



SECOND DEGREE (MOBITZ TYPE 2) HEART BLOCK

Basem Abbas Al Ubaidi*

Consultant Family Physician, Primary Care, Kingdom of Bahrain.

Corresponding Author:- **Basem Abbas Al Ubaidi**
E-mail: bahmed1@health.gov.bh

<p>Article Info Received 07/09/2015 Revised 17/09/2015 Accepted 12/10/2015</p> <p>Key words: Atrioventricular, Mobitz type 2, Arrhythmia.</p>	<p>ABSTRACT Second-degree atrioventricular (AV) block refers to a delay conduction of electrical impulses from the atria to ventricles; some impulses are not conducted. Incomplete or second-degree heart block is divided into two types, Mobitz type I and Mobitz type II. Both are characterized by "dropped beats." Mobitz type II second-degree AV block and third-degree AV block usually require pace maker, and it is usually permanent, although a temporary pacemaker may be inserted if the arrhythmia is symptomatic and unresponsive to other therapies. However, a permanent pacemaker should be placed as soon as possible as an emergency case.</p>
---	---

INTRODUCTION

Definition an of atrioventricular (AV) block is a delay or interruption in the conduction of an electrical heart impulse, which either being transient or permanent, from the atria to the ventricles due to either to an anatomic or functional impairment in the cardiac conduction system. The second AV block fails to conduct some of atrial impulses to reach the ventricles. The second AV block divided to Mobitz type1 (Wenckebach)described by progressive delay in cardiac impulse from atrial to ventricular with eventual failure of an atrial beat to reach the ventricle, in which there are progressive PR interval prolongation precedes a non-conducted P wave with narrow QRS [1]. Mobitz type II AV block, in which the PR interval remains unchanged prior to a P wave that suddenly fails to conduct to the ventricles, in which there are two or more consecutive non-conducted P waves with wide QRS. In contrast to the third degree or complete heart block some P waves continue to be conducted to the ventricle [2].The incidence of Mobitz II second-degree AV block is rare in healthy people (~0.003%). Mobitz I (Wenckebach) occurs more frequently and is observed in 1% to 2% of healthy young people, especially during sleep [3].

The anatomical site of the block in Mobitz type II has been almost always below the AV node; in Mobitz type I block the site is usually within the AV node. Type

II AV block is a serious conductive defect which lead to complete heart block and Stokes-Adams arrest [4].

Case Presentation

75-old- Bahraini male, who is known case of controlled diabetes and hypertension, presented with light-headedness, dizziness and pre-syncope since 3 days ago, no history of chest pain. On patient examination, regular irregular heartbeat, heart rate 45/ minute, blood pressure 90/ 50 mmHg. The ECG showed recurrent non- conducted P wave, with constant PR interval, a pause incorporating the blocked P wave; which was equal to exactly twice the sinus cycle length, P wave appeared at a constant rate and showed fascicular block. Further laboratory studies to identify possible underlying causes were as follows: normal serum electrolytes, calcium, and magnesium levels, normal cardiac biomarker testing, and normal thyroid function studies. Furthermore, in hospital the patient's telemetry showed Mobitz-2 AV block, hence the patient has a permanent pacemaker implant and the patient showed dramatic symptoms improvement. The patient had continued to follow up in the pacemaker clinic and primary care setting for further evaluation.



Fig1. Mobitz type 2 with intermittent non-conducted P waves without progressive prolongation of the PR interval, associated with a wide QRS complex (infra-nodal)



DISCUSSION

Mobitz type 2 is characterized by a disturbance, delay, or interruption of electrical impulse from the atrial conductive system through the AV node to the ventricles; it is an emergency condition; may progress to complete heart block, with high risk of mortality [5]. Diagnostic electrophysiological testing can help determine the level of the block and the potential need for a permanent pacemaker. Infra-nodal blocks, whether Mobitz I or Mobitz II, carry high risk of progression to complete heart block [6]. Presented patients are either being asymptomatic or have some cardiac in origin symptoms (light-headedness, dizziness, syncope, chest pain, regularly irregular heartbeat, bradycardia, and hypotension) [7].

The patient was referred to the emergency department, then transferred to the coronary care unit (CCU) for cardiac monitoring and to prepare the patient for effective placing of either transcutaneous or transvenous pacing or transvenous pacemaker [8].

While, in general the temporary or permanent pacemakers are indicated for patients with the following [9-11]:

1. Sinus node dysfunction.

- A. Persistent daytime sinus bradycardia.
- B. Symptomatic brady arrhythmias.
- C. Persistent sinus arrest ≥ 3 seconds.
- D. Chronotropic incompetence, an inability of the heart to increase its rate in response to increased demand.
- E. Syncopal attacks of unexplained origin or syncopal of cardiac origin are found during an electrophysiological study.

