Heart block necessitating pacing at Iraqi center for heart diseases

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Abstract

A cross– sectional study was conducted at Iraqi Center for Heart Disease– Baghdad /Iraq. A 82 cases of heart block during the period from October 2011- August 2013. 43(52.43%) were males while female sex was reported in 39 (47.56%), 40(48.78%) had syncope dizziness, 18(21.95%) impaired performance, and 8(9.75%) presyncope. 3rd degree heart block was reported in 47(57.31%), Sick sinus syndrome in 14(17.07%) mobitz 2 in 11(29.39%), bifascicular in 5(6.09%) and be fascicular with prolonged PR interval in 2(2.43%). Temporary pacing was done in 70 (85.36%). Congenital heart block was reported in only one patient (1.21%), while familial heart block had not been reported. Critical IHD had been seen in 20(24.39%). Acute MI was founded in one case (1.21%) only. Permanent pacemaker had been implanted in 74 (90.24%) of patients. The highest rates of heart block had been shown in elderly patients and mostly of the white race. Sex has no an impact on the incidence of heart block. Dizziness was a common presenting symptom. Most of events were insidious. The majority of our cases of heart block were of 3rd degree type. Ischemic heart diseases precede the event in about a quarter of our cases, also DM and hypertension are commonly preceding the occurrence of heart block. Drugs although rarely encountered as a cause of heart block in our series but should be taken into consideration. Congenital heart block was extremely rare and so also the familial type which had not be encountered in our cases. Temporary pacing as a bridge for permanent pacing was commonly used. Cardiac biomarkers were nearly normal in all our patients. Holter study showed AV block to be more common than Sick sinus syndrome in those cases studied by this test. No need to perform treadmill test in most of our cases. Coronary angiography is required to be performed according to the recommended guidelines and IHD was reported in a quarter of our cases. Acute myocardial infarction was rare as a cause of heart block necessitating a permanent pacing.

Key words: Heart block, Ischemic heart disease, Sick sinus syndrome, Coronary angiography, Atrioventricular

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Introduction

Atrioventricular (AV) block is defined as a delay or interruption in the transmission of an impulse from the atria to the ventricles due to an anatomical or functional impairment in the conduction system. The conduction disturbance can be transient or permanent, and it can have many causes. Enhanced vagal tone due to sleep, athletic training, pain, carotid sinus massage, or hypersensitive carotid sinus syndrome can result in a slowing of the sinus rate and /or the developments of AV block [1]. Fibrosis and sclerosis of the conduction system account for about one-half of cases of AV block and may be induced by several different conditions which often cannot be distinguished clinically. Progressive cardiac conduction defects, referred to as Lenegre's or Lev's disease, are characterized by progressive impairment of the conduction system [1]. Heart block can be caused by several conditions and certain medications. People can be born with the condition (congenital) or develop it over time (acquired) [1]. First-degree heart block may found in long-distance runners. Other causes include (myocarditis), (hypokalaemia), (hypomagnesemia), (antiarrhythmics), such as disopyramide, calcium channel blockers, and digoxin. Second-degree heart block can be found in athletes some children born with congenital heart disease can also develop second-degree heart block [1]. Other causes include Lyme disease, antihypertensive medications, amiodarone, and pentamidine. Third-degree H.B. could be congenital or acquired like a complication of heart surgery, radiotherapy, cytotoxics, diphtheria, rheumatic fever and poorly controlled hypertension [2]. Cancer that has spread from another part of the body into the heart, penetrating trauma to the chest, such as a stab wound or gunshot wound and as a complication of radiofrequency ablation of the heart. Medications including digoxin, calcium-channel blockers beta-blockers. Tricycle antidepressants and clonidine [3, 4, 5]. In 3rd degree (AV) block there is complete dissociation of the atrial and ventricular activity. The ventricular escape mechanism can occur anywhere from the AVN to the bundle-branch Purkinje system [6]. In some cases, acquired H.B. may go away if the factor causing it is treated or resolved. For example, H.B. that occurs after a heart attack or surgery may go away during recovery [7].

Patients and Methods

A cross-sectional study was conducted at the Iraqi Center for Heart Disease Baghdad/ Iraq. We had studied 82 cases of heart block during the period from October 2011- August 2013. We studied our cases according to baseline characteristics including age, sex, race, the onset of events, echo cardio-graphic evaluation regarding systolic and diastolic dysfunction, temporary pacemaker implantation, and coronary angiography. We also studied our cases

according to age groups, presetting features, types of heart block, preceding diseases and the drugs incriminated so also we evaluated the cardiac biomarkers, the incidence of congenital heart block, the need of performing exercise test, electrolytes assessment, renal function indices and type of implanted permanent pacemakers.

