**Nifedipine Induced Bradycardia in a Patient with Autonomic Neuropathy**

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**SUMMARY**

An 80 year old diabetic male with evidence of peripheral and autonomic neuropathy was admitted with chest pain. He was found to have atrial flutter at a ventricular rate of 70/min which slowed down to 30-40/min when nifedipine (60 mg) in 3 divided doses, during which he was paced at a rate of 70/min. This is inconsistent with the well-established finding that nifedipine induces tachycardia in normally innervated hearts. However, in hearts deprived of compensatory sympathetic drive, it may lead to bradycardia.

**Additional Indexing Words:**
Nifedipine  Bradycardia  Autonomic neuropathy

The calcium channel blocker nifedipine is a powerful coronary and systemic vasodilator, that can both reduce systemic blood pressure and produce a reflex tachycardia.

We report a case of bradycardia after nifedipine administration in a diabetic patient with evidence of autonomic neuropathy.

**SUBJECTS AND METHODS**

**History:**

An 80 year old Kuwaiti-Arab, known to have diabetes mellitus for more than 20 years, presented with increasing angina pectoris on mild exertion which was sometimes associated with breathlessness. He also had intermittent diarrhoea which was described as watery with plenty of mucous, and relieved by medication from the local clinic. He experiences slight sweating during meals. He has no urinary complaints and had lost interest in sexual relations since the death of his wife 6 years previously. His diabetes was controlled with glibenclamide.

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Examination:

The patient did not appear to be dyspnoeic, cyanosed or anaemic. The pulse rate was 70/min and irregular in time and volume in erect and supine positions. He had weak pulsation on both dorsalis pedes and posterior tibials. The blood pressure was 170/70 mmHg in the supine position and 130/70 mmHg standing. The lung bases were clear. The apex beat of the heart was not palpable. The S₁ was of variable intensity and S₂ was normal. There was a short basal ejection systolic murmur.

Neurologic examination revealed signs of sensory and autonomic neuropathy. The patient’s pupils were contracted and reacted sluggishly to light. The Patellar reflexes were present. There was loss of vibration and position sensations. There was reduction to pin prick sensation in both legs, more on the left side.

Results

Haematologic and biochemical blood tests were normal, with the exception of mildly elevated fasting and postprandial blood sugar levels. Serological tests for syphilis were negative. The chest x ray showed clear lung fields, with a CT-ratio of 55%. The electrocardiogram revealed atrial flutter with a ventricular response of 70/min. Deep S waves were present in V₅ and V₆. Atrial fibrillation emerged during an episode of chest pain associated with rapid ventricular response, ST-depression in I, aVL, V₄-V₆ and a poor progression of the R-waves in the V-leads. He was treated with increasing doses of isosorbide dinitrate (10 mg tid up to 40 mg tid) in addition to sublingual glycerine trinitrate as needed.

The patient reported some relief but still complained of chest pain.

Fig. 1. On admission.
Although addition of nifedipine (10–20 mg tid) alleviated the chest pain, the patient's heart rate dropped with 20 mg tid and he reported dizzy spells.

Upon examination his heart rate was 30–40/min and irregular, with a supine blood pressure of 120/70 mmHg and a pressure of 80/60 mmHg while standing. Pace maker wire was inserted and he was paced at 70/min, which resolved the dizziness, however his chest pain recurred when nifedipine was discontinued. Reintroduction of nifedipine during pacing controlled the chest pain.

The electrocardiogram showed atrial flutter/fibrillation with slow ventricular response, which improved when nifedipine was discontinued. These findings reappeared when nifedipine therapy resumed.

A permanent pacemaker was implanted and fixed at a demand rate of 70/min. The patient's chest pain was controlled with nifedipine (20 mg tid)
and isosorbide dinitrate (20 mg tid). Glycerine trinitrate was administered on demand.

**DISCUSSION**

Nifedipine facilitates A-V nodal conduction which probably reflects action of a sympathetic mechanism triggered by peripheral vasodilatation and hypotension. In rabbits small intravenous doses of nifedipine (3 mg/kg body weight) elicited enhanced A-V nodal conduction in the normally innervated heart, and had no detrimental effects in hearts deprived of compensatory sympathetic drive by bilateral stellate ganglionectomy (Taira et al, 1975). At higher doses (30 mg/kg body weight), A-V conduction was unaffected as long as the sympathetic nerve supply to the heart was intact. However, after interruption of sympathetic nerves, in both the A-V nodal conduction time and the A-V nodal functional refractory period in animal experiments, nifedipine has a definite depressant effect on A-V nodal conduction, which is a dose dependent effect. This is compatible with that of verapamil and diltiazem.

Our patient has very suggestive signs and symptoms of autonomic neuropathy such as postural blood pressure changes, no response of the heart rate to postural changes, intermittent diarrhoea, sweating during meals and sluggish pupillary reflexes. His heart rate was slowed by nifedipine. Increased doses produced dizziness and bradycardia which were resolved when the drug was discontinued.

We believe that nifedipine caused bradycardia in this patient with cardiac autonomic neuropathy. To our knowledge there is only one previous report of bradycardia after nifedipine administration. The previously reported case was a patient with accelerated hypertension and heart failure. There were no other clinical notes on that case and there was no electrocardiographic evidence of bradycardia to support this effect.

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