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Case report

Vernakalant Use in Cardioversion of Recent Onset Atrial Fibrillation: A Case Report

Vuk Niković[1], Predrag Blagojević[2], Dušan Milenković[3], Anton Laggner[4], Hans Domanovits[4], Ranka Bulajić[5]

[1]*Institute for Emergency Medical Care Montenegro, Podgorica, Montenegro*
[2]*Primary Health Care Center Pale - Emergency Medical Services, Republic of Srpska, Bosnia and Herzegovina*
[3]*Institute for Emergency Medical Care Niš, Niš, Serbia*
[4]*AKH Hospital Vienna University Clinic for Emergency medicine, Vienna, Austria*
[5]*Southlake Regional Health Centre, Toronto, Canada*

SUMMARY

Atrial fibrillation (AF) is a chaotic, irregular atrial rhythm at 300-600 bpm. The AV node conducts the impulse intermittently, causing the irregular ventricular rate. The main risk is of embolism (stroke), which is preventable by anticoagulation. The current estimate of the AF prevalence in the developed world is approximately 1.5-2% in the general population, with the average age of patients with this condition steadily rising to between 75 and 85 years. Hospitalization of patients with AF is also very common. Vernakalant (Brinavess®) is a concentrate that is made up into a solution of infusion (drip into a vein). In recent years, vernakalant has emerged as a novel agent for the termination of recent-onset AF.

Forty-seven-year-old man felt chest discomfort and palpitations after a strenuous work (lifting heavy objects). After calling the EMS, the patient was transferred to hospital. When more detailed history was taken, it was established that the patient had the diagnosis of paroxysmal AF for which he was taking Concor 1.25 mg q.d. and Simvastatin 40 mg q.d. BP 160/70 mmHg. ECG was done in the emergency room (ER) which revealed AF with rapid ventricular rate of 135 bpm with no ST–T changes. Laboratory analysis showed: pro BNP 89.1 pg/ml, CK 3.8, venous ABG unremarkable. Cardiac ultrasound was unremarkable and the patient was properly anticoagulated with heparin and enoxaparin in order to receive vernakalant. He was treated with vernakalant 3mg/kg i.v. in the ER. Ten minutes afterwards, a repeated ECG was done showing a normal sinus rhythm at 75 bpm. The patient was discharged from hospital in stable condition.

Vernakalant was successful in converting recent-onset AF into the sinus rhythm in the emergency department.

Key words: **heart rhythm, vernakalant, atrial fibrillation, successful cardioversion**

Corresponding author:
Vuk Niković
Email: nikovicvuk@gmail.com

INTRODUCTION

Atrial fibrillation (AF) is a chaotic, irregular atrial rhythm at 300-600 bpm. The node responds intermittently, causing the irregular ventricular rate. It is common in the elderly population (≤ 9%). The main risk is of embolic stroke, which is preventable by warfarin. One of the most common arrhythmia seen in the emergency room (ER) is AF. Since AF can have long-term consequences and risks, it is very important to recognize it and to treat the condition properly (1).

AF is identified by the absence of P waves and the presence of an irregular ventricular rate. Coarse AF, which describes the presence of residual atrial activity on the ECG, is generally best seen in lead V1 with the absence of P wave-like activity in other leads (1, 2).

There are multiple definitions of AF. It is an irregular atrial activity with an irregular ventricular response. Once recognized, a cause/trigger should be sought. Common causes of AF can be divided into cardiac issues (coronary artery disease, hypertension, heart anatomic anomalies, heart muscle inflammation, infection), lung disorders (hypoxia, hypercarbia, pulmonary hypertension, lung infections, inflammations), electrolyte disbalance, endocrinopathies, toxins, etc. (2).

AF that self-terminates within 7 days is called paroxysmal AF. If AF lasts longer than seven days, it is called persistent AF. AF can cause many symptoms like feeling of palpitations, shortness of breath, chest pain, tiredness, syncope. In many cases, however, the AF is asymptomatic. Treatment slows down the heart rate in rapid atrial fibrillation, and frequently, conversion into sinus rhythm is not needed. Anticoagulation is needed according to CHADS-VASc Score (3).

Vernakalant (Brinavess®) is a concentrate that is made up into a solution for infusion (drip into a vein). It contains the active substance vernakalant hydrochloride. Brinavess is used to rapidly restore the normal heart rhythm in adult patients (aged 18 years and older) who have recently started having AF (4, 5).