2. AV Block

- A. Third-degree heart block or complete AV block (i.e., complete dissociation between the P wave and the QRS complex).

REFERENCES

1. Wenckebach KF. (1899). Zur Analyse der unregelmässigen Pulsus. *Ztschr klin Med*, 36, 181.
2. Mobitz W. (1924). Über die unvollständige Störung der Erregungsüberleitung zwischen Vorhof und Kammer des menschlichen Herzens. *Z Gesamte Exp Med*, 41, 180.
3. <http://www.mdguidelines.com/atrioventricular-block-incomplete-second-degree>.
4. Steven R. (1993). Second-degree atrioventricular block: mobitz type II. *The Journal of Emergency Medicine*, 11(1), 47-54.

B. Type II second-degree AV block (symptomatic bradycardia ≤ 40 /min., heart failure, longer a systole ≥ 3 seconds, wide QRS complex and intra or infra-nodal).

C. Type I second-degree AV block (Wenckebach) for symptomatic patients and for asymptomatic patients with an infra- or intra-nodal block found at the time of the electrophysiological study [12, 13].

D. First-degree AV block for symptomatic patient.

The patient was doing well on pace maker as well as all the symptoms (light-headedness, dizziness) were disappeared completely.

CONCLUSION

The decision to implant a pacemaker in a patient with abnormal AV conduction depends on the presence of symptoms which are related to bradycardia or ventricular arrhythmias (e.g. Syncope or pre-syncope) and their prognostic implications [14-15].

It has been recognized that patients with type II second-degree AV block may develop a complete AV block or Stokes-Adams arrest. Type II second-degree AV block should be treated with a permanent pacemaker even in an asymptomatic patient, particularly if it is associated with fascicular block [16].

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

STATEMENT OF HUMAN AND ANIMAL RIGHTS

All procedures performed in human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.



5. Barold SS, Herweg B. (2012). Second-degree atrioventricular block revisited. *HerzschrittmachertherElektrophysiol*, 23(4), 296-304.
6. Silverman ME, Upshaw CB Jr, Lange HW. Woldemar Mobitz and His. (2004). Classification of second-degree atrioventricular block. *Circulation*, 110(9), 1162-7.
7. Gregoratos G, Abrams J, Epstein AE, Freedman RA, Hayes DL, Hlatky MA, *et al.* (2004). ACC/AHA/NASPE 2002 guideline update for implantation of cardiac pacemakers and antiarrhythmia devices: summary article: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/NASPE Committee to Update the 1998 Pacemaker Guidelines). *Circulation*, 106(16), 2145-61.
8. Epstein AE, DiMarco JP, Ellenbogen KA, *et al.* (2002). ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the ACC/AHA/NASPE 2002 Guideline Update for Implantation of Cardiac Pacemakers and Antiarrhythmia Devices) developed in collaboration with the American Association for Thoracic Surgery and Society of Thoracic Surgeons. *J Am CollCardiol*, 51(21), 1-62.
9. Epstein AE, *et al.* (2008). ACC/AHA/HRS 2008 guidelines for device-based therapy of cardiac rhythm abnormalities. *Circulation*, 117(21), e350–e408.
10. Gillis AM. (2007). Pacing for sinus node disease: indications, techniques, and clinical trials. *Clinical Cardiac Pacing, Defibrillation, and Resynchronization Therapy*. 3rd ed. Philadelphia, 407–427.
11. Vardas PE, *et al.* (2007). Guidelines for cardiac pacing and cardiac resynchronization therapy. *Europace*, 9(10), 959–998.
12. Shaw DB, *et al.* (2004). Is Mobitz type I atrioventricular block benign in adults? *Heart*, 90(2), 169–174.
13. Romme JJ, *et al.* (2011). Drugs and pacemakers for vasovagal, carotid sinus and situational syncope. *Cochrane Database Syst Rev*, 10, 00419.
14. Hindman MC, Wagner GS, JaRo M, Atkins JM, Scheinman MM, DeSanctis RW, *et al.* (1978). The clinical significance of bundle branch block complicating acute myocardial infarction. 2. Indications for temporary and permanent pacemaker insertion. *Circulation*, 58, 689–99.
15. Edhag O, Swahn A. (1976). Prognosis of patients with complete heart block or arrhythmic syncope who were not treated with artificial pacemakers. A long-term follow-up study of 101 patients. *Acta Med Scand*, 200, 457–63.
16. Strasberg B, Amat-Y-Leon F, Dhingra RC, Palileo E, Swiryn S, Bauernfeind R, *et al.* (1981). Natural history of chronic second-degree atrioventricular nodal block. *Circulation*, 63, 1043–9.

