Headache as an Unusual Presentation of Ischemic Heart Disease: A Case Report

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Abstract
The clinical features of coronary artery disease vary, and patients may present with symptoms other than chest pain, such as headache. Rarely, