Prikaz slučaja / Case report

Pristup bolesniku s poremećajem provođenja uzrokovan Lyme boreliozom

Approach to a patient with conduction disturbance caused by Lyme borreliosis

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SAŽETAK: U muškarca s kliničkom slikom Lyme borelioze i atrioventrikulskim blokovima svih stupnjeva indicirano je elektrofiziološko ispitivanje, a po nalazu i ugradnja dvokomornog elektrostimulatora srca. Smatramo da je elektrofiziološko ispitivanje indicirano kod te grupe bolesnika radi donošenja odluke o potrebi ugradnje privremenog ili trajnog elektrostimulatora srca.

KLJUČNE RIJEČI: Lyme borelioza, poremećaj provođenja, elektrofiziologija, elektrostimulator.

SUMMARY: In a man presented with Lyme disease and atrioventricular blocks of all grades, electrophysiology study is indicated followed by the implantation of the two chamber permanent pacemaker upon obtaining the findings. We consider electrophysiology study indicated in that group of patients for the purpose of making a decision — to implant a temporary or a permanent pacemaker.

KEYWORDS: Lyme boreliosis, conduction disturbance, electrophysiology, pacemaker.

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Uvod

U Europi se Lyme borelioza kardiološki manifestira u oko 0,5% do 4,0% slučajeva, međutim neke studije navode razvoj kardijalnih komplikacija i do 10% neliječenih bolesnika s infekcijom koju uzrokuje *Borrelia burgdorferi*[1,2]. Lajmska bolest se javlja sa sličnom prevalencijom u oba spola te zahvaća ljude sve dobi, međutim, neki autori navode drugačiju prevalenciju lyme karditisa ovisno o spolu[3,4]. Lyme karditis se prezentira najčešće kao poremećaj atrioventrikulskog (AV) provođenja, pri čemu se najčešće javlja prolongacija PR intervala, koji progredira u oko 50% tih bolesnika u totalni AV blok[5]. Napominje se da se u istog bolsnika mogu intermitentno javiti različiti stupnjevi AV provođenja[6]. Totalni AV blok tipično spontano prolazi (u više od 90% bolesnika) unutar tjedan dana, a manje teški poremećaji provođenja unutar šest tjedana[7].

Postavljanje dijagnoze lyme karditisa može biti veoma zahtjevno, a kada se naglo razvije AV blok nepoznate etiologije potrebni je uzeti u obzir lyme karditis, posebice u mladih ljudi[6]. Eritema migrans, kao izrazito specifičan simptom akutne faze bolesti često nije prisutan u svim slučajevima[8], zbog čega postoji potreba za jasnim testom potvrde kliničke sumnje — serološka pretraga kao što je imunoapsorpcijski

Introduction

While some studies showed that cardiac manifestations in Lyme borreliosis occur in 0.5% to 4.0% of cases in Europe, some other studies have suggested incidences as high as 10% of untreated patients infected with Borrelia burgdorferi as having cardiac complications[1,2]. Lyme disease has a similar prevalence in both males and females and affects people of all ages, while some studies have shown slightly different Lyme carditis predominance depending on a sex[3,4]. It is tipically presented as conduction disturbances, the most common of which is the 1st degree atrioventricular (AV) block, with up to 50% of these patients progressing to complete heart block[5]. Also, different forms of block can occur intermittently in a single patient[6]. Complete AV block typically spontaneously (in >90% patients) resolves within one week, and more minor conduction disturbances within six weeks[7].

Diagnosis Lyme carditis can be very challenging. When AV block of unkown origin develops suddenly, Lyme carditis must be considered, especially in younger patients[6]. Although erytema migrans is a very specific symptom in the acute phase, it may not be present in all cases[8]. Therefore, there is a need of readily clinical testing — serologic examination, such as enzyme-linked immunosorbent assay

enzimski test (ELISA)[9]. Tijekom čekanja rezultata pretrage, opravdano je kod bolesnika s poremećajem provođenja, učiniti elektrofiziološko ispitivanje radi donošenja odluke o potrebi ugradnje trajnog ili privremenog elektrostimulatora.