Results

Regarding baseline characteristics the results as in table 1, age groups as in table 2, presenting features as in table 3, type of heart block as in table 4, preceding diseases as in table 5, drugs incriminated as in table 6 and type of implanted permanent pacemaker as in table 7.

Discussion

In our study, we faced only one case of complete HB associated with acute extensive anterior MI. The patient had been treated by thrombolytic therapy in another hospital and then shifted to our center because of HB for the purpose of establishing temporary pacing, however, the patient went into a very rapid downhill course, getting collapsed, passing into cardiogenic shock and died. There is a study [8, 9] which confirmed the same idea above and accounted. That the decision to implant a permanent pacemaker for AV or intraventricular conduction block complicating AMI will depend on the type of conduction disturbance, location of the infarction, and the relation of the electrical disturbance to infarct time. Thrombolytic therapy has decreased the incidence of high-grade AV block in AMI, but mortality remains high in this group of patients. The impact of preexisting bundle branch block on mortality after AMI is uncertain. However, left bundle branch block combined with advanced or third-degree AV block and right bundle branch block combined with left anterior or left the posterior fascicular block to carry a particularly ominous prognosis [6]. Not every case of complete HB needs permanent pacing, and, in our study, there were three cases, one of them was 2ry to hyperkalemia and the others were due to CCB and BB. Dealing with these things can correct the subject and obviate the need for pacing. This idea is confirmed by many studies [5], [10]. In which it is accounted that Initial triage of patients with complete heart block consists of determining symptoms, assessing vital signs, and looking for evidence of compromised peripheral perfusion. In particular, the physical examination findings of patients with third-degree AV block will be notable for bradycardia, which can be severe. Treatment of third-degree AV block is based on the level of the block. The first and sometimes most important, medical treatment for heart block is the withdrawal of any potentially aggravating or causative medications. Medical treatment of complete heart block

is limited to patients with conduction disease in the AVN. Initial treatment efforts should focus on assessing the need for temporary pacing and initiating the pacing. Most patients whose heart block is not otherwise treatable will require a permanent pacemaker or an implantable cardioverter-defibrillator ICD. In our center, there is no a facility to perform an electrophysiological study so as to clarify the real part of the PR that is prolonged whether the AH or HV internal and accordingly to establish a base for permanent pacing and this was one of the limitations of our study. The guidelines [8] confirmed that symptomatic PR interval and the HV > 65 msec to < than 100 msec. Is an indication for permanent pacing so also the markedly prolonged HV interval >100 msec in asymptomatic patients. While in another study it is accounted that the PR and HV intervals have been identified as possible predictors of third-degree AV block and sudden death in the presence of underlying bifascicular block. However, the prolongation is often at the level of the AV node, and frequently there is no correlation between the PR and HV intervals and progression to third-degree AV block and incidence of sudden cardiac death. Some investigators have suggested that asymptomatic patients with bifascicular block and prolonged HV interval ≥100 milliseconds should be considered for permanent pacing. However, the incidence of progression to third-degree AV block is low, even in the setting of prolonged HV interval. Death is often not sudden or due to advanced AV block but rather due to the underlying heart disease itself and non-arrhythmic cardiac causes [6]. Taking symptoms into consideration is very important in deciding to establish permanent pacing especially in 1st degree AV block and Mobitz [1]. This idea was affirmed in another study which stated that Patients with abnormalities of atrioventricular AV conduction may be asymptomatic or may experience serious symptoms related to bradycardia, ventricular arrhythmias, or both. Decisions about the need for a pacemaker are necessarily influenced by the presence or absence of symptoms that are directly attributable to bradycardia [6]. Also, in the same study, it was stated that nonrandomized studies strongly suggest that permanent pacing improves survival in patients with 3rd degree AV block, particularly if syncope has occurred. It is now recognized that marked 1st degree AV block can lead to symptoms even in the absence of higher degrees of AV conduction disturbance and may be associated with a “pseudopacemaker syndrome” because of the close proximity of atrial systole to the preceding ventricular systole. Small uncontrolled trials have suggested some symptomatic and functional improvement with pacing in patients with PR intervals >0.30 second, especially those with left ventricular LV dysfunction, some of whom may benefit from dual-chamber pacing with short AV delay [11]. In our study, there was only one case out of the 82 which has congenital heart block, and which had not been dealt with by permanent pacing although the patient was in her forties according to her doctor's opinion while the

