A Case of Swallowing-Induced Atrioventricular Block After Myocardial Infarction

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We report a patient with transient atrioventricular (AV) block induced by swallowing. He complained of recurrent dizziness during meals and had suffered from inferior myocardial infarction 1 year before the onset of these symptoms. Radiologic examination showed no apparent esophageal abnormalities. Swallowing a piece of solid food or hot liquid repeatedly provoked advanced AV block. Administration of intravenous atropine sulfate prevented AV block. An electrophysiologic study revealed that this swallowing-induced AV block was an intranodal (A-H) block. We did not implant a cardiac pacemaker because his symptoms were not very serious and could be prevented by eating carefully. The patient has been symptom-free for the past 12 months. The previous myocardial infarction may be related to the appearance of this vagal-related AV block.

(Ipn Circ J 1996; 60: 710—714)

Swallowing-syncope is characterized by the loss of consciousness during or immediately after swallowing. This syncope is due to a sudden and temporary reduction in cardiac output and cerebral blood flow, induced by a cardiac dysrhythmia after deglutition. About 50 cases of Swallowing-Syncope have been reported since the first case was described by Spens in 1793! Although the most prevalent causes are sinus arrest and sinus bradycardia, swallowing-induced atrioventricular (AV) block is a rare mechanism of syncope and only a few cases have been reported?

We describe here a patient with swallowing-induced AV block after a myocardial infarction which was identified as an intranodal (A-H) block during an electrophysiologic study.

CASE REPORT

A 45-year-old man was admitted to our hospital on April 12, 1993, complaining of recurrent dizziness while eating. During the 2 months prior to admission, he had felt faint immediately after swallowing. Electrocardiographic monitoring in our outpatient clinic revealed advanced AV block with asystole of 4.3 sec during eating (Fig 1). He had had an inferior myocardial infarction 1 year before the onset of these symptoms. Cardiac catheterization performed at the time of infarction revealed right coronary artery occlusion, which responded well to thrombolytic therapy. The patency of the right coronary artery was confirmed at this time. On admission, his heart rate was 64 beats/min and blood pressure was 136/80 mmHg. A complete physical examination,

Key words:
Swallowing
Atrioventricular block
Myocardial infarction
Vagovagal reflex

(Received July 13, 1995; accepted November 24, 1995)
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Japanese Circulation Journal Vol.60, September 1996
Holter Monitoring

7:19 (During a meal)  2/20/1993

Fig 1. The first electrocardiographic monitoring at our outpatient clinic. AV block was observed during meals.

Y.M. 45y-o M  4/19/1993

Fig 2. Electrocardiogram at rest showed regular sinus rhythm with a P-R interval of 0.18 sec, a narrow QRS complex and small q waves in leads II, III, aVF. Electrocardiography showed hypokinesis of the posterior wall. Radiologic examination of the

including neurological testing, revealed no abnormalities. Hematological and biochemical examinations and urinalysis were normal. Chest X-rays showed no cardiomegaly. An electrocardiogram at rest showed regular sinus rhythm with a P-R interval of 0.18 sec, and a narrow QRS complex with small q waves in leads II, III, aVF (Fig 2).
Holter Monitoring

18:07 (During a meal)  4/26/1993

CM5

NASA

Fig 3. The second electrocardiographic monitoring. AV block was still observed during meals after diltiazem was discontinued.

Provocation Test

Banana

Before

Atropine sulfate 1.0mg iv

II

II

Fig 4. Electrocardiographic monitoring during the provocation test. Swallowing solid foods such as bananas provoked AV block repeatedly (top). This AV block was not induced by swallowing after intravenous administration of 1 mg atropine sulfate (bottom).

esophagus and upper gastrointestinal tract yielded no abnormal findings.

We initially thought that the advanced AV block was caused by diltiazem, which had been prescribed (120 mg per day) after his myocardial infarction. However, AV block was still observed during meals on the second electrocardiographic monitoring after diltiazem was discontinued (Fig 3).

Based on these findings, we suspected swallowing-induced AV block. Therefore, a swallowing provocation test was performed during continuous electrocardiographic monitoring. Swallowing solid foods such as bananas or hot liquids provoked AV block repeatedly. After intravenous administration of 1 mg atropine sulfate, AV block was not induced by swallowing (Fig 4). Vagotonic maneuvers such as carotid sinus massage and the Valsalva maneuver did not induce AV block.

An electrophysiologic study demonstrated normal AH and HV intervals (105 and 45 msec, respectively). Incremental atrial pacing provoked AV nodal Wenckebach periodicity at a pacing rate of 140 beats/min. The effective and functional refractory periods of the AV node were also within the
normal range. However, swallowing a piece of banana repeatedly induced advanced AV block, which was determined to be an intranodal (A-H) block (Fig 5).

Since his only symptom was dizziness and the induction of AV block became more difficult with repeated deglutitions, a permanent pacemaker was not implanted. The patient has been symptom-free for 1 year.

DISCUSSION

Syncope is most often due to reduced perfusion of the brain, and has various causes, such as neurological diseases, arrhythmias, hypoglycemia and vagovagal reflex. It may occasionally be provoked by swallowing. Cardiac arrhythmias with syncope secondary to swallowing include atrial and ventricular asystole, partial or complete AV block, sinus bradycardia, sinoatrial block, and ventricular arrhythmias. Most of these arrhythmias are brady-arrhythmias.

Physiologically, swallowing-induced AV block is produced by a vagovagal reflex. Swallowing triggers the afferent arc of the carotid sinus reflex and may produce vagal bradycardia or cardiac arrest if the barrage is sufficiently strong. In this case, we demonstrated that AV block was not provoked after intravenous administration of atropine sulfate. These findings strongly suggest that the reflex arc is vagally mediated. We also determined that the induced A-V block occurred at the AV node on the His bundle electrogram.

Most patients with swallowing-induced AV block have structural abnormalities of either the esophagus or the heart. Esophageal conditions include spastic esophagitis, esophageal herniation and diverticula. Several cardiac conditions, including myocardial infarction, rheumatic heart disease and valvular disease, have also been reported to be associated with swallowing-induced AV block. Although our patient had no apparent esophageal disease, he had a history of inferior myocardial infarction.

Although the precise mechanism of swallowing-induced AV block following myocardial infarction is uncertain, acute or old myocardial infarction was found in 11 patients with swallowing-induced AV block, 8 of which had posterior infarction. Two of these occurred in the acute phase, while the others occurred in the chronic phase. Bradycardia is more common in patients with infero-posterior ischemia and infarction. The distribution of myocardial ischemia may have a strong effect on the role of the vagal reflex. This may be associated with the concentration of inhibitory cardiac sensory receptors in the infero-posterior wall of the left ventricle. In addition, reflex bradycardia, hypotension and sympatho-inhibition are more common during posterior ischemia than during anterior ischemia in dogs. These observations indicate that the sensory endings that trigger reflex bradycardia and hypotension in response to
ischemia are preferentially distributed in the infero-posterior wall of the left ventricle.

Although swallowing-induced AV block may be rare, it is a possible cause of syncope or dizziness following a myocardial infarction. Beta-blockers, digitalis, verapamil and diltiazem deteriorate this AV block and may lead to more serious symptoms. Since we often prescribe these medicines for patients with myocardial infarction, we should keep this arrhythmia in mind when placing patients with myocardial infarction, especially postero-inferior infarction, on medication. Radiologic examination of the esophagus may also be warranted. With an increased awareness of swallowing-induced AV block and a comprehensive approach to its management, this potentially lethal condition can be successfully treated.

REFERENCES