Vernakalant is a mixed blocker of both K^+ and Na^+ channels that acts selectively on atrial tissue. Its atrial selective action is explained both in targeting channels mainly found in atrial tissue (and not in the ventricles) and in its rate and voltage-dependent efficacy, which leads to a greater reduction in impulse conduction velocity and tissue excitability when the heart rate is high, such as in AF (5).

Therapeutic indication for vernakalant (Brinavess®) is a rapid conversion of recent-onset AF to sinus rhythm in adults: for non-surgery patients: AF ≤ 7 days duration; for post-cardiac-surgery patients: AF ≤ 3 days duration (5).

Clinical evidence for Brinavess®

In phase III and IV studies, vernakalant was administered as a 10-min infusion of 3 mg/kg and, if AF persisted after 15 minutes, a second infusion of 2 mg/kg was given. Patients enrolled in the vernakalant studies were primarily men (68%), with a mean age of 63 years, with approximately half of the patients over 65 years (6). Compared to other commonly used drugs, Brinavess® showed shorter times to sinus conversion (Figure 1) (7-12).

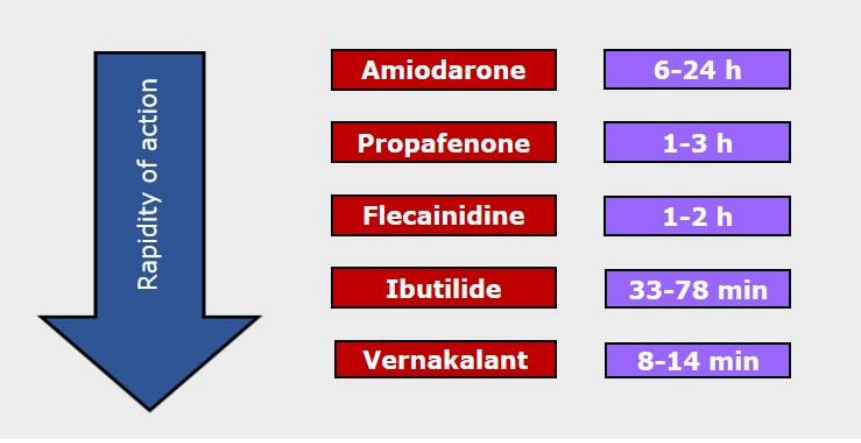


Figure 1. **Mean time-to-conversion of intravenous antiarrhythmics used to restore sinus rhythm in AF (7-12)**

CASE REPORT

Forty-seven-year-old man felt discomfort and palpitations in his chest after strenuous work (lifting heavy objects). After calling the EMS, the patient was transferred to hospital.

When more detailed history was taken, it was established that the patient had the diagnosis of paroxysmal AF for which he was taking Concor 1.25 mg q.d. and Simvastatin 40 mg q.d. BP 160/70 mmHg.

ECG was done in the ER which revealed AF with ventricular rate of 135 bpm with no ST–T changes (Figure 2).

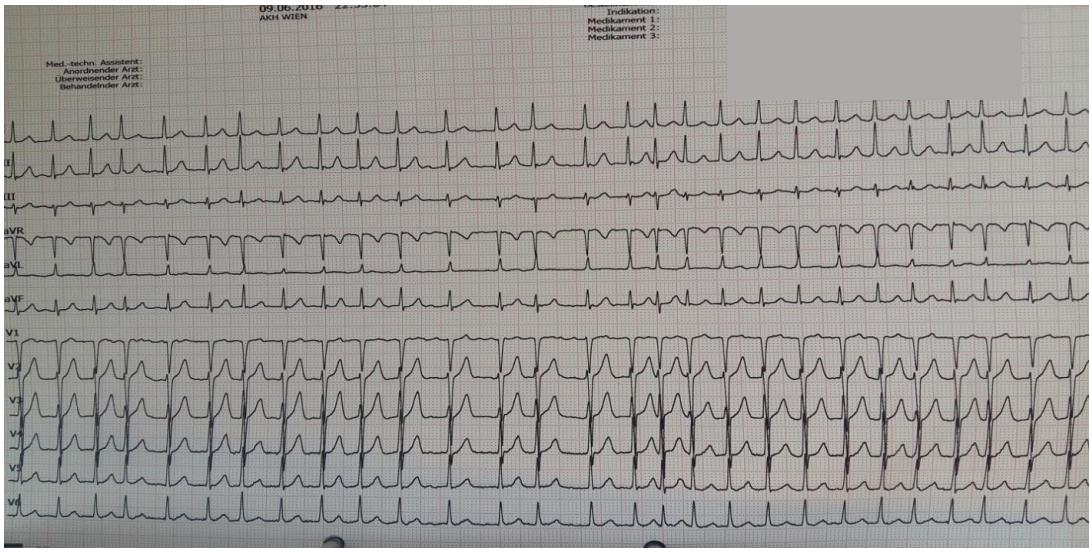
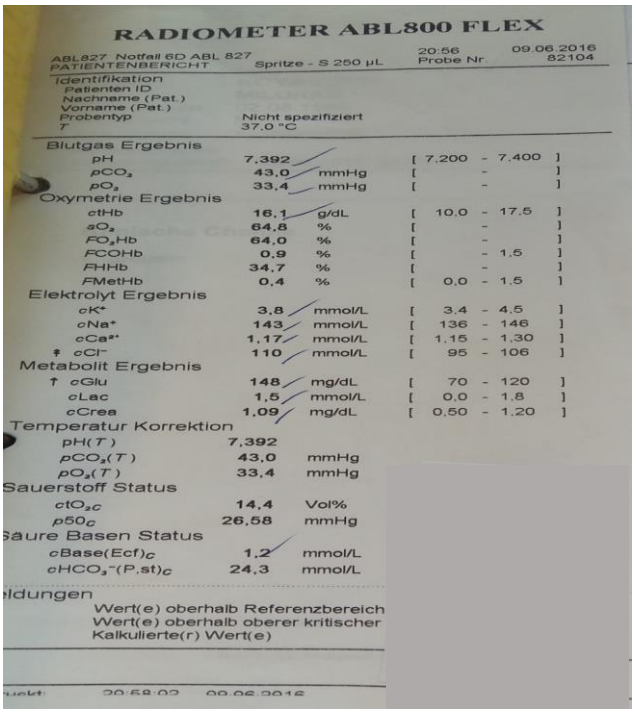


Figure 2. **ECG showing AF with ventricular rate of 135 bpm with no ST–T changes**



RADIOMETER ABL800 FLEX

ABL827 Notfall 6D ABL 827 — 20:56 — 09.06.2016
PATIENTENBERICHT — Spritze - S 250 µL — Probe Nr. 82104

Identifikation
Patienten ID
Nachname (Pat.)
Vorname (Pat.)
Probentyp — Nicht spezifiziert
T — 37,0 °C

Blutgas Ergebnis				
pH	7,392		[7,200 - 7,400]	
pCO_2	43,0	mmHg	[-]	
pO_2	33,4	mmHg	[-]	
Oxymetrie Ergebnis				
ctHb	16,1	g/dL	[10,0 - 17,5]	
sO_2	64,8	%	[-]	
FO_2Hb	64,0	%	[-]	
FCOHb	0,9	%	[- 1,5]	
FHHb	34,7	%	[-]	
FMetHb	0,4	%	[0,0 - 1,5]	
Elektrolyt Ergebnis				
cK^+	3,8	mmol/L	[3,4 - 4,5]	
cNa^+	143	mmol/L	[136 - 146]	
cCa^{2+}	1,17	mmol/L	[1,15 - 1,30]	
↑ cCl^-	110	mmol/L	[95 - 106]	
Metabolit Ergebnis				
↑ cGlu	148	mg/dL	[70 - 120]	
cLac	1,5	mmol/L	[0,0 - 1,8]	
cCrea	1,09	mg/dL	[0,50 - 1,20]	
Temperatur Korrektion				
pH(T)	7,392			
$pCO_2(T)$	43,0	mmHg		
$pO_2(T)$	33,4	mmHg		
Sauerstoff Status				
ctO_{2c}	14,4	Vol%		
$p50_c$	26,58	mmHg		
Säure Basen Status				
$cBase(Ecf)_c$	1,2	mmol/L		
$cHCO_3^-(P,st)_c$	24,3	mmol/L		

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Wert(e) oberhalb Referenzbereich
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Figure 3. **Laboratory analysis**

Laboratory analysis showed: pro BNP 89.1pg/ml, Troponin T 0 ng/L, K 3.8, venous ABG Cl- 110 mmol/L, Glu 148 mg/dL (Figure 3).

Cardiac ultrasound was done and was unremarkable (Figure 4). Patient was properly anticoagulated with heparin and enoxaparin in order to receive vernakalant. He was treated with vernakalant 3mg/kg i.v. in the ER.

Ten minutes afterwards, a repeated ECG was done showing the normal sinus rhythm at 75 bpm (Figure 5). The patient was discharged home in stable condition.

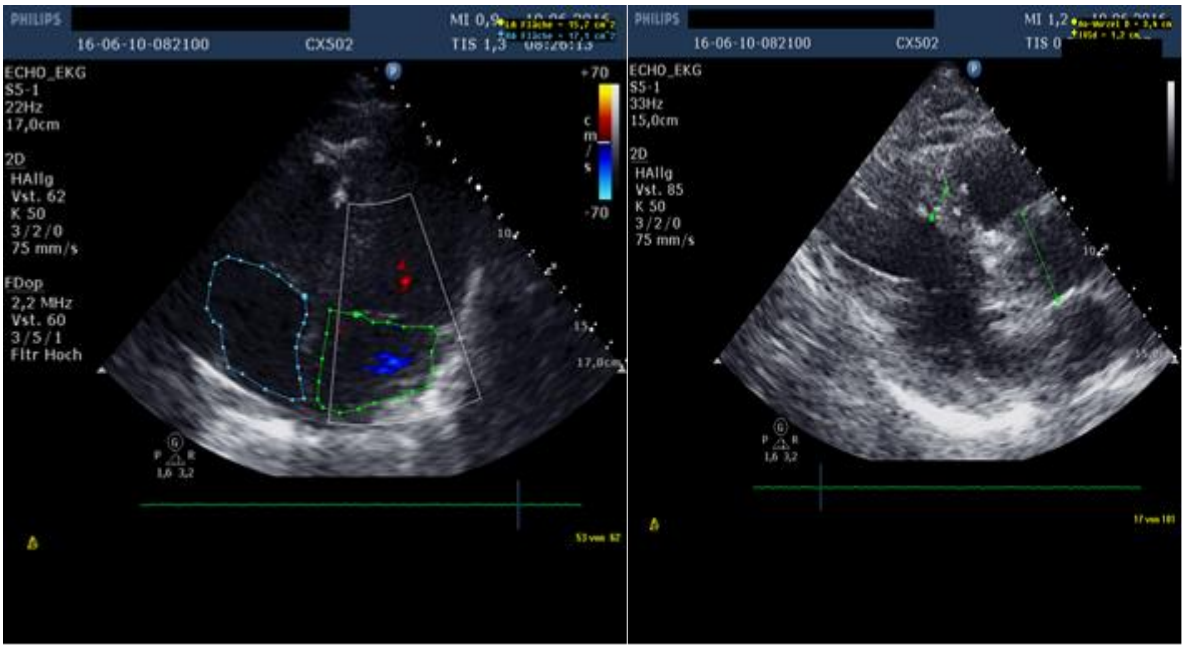

Figure 4. **ECHO**

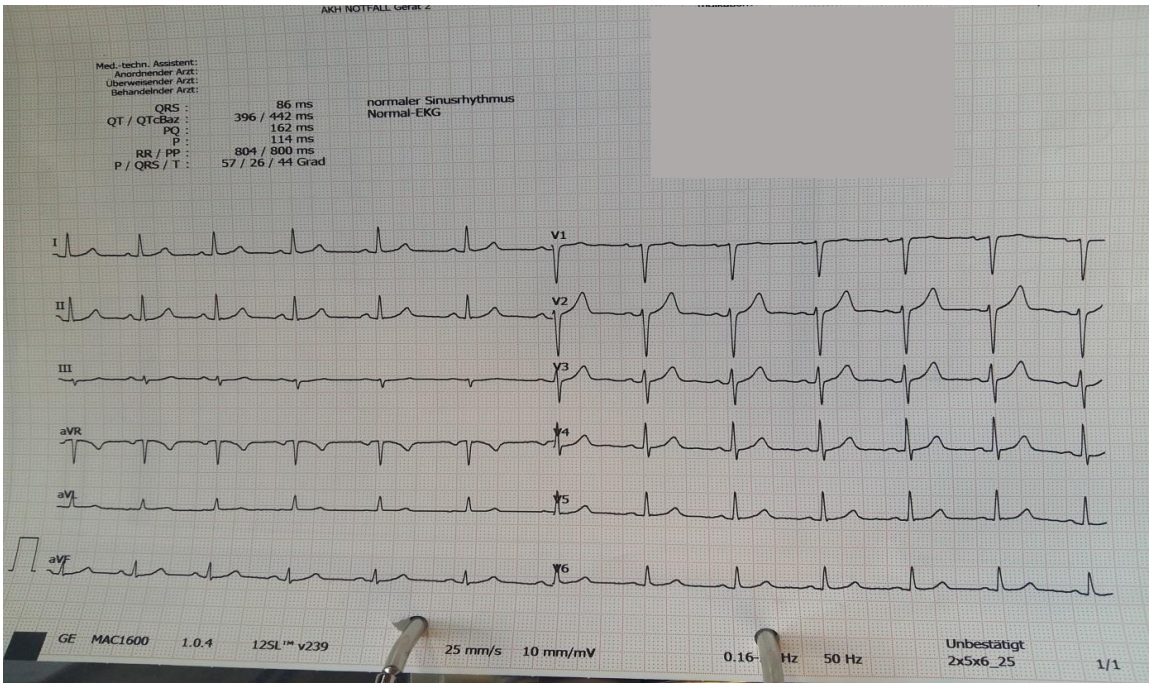

Figure 5. **ECG after cardioversion**

CONCLUSION

AF is the most common arrhythmia. Complication of AF can be severe and treatment can be expensive. The sooner it is discovered, an adequate treatment can be started in a timely and safe manner. Apart from slowing down rapid AF, occasionally, cardioversion to sinus rhythm is needed. As can be seen, vernakalant (Brinavess®) can convert a patient quite quickly into sinus rhythm. The medication is quite expensive, but due to safety profile and rapid action, its use may be reasonable in selected patients.

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Upotreba vernakalanta u konverziji novonastale atrijalne fibrilacije: prikaz slučaja

Vuk Niković[1], Predrag Blagojević[2], Dušan Milenković[3], Anton Laggner[4], Hans Domanovits[4], Ranka Bulajić[5]

[1]*Zavod za hitnu medicinsku pomoć Crna Gora, Podgorica, Crna Gora*
[2]*Dom zdravlja Pale – Služba za hitnu medicinsku pomoć, Republika Srpska, Bosna i Hercegovina*
[3]*Zavod za hitnu medicinsku pomoć Niš, Niš, Srbija*
[4]*Opšta bolnica u Beču, Univerzitetska klinika za hitnu medicinsku pomoć, Beč, Austrija*
[5]*Regionalni zdravstveni centar Southlake, Toronto, Kanada*

SAŽETAK

Atrijalna fibrilacija (AF) je haotičan, nepravilan predkomorski ritam od 300 do 600 otkucaja u minuti. Atrioventrikularni čvor (AV) sprovodi impuls povremeno, uzrokujući iregularnu aktivaciju komora. Glavni rizik je embolija (moždani udar), koja se može sprečiti antnikoagulansima. Aritmija je povezana sa petostrukim rizikom od moždanog udara i trostrukom incidencijom kongestivnog srčanog udara i većom stopom mortaliteta. Hospitalizacija bolesnika sa AF takođe je vrlo česta. Vernakalant (Brinavess®) je koncentrat koji se stavlja u rastvor infuzije (kap po kapu u venu). Poslednjih godina, vernakalant se pojavio kao novo sredstvo za prekid novonastale AF.

Četrdesetsedmogodišnji muškarac osetio je nelagodu u grudima i palpitacije nakon napornog rada (podizanje teških predmeta). Nakon što je nazvao hitnu pomoć, bolesnik je prevežen u bolnicu. Uzimanjem istorije bolesti ustanovljeno je da bolesnik ima dijagnozu paroksizmalne atrijalne fibrilacije, za koju je uzimao Concor 1,25 mg i Simvastatin 40 mg. TA 160/97 mmHg. Urađen je EKG u hitnoj pomoći, koji je otkrio atrijalnu fibrilaciju sa frekvencijom komora od 135/min bez promjene ST-T segmenta. Laboratorijske analize su pokazale: pro BNP 89,1 pg/ml; CK 3,8; venski ABG bez osobenosti. Urađen je ultrazvuk srca koji je bio bez promjena, bolesnik je primio antikoagulansnu terapiju heparina i enoksparina kako bi dobio vernakalant. Bio je tretiran vernakalantom 3mg/kg i.v. Deset minuta nakon toga, ponovljen je EKG koji je pokazao normalan sinusni ritam sa frekvencijom 75/min. Pacijent je otpušten kući u stabilnom stanju.

Vernakalant je bio uspešan u konverziji novonastale atrijalne fibrilacije u sinusni ritam u hitnoj medicinskoj pomoći.

Ključne reči: **srčani ritam, vernakalant, atrijalna fibrilacija, uspešna kardioverzija**