Prikaz slučaja

Hospitaliziran je prethodno zdrav 32-godišnjak zbog umora, mučnine i razvoja AV bloka nepoznatog trajanja. Kod prijema bolesnik je bio priseban, afebrilan te bez patološkog nalaza u statusu osim sistoličkog šuma nad aortalnom valvulom maksimalnog intenziteta II/IV. Bolesnik nije uzimao nikakve lijekove, ilegalnu drogu ili je imao promjenu u prehrani koji bi mogli utjecati na navedene simptome. Po zanimanju je poljoprivrednik, a bavi se i pčelarstvom te uzgojem krava i svinja. Navodi učestale ubode krpelja, posljednji put prije mjesec dana kada je primijetio i osip u području glutealne regije, zbog navedenoga se nije javio liječniku obiteljske medicine. Kod bolesnika nisu utvrđeni sistemski znakovi infekcije ili simptomi slični gripi karakteristični za početnu fazu. Nakon prijema učinjeno je rutinsko laboratorijsko testiranje pri čemu nisu utvrđena patološka odstupanja. Elektrokardiogram je pokazao sinusni ritam, urednog trajanja PR intervala, bez drugih poremećaja provođenja. Dinamičkim elektrokardiogramom se utvrdi intermitentna pojava AV bloka svih stupnjeva. Najčešći patološki nalaz bili su prolongacija PR intervala do 320 ms i Mobitz tip I. Manje učestalo su se javljali AV blok II stupnja Mobitz tip II i totalni AV blok s uskim QRS kompleksom i s najduljim RR intervalom od 3 sekunde.

Tijekom čekanja nalaza učinjene serološke pretrage za B. burgdorferi učinili smo elektrofiziološko (EF) ispitivanje. Rezultati EF ispitivanja (**Figure 1**) su ukazali na rascijepani i prolongirani His (35 ms), atrio-hisalna provodljivost (AH interval) je bila normalna (75 ms), a his-ventrikularna (HV) provodljivost je bila oštećena (65 ms). Tijekom kateterske (kvadripolarni) stimulacije iz područja desnoga atrija izazove se Wenckebach kod 660 ms. Na temelju rezultata elektrofiziološkog ispitivanja koje je ukazalo na intra- i infrahisalni poremećaj provođenja indicira se ugradnja dvokomornog elektrostimulatora srca. Tri mjeseca kasnije na kontroli rada

(ELISA)[9]. While awaiting the results, the electrophysiological examination should be done in patients with conduction disturbances to localize the origin of the block in order to estimate the need of implantation of a permanent or a temporary pacemaker.

Case presentation

A 32-year old previously healthy man was admitted for fatigue, nausea and AV block of undetected origin. On examination, the patient was conscious, afebrile and responsive with no abnormalities in physical examination except for a systolic heart murmur II/VI, punctum maximum above aortic valve. Based on the patient's reliable account, he did not use any medications, illegal drugs and made no changes in diet which could be attributed to reported symptoms. The patient is a farmer, he is engaged in beekeeping and breeds cows and pigs. He recalls a tick bites, many of them, the last one occurred a month ago, and he noticed rash on his gluteal region, but he did not consult the family physician. There were no systemic signs of an infection or flu-like symptoms as commonly observed in the initial stage. After admission, we did routine laboratory blood testing and there were no pathological aberrations. A resting electrocardiogram showed sinus rhythm, normal length of PR interval and without other aberrations. Holter ECG revealed AV block of all grades, intermittently. Most common pathological findings was PR prolongation up to 320 ms and AV block second degree Mobitz type I. Atrioventricular block second degree Mobitz type 2 and total AV block occurred less frequently, with narrow QRS complexes and the longest RR interval of up to 3 seconds.

While waiting for serological findings for B. burgdorferi, we approached to electrophysiological examination (EPS). Results of the EPS (**Figure 1**): Electrophysiological study showed a spitted and prolonged His potential (35 ms), the atrio-Hisial conduction (AH interval) was normal (75 ms) and His-ventricular (HV interval) conduction was disturbed (65 ms). During the catheter stimulation from the site of the right atrium, Wenckebach appears at 660 ms. Considering the results of the electrophysiology studies, which revealed the intra- and infra-Hisian conduction disturbance, implantation of permanent double-chamber pacemaker is indicated.

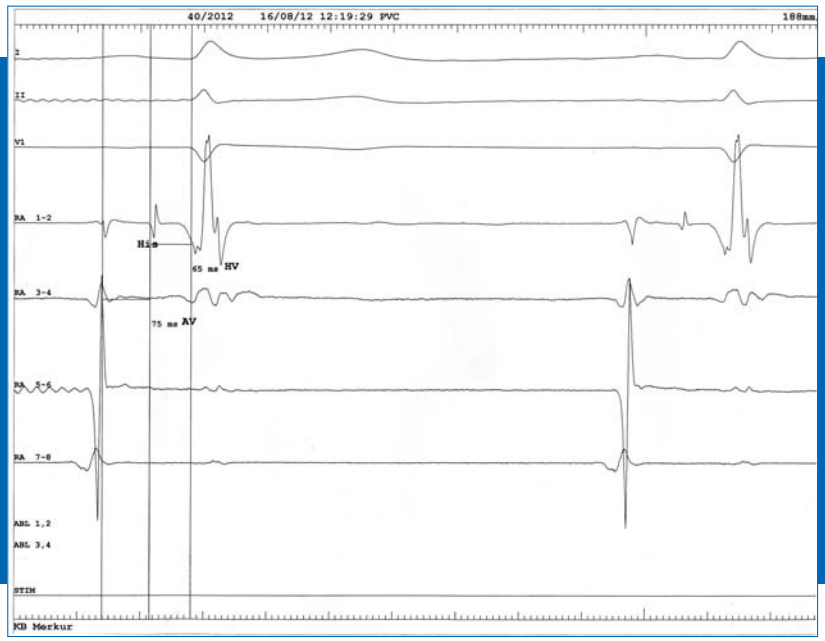

Figure 1.
I, II, V1 — extracardiac records;
RA 1-4 — quadripolar catheter in the area of His;
RA 5-8 — quadripolar catheter in the are of right atrium;
AH — atrio-hisial interval;
HV — his-ventricular interval.

elektrostimulatora utvrdi se ventrikulska stimulacija u 8% vremena, a u preostalom vremenu je bio prisutan ventrikulski sensing.

Rasprava

Lajmska bolest je multisistemska bolest uzrokovana s Borrelia burgdorferi. Zahvaćenost srca kod ove bolesti je izrazito rijetko i nastaje tijekom rane faze bolesti, u prosjeku unutar 3-10 dana od inicijalnog izlaganja.

Kao i bolesnici prezentirani u drugim slučajevima, naš bolesnik nije imao ranije zdravstvene tegobe, ali je navodio osip te se prezentirao sa stečenim AV blokovima svih stupnjeva zbog čega smo se odlučili učiniti elektrofiziološko ispitivanje uslijed postavljene sumnje na Lyme boreliozu. Klinička manifestacija lymske bolesti je izrazito varijabilna, pri čemu se najčešće kod zahvaćenosti srca javljaju AV blokovi[10-13].

Naime, Van der Linde je u preglednom članku o kliničkim karakteristikama lyme karditisa kod 66 slučajeva u Europi i 39 slučajeva u SAD-u zaključio da je totalni AV blok bio najčešći oblik AV bloka u obje skupine. On se javio u 49% bolesnika, u usporedbi s pojavnošću AV blokom kod 16% te prolongacije PR intervala kod 12% bolesnika. Prema istome, vjerojatnost razvoj kompletnog AV bloka je znatno češća kod produljenja PR intervala >300 ms[6].

Elektrofiziološko ispitivanje provedeno na 19 bolesnika s Lyme karditisom je pokazalo da je u 68% bolesnika blok nastao na supraventrikulskoj razini, pri čemu je jedna trećina ispitanika imala difuzno zahvaćen provodni sustav zaključeno na temelju produljenih AA, AH i HV intervala[14].

U drugom članku stoji da je 98% bolesnika s poremećajima provođenja tijekom bolesti imalo PR prolongaciju, dok se Wenckebachova periodika javila u 40% i AV blok u 50% bolesnika[7].

McAlister i sur. su 1989. godine proveli elektrofiziološko ispitivanje na 4 bolesnika s lajmskom bolesti pri čemu su 3 pacijenta imala blok iznad His-a. Preostali pacijent je imao blok ispod razine His-a te je zahtijevao implantaciju trajnog elektrostimulatora srca[7].

Van der Linde je također izvijestio o 4 bolesnika s AV blokom izazvanim lyam-boreliozom, pri čemu je učinio elektrofiziološko ispitivanje na trojici od njih. Ispitivanjem se kod dvoje bolesnika verificirao suprahisalni blok, a kod trećeg normalni AH interval, bez terminalne negativne defleksije His-ovog signala uz razvoj totalne disocijacije signala His-ovog snopa i ventrikla[15]. Studija je pokazala da se poremećaj provođenja također može javiti u distalnom segmentu His-ova snopa ostavljajući proksimalni dio His-a netaknutim. U tom izvješću, unatoč ekstenzivnoj primjeni antibiotika i kortikosteroida kod bolesnika je perzistirao totalni AV blok te je pacijentu implantiran trajni elektrostimulator[16-19].

