experienced a stroke as a complication of AF. 9 subjects who experienced a stroke (69.2%) were previously on anticoagulant therapy due to verified AF. There was no statistically significant difference in the age of subjects with a previous stroke compared with subjects who had a recorded myocardial infarction (66.85 years vs. 72.75 years, p=0.92). In addition to myocardial infarction and stroke, pulmonary embolism was recorded in 2 patients (4.6%).

Based on the inspection of the participants' medical records, 38 of them (88.4%) were on anticoagulant therapy. The majority of patients received rivaroxaban as anticoagulant therapy, 26 of them (60.5%), while 6 patients were on warfarin (13.9%) and 6 on apixaban (13.9%). In 4 participants (10.5%), anticoagulant therapy was included after a stroke. In addition to anticoagulant therapy, 11 respondents (25.6%) also had antiplatelet drugs in their therapy, while aspirin was used in 8 patients (18.6%) and dual antiplatelet therapy (aspirin and clopidogrel) in 3 patients (7.0%). 8 patients included in this study (18.6%) were on both anticoagulant and antiplatelet therapy.

## Discussion

Atrial fibrillation is the most common arrhythmia in the general population, which increases with age. AF is associated with significant morbidity and mortality, and the increasing number of people with AF will have major implications for public health[15-17]. There are numerous risk factors that play a role in the development of AF, such as age, hypertension, obesity, HF, and diabetes mellitus type 2.

i u ovom, gdje najveći broj ispitanika pripada skupini osoba starijih od 65 godina (81,4 %). Kako stanovništvo stari, broj bolesnika s AH-om svakodnevno se povećava.

Bosanskohercegovačka studijska skupina koja je najnovije izvijestila o AH-u pokazala je da je visoka prevalencija AH-a danas rezultat nezdravog načina života kao što su neadekvatna prehrana, pretilost, nedostatak tjelesne aktivnosti, pušenje i visoka izloženost stresu[20]. Rezultati ovog istraživanja upućuju na to da je najviše ispitanika (93,0 %) u zdravstvenoj dokumentaciji imao dijagnozu AH-a. Hipertenzija je identificirana kao jedan od najvažnijih čimbenika koji povećavaju rizik od razvoja AF-a[5,21]. Dobro kontrolirana AH primjenom antihipertenziva može smanjiti rizik od nastanka i razvoja AF-a. Vjeruje se da prije navedeni čimbenici rizika dovode do strukturnog i električnog remodeliranja atrija, što se smatra važnim supstratom u razvoju AF-a. Iako je postignut znatan napredak, ti su fenomeni i dalje nepotpuni ili slabo shvaćeni, što vjerojatno pridonosi ograničenoj učinkovitosti terapijskih pristupa AF-u[22]. Osim AH-a, FA iznimno se često pojavljuje zajedno sa šećernom bolešću, no kako bi se utvrdila definitivna uloga i povezanost s pojavom AF-a potrebna su velika randomizirana istraživanja.

Kao što je već poznato, najčešći tromboembolijski incident povezan s AF-om jest ishemijski MU. U istraživanju koje je obuhvatilo 739 bolesnika s MU-om, AF je bila registrirana u 20,7 % oboljelih[23]. Rezultati istraživanja MU-a u bolesnika s početkom AF-a odgovaraju prethodnim nalazima u Bosni i Hercegovini.[23] To je također u skladu s nekoliko svjetskih istraživanja koja su potvrdila odnos između MU-a i AF-a, njihov utjecaj na visoku smrtnost i invaliditet[24-26].

Nabil *i sur.* utvrdili su da je većina bolesnika s AF-om bila na antikoagulantnoj terapiji (antagonisti vitamina K i nove oralne antikoagulancije) 44,2 %, dok je nešto manji postotak oboljelih bio na antiagregacijskoj terapiji, oko 22 % bolesnika[27]. U ovom smo istraživanju došli do sličnih rezultata, pri čemu je mnogo više bolesnika bilo na oralnim antikoagulansima nego na antiagregacijskoj terapiji, no, bez obzira na to, propisivanje antikoagulantne terapije bez prethodne hospitalizacije mnogo je rjeđe. Troškovi hospitalizacije koji se mogu pripisati AF-u znatno su porasli tijekom posljednjih desetljeća i očekuje se da će se povećati u budućnosti zbog starenja stanovništva[28,29].

Sve su češći bolesnici koji su uzimali oralnu antikoagulantnu terapiju, a ipak imaju tromboembolijski incident, što otvara pitanje vjerojatnog nemara i nepravilnog uzimanja lijekova, kao i needuciranosti o mogućim komplikacijama. Regionalno je istraživanje izvijestilo da 73 % bolesnika s prethodno dijagnosticiranom AF nije bilo adekvatno liječeno kako bi se spriječili tromboembolijski događaji.[30] Ipak, antikoagulantna terapija štiti u najvećoj mjeri i još uvijek je prva linija prevencije od pojave tromboembolijskih incidenata.

Fibrilaciju atrija uzrokuje HFrEF zbog nepovoljnoga strukturnog i električnog remodeliranja atrija[31,32]. Štoviše, AF pogoršava HF, uzrokujući pogoršanje simptoma, hospitalizaciju i smrtnost[33]. Nekoliko je istraživanja pokazalo da HFpEF i HFmrEF imaju veću prevalenciju AF-a nego HFrEF[34,35]. Više od polovice bolesnika u ovom istraživanju (74,3 %) imalo je HFpEF i HFmrEF, što odgovara rezultatima prethodno navedenih istraživanja.