new trend now. Accounted that permanent pacing in children or adolescents is generally indicated in symptomatic sinus bradycardia, recurrent bradycardia-tachycardia syndromes, congenital AV block, and advanced 2ed or 3rd degree surgically induced or acquired AV block. Important differences between indications for permanent pacing in children and adults include age dependency of physiological heart rate and impact of residual ventricular dysfunction and abnormal circulatory physiology after surgical palliation of complex congenital cardiac defects [6]. In the same study, it was added that the indications for permanent pacing in congenital 3rd -degree AV block has evolved with some studies suggesting improved long- term survival and prevention of syncopal episodes in asymptomatic patients with congenital complete heart block who meet specific criteria. Reasonable number of cases of sick sinus syndrome SSS had been seen in our series 14 (17.07%) and sometimes there were combinations of both SSS plus AV block and whether SSS is found solely or in combination we must choose the best applicable type of pacemaker to get optimal benefit at the time of implant and for the future anticipation. It was stated in one study that correlation of symptoms with arrhythmias resulting from sinus node dysfunction (e. g, sinus bradycardia, sinus arrest, paroxysmal supraventricular tachycardia alternating with periods of bradycardia or even asystole) is essential in deciding whether a permanent pacemaker is indicated. This correlation may be difficult because of the intermittent nature of the episodes. Sinus node dysfunction may also express itself as chronotropic incompetence. Rate-responsive pacemakers have clinically benefited patients by restoring physiological heart rate during physical activity in this setting [12].

Conclusion

The highest rates of HB had been shown in elderly patients and most of the white race. Sex has no impact on the incidence of H.B. Dizziness was a common presenting symptom. Most of the events were insidious. The majority of our cases of H.B were of 3rd-degree type. Ischemic heart diseases precede the event in about a quarter of our cases, so also DM and hypertension are commonly preceding the occurrence of H.B. Drugs although rarely encountered as a cause of H.B in our series but should be taken into consideration. Congenital H.B was extremely rare and so also the familial type which had not to be encountered in our cases. Temporary pacing as a bridge for permanent pacing was commonly used. Cardiac biomarkers were nearly normal in all our patients. Holter study

showed AV block to be more common than SSS in those cases studied by this test. No need to perform a treadmill test in most of our cases.

CA is required to be performed according to the recommended guidelines and I.H.D. was reported in a quarter of our cases. Acute MI was rare as a cause of H.B necessitating permanent pacing.

Table 1

Base line characteristics

Age	Mean age 40-59 y s		
Sex	Male 43(52.43%)	Female 39(47.56%)	
Race	White 100%	Black 0	
Onset of events	Sudden 17(20.73%)	Insidious 65(79.26%)	
Echo. dysfunction	Systolic 9(10.93%)	Diastotlic 27(32.92%)	Combined 5(6.09%)
Coronary angiography.	Cases studied 47	Normal CA 15(18.29%)	Critical lesion 20(24.39%)
Temporary pacing	Yes 70(85.36%)	No 12(14.63%)	
Congenital HB	1(1.21%)		
Cardiac biomarkersTPT,TPI,CK-MB	Positive:1 (1.21%)		
Need for exercise test	Performed: 1(1.21%)		
Impaired renal function	1(1.21%)		
Electrolyte abnormalities	Hyperkalemia:1 (1.21)		

Table 2.

Age groups

Age groups in years	Number of patients
1 – 9	0%
10 – 19	0%
20 – 29	4(4.87%)
30 – 39	0%
40 – 49	10(12.19%)
50 – 59	8(9.75%)
60 – 69	27(32.92%)
70 – 79	23(28.04%)
80 - 89	10(12.19%)

Table 3.

Presenting features

complaint	frequency	complaint	frequency
Syncope	40(48.78%)	Presyncope	8(9.75%)
Dizziness	36(34.9%)	Dyspnoea	4(4.87%)
Impaired performance	18(21.95%)	Congestife H.F	1(1.21%)
Confusion	11(13.41%)		

Table 4.

Preceding diseases

Type of disease	frequency	Type of disease	frequency
Hypertension	47(57.31%)	DM	27(32.92%)
IHD	20(24.39%)	Rh.H.D	4(4.87%)
Autoimmune diseases	3(3.65%)	CRF	1(1.21%)
Heart surgery	1(1.21%)		

Table 5

Heart block

Type of block	frequency
3 rd degree	47 (57.31%)
SSS	14 (17.07%)
Mobitz 2	11 (29.39%)
Bifascicular	5 (6.09%)
Bifascicular + prolonged PR	2 (2.43%)
LBBB + prolonged PR	1 (1.21%)

Table 6.
Drugs incriminated

drug	frequency	drug	frequency
Digoxine	4(4.87%)	B-blocker	4(4.87%)
Calicium channel blocker	1(1.21%)	Phenothiazine	1(1.21%)
Chloroquine	1(1.21%)		

Table 7

Types of permanent pacemaker implanted

Pacemaker	frequency	Pacemaker	frequency
DDDR	24(32.43%)	VVIR	19(25.97%)
VVI	17(22.97%)	DDD	10(13.51%)
VDDR	4(5.4%)		

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