Naš pacijent, baš kao i već navedeni iz primjera, prikazao se klasičnom slikom poremećaja provođenja kod Lyme borelioze u smislu da su zabilježeni intermitentno svi tipovi AV blokova. S obzirom na postavljenu sumnju, kasnije serološki potvrđenu, učini se EF ispitivanje. Istim se utvrdi fragmentacija His-a i njegova prolongacija što ukazuje da je bolešću zahvaćen i His (intrahisalno). Također, zabilježi se produljen HV interval koji ukazuje na bolest provodne strukture distalnije od AV čvora (infrahisalni blok). Vodeći se time i ranije objavljenim radovima *McAllistera* i *van der Linde*[6,7], odlučili smo se za ugradnju trajnog elektrostimulatora srca. U daljnjem praćenjem, pacijent je bio subjektivno bez tegoba te se na prvoj kontroli rada elektrostimulatora, kao dodatna potvr-

Three months later, on control checkup, we verified ventricular stimulation during the 8% of the time, whereas ventricular sensing was present during the remaining time.

Discussion

Lyme disease is a multisystem disease caused by Borrelia burgdorferi. Cardiac involvement with Lyme disease is extremely rare and occurs during the early disseminated phase of the disease, typically within 3-10 days of initial exposure.

Our patient, just like many other presented patients in other cases, is young, with no health problems, with the history of rash and acquired AV block of all types, so we decided to do electrophysiology study, based on suspected Lyme borreliosis. The clinical expression of Lyme disease is highly variable, but the most common cardiac manifestation is AV block[10-13].

Van der Linde, in a review of the clinical characteristics of 66 cases of Lyme carditis in Europe and 39 cases from the US, found that complete heart block was the most common form of AV block in the both groups. It was present in 49% of patients, compared to 16% with second-degree and 12% with first degree AV blocks. According to him, the risk of complete atrioventricular block is much higher when the PR interval is >300 ms [6].

Electrophysiology studies, performed in 19 patients with Lyme carditis, showed a supraventricular origin of the block in 68% of patients. One third of patients studied were believed to have had diffuse conduction system disease based upon simultaneously prolonged AA, AH and HV interval[14].

Another report suggests that 98% of the patients with AV conduction disturbances had at some time during the course of the disease the first degree AV block, while Wenckebach periodicity occurred in 40% and complete AV block in 50%[7].

McAlister et al. performed an electrophysiology studies on 4 patients with Lyme disease in 1989 and 3 of them had block above the His bundle. The remaining patient who had block at or below the His bundle, required a permanent pacemaker[7].

Van der Linde also reported four cases of Lyme borreliosis induced AV block and, also, did electrophysiology studies on three of them. The studies showed that 2 of them had a suprahisal origin of the block and the third one had no terminal negative deflection of the His spike, a normal AH interval and no relation between His bundle activity and ventricular complexes[15]. This shows that the site of the atrioventricular block may also lie in the distal part of the His bundle, leaving the proximal part undisturbed. In this report, despite extensive treatment with antibiotics and corticosteroid, complete AV block persisted in this patient and a permanent pacemaker had to be implanted[16-19].

Our patient, like many other from the examples above, presented with classic conduction disturbances like intermittently recorded AV blocks of all degrees, due to Lyme borreliosis. Considering the suspected Lyme disease, what was later serological confirmed, we did the electrophysiology study. It revealed His fragmentation and its prolongation which indicates a sickness of a His. We also recorded a prolongation of HV interval which reveals a sickness of conduction structure distal of AV node (intra- and infra Hisian block). Considering to early published articles of *Mc Allister* and *van der Linde*[6,7], we decided to implant a permanent double-chamber pacemaker. In further monitoring, the patient had

da valjanosti terapijskom postupku, verificira povremena potreba za ventrikulskom stimulacijom (AS-VP je 8%, AS-VS je 92%). Na temelju našeg iskustva i dostupne literature relativno starijeg datuma, stava smo da bi se kod svih mladih ljudi sa stečenim AV blokovima s rizičnom profesijom, odnosno endemskom lokalizacijom, trebalo učiniti EF ispitivanje u jednom od postojećih centara radi donošenja odluke o potrebi implantacije trajnog ili zaštite pacijenta s privremenim elektrostimulatorom tijekom aktivne bolesti (prosjek unutar 6 tjedana).

no subjective complaints and at the first pacemaker operation control, as further validation of the therapeutic procedure, we verified the occasional need for ventricular stimulation (AS-VP 8%, AS-VS 92%). Based on our experience and the available literature, that is relatively older, we consider reasonable in all young people with acquired AV block with a risky profession, respectively endemic localization, EP study is to be done in one of the existing centers, in order to make a decision on the need for implantation of a permanent pacemaker or care of the patient with a temporary pacemaker during active disease (mean within 6 weeks).

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