Ovo istraživanje ima nekoliko ograničenja: provedeno je u samo jednom zdravstvenom centru na relativno malom broju

Published studies state that the average age of patients in most reports is between 65 and 70 years[18,19], similar to results in the present study, where the majority of respondents belonged to the group of elderly people over 65 years of age (81.4%). As the population ages, the number of patients with hypertension increases.

A Bosnian study group that recently reported on hypertension stated that the high prevalence of hypertension today is the result of unhealthy lifestyle habits, such as poor dietary choices, obesity, lack of physical activity, smoking, and high exposure to stress[20]. Our results show that the majority of respondents (93.0%) had a diagnosis of hypertension in their medical records. Hypertension was identified as one of the most significant factors that increase the risk of developing AF[5,21]. Successfully controlling hypertension with antihypertensive drugs can reduce the risk of the onset and development of AF. It is believed that the above-mentioned risk factors lead to structural and electrical atrial remodeling, which is considered an important element in the development of AF. Although significant progress has been made, these phenomena remain incompletely or poorly understood, which likely contributes to the limited effectiveness of therapeutic approaches for AF[22]. In addition to hypertension, AF occurs extremely often together with diabetes mellitus, for which large randomized studies are needed to determine the definitive role and link with the occurrence of AF.

As is already known, the most common thromboembolic incident related to AF is ischemic stroke. In a study that included 739 patients with stroke, AF was registered in 20.7%[23]. Our results for stroke in patients with AF onset correspond to previous findings in Bosnia and Herzegovina[23]. This is also consistent with several worldwide studies that have confirmed the relationship between stroke and AF and their impact on high mortality and disability[24-26].

Nabil *et al.* found that most patients with AF were on anticoagulant therapy (vitamin K antagonists and new oral anticoagulants), 44.2%, while a slightly smaller percentage were on antiplatelet therapy: about 22% of patients[27]. In our study, we obtained similar results, which significantly more patients on oral anticoagulants then antiplatelet therapy, but regardless of that, the prescription of anticoagulant therapy without prior hospitalization is much less frequent. Costs and hospitalizations attributable to AF have increased markedly over recent decades and are expected to increase in the future due to ageing populations[28,29].

Increasingly often, patients who use oral anticoagulant therapy still have a thromboembolic incident, which raises the question of probable negligence and irregular use of drugs, as well as lack of education about possible complications. A regional study reported that 73% of patients with previously diagnosed AF were not adequately treated to prevent thromboembolic events[30]. Nevertheless, anticoagulant therapy provides the greatest extent of protection and is still the first line of prevention against the occurrence of thromboembolic incidents.

Atrial fibrillation is caused by HFrEF due to unfavorable structural and electrical atrial remodeling[31,32]. Moreover, AF worsens HF, causing worsening symptoms, hospitalizations, and mortality[33]. Several studies have shown that HFpEF and HFmrEF have a higher prevalence of AF than HFrEF[34,35]. More than half of the patients in this study (74.3%) had HFpEF and HFmrEF, which corresponds to the results of the previously mentioned studies.

ispitanika i u kratkom razdoblju te je stoga potrebno daljnje istraživanje koje će obuhvatiti veći broj ispitanika u dvama ili više zdravstvenih centara u Bosni i Hercegovini.

## Zaključak

Istraživanje pokazuje da je AH najčešći i najveći čimbenik rizika za razvoj AF-a. To upućuje na potrebu smanjenja čimbenika rizika i kontrole same AH. Uz AH, visoka je učestalost i povezanost s dijabetesom, što zahtijeva daljnja istraživanja. Učestalost je veća u bolesnika s očuvanom EF, što otvara put budućim istraživanjima o tome je li to posljedica dobro kontrolirane AF i drugih čimbenika rizika te jesu li uključeni i drugi mehanizmi. Velik postotak bolesnika s ishemijskim MU-om kardioembolijskog je podrijetla, što je pokazalo naše istraživanje. To, međutim, povećava broj hospitalizacija, ali i invalidnost i smrtnost bolesnika.

Sveobuhvatni cilj trebao bi biti izradba nacionalnog registra AF-a koji bi služio kao referenca za sve daljnje aktivnosti u liječenju AF-a, komplikacija i komorbiditeta.

This study had several limitations: the study was conducted in only one health center on a relatively small number of subjects, and in a short period of time; therefore, further research is necessary that will include a larger number of respondents in two or more health centers in Bosnia and Herzegovina.

## Conclusion

This study shows that hypertension is the most common and greatest risk factor for AF. This indicates the need to reduce risk factors and control hypertension. In addition to hypertension, the frequency and association with diabetes mellitus was high, which requires further research. The frequency was higher in patients with preserved EF, which paves the way for future studies, whether this is the result of well-controlled AF and other risk factors, or whether other mechanisms are involved. Ischemic stroke in a large percentage of patients is of cardioembolic origin, as our study showed, which increases the number of hospitalizations as well as disability and mortality in patients.

The overarching goal should be to develop a national registry of AF that would serve as a reference for all further activities in the management of AF, complications, and comorbidities.

**ACKNOWLEDGEMENTS:** We would like to thank nurses Nihadi Avdić, Mukadesi Vehabović and Ajša Husić for their help in the technical part of the research.

**FUNDING:** No specific funding was received for this study.

**TRANSPARENCY DECLARATION:** Conflict of interest: None to declare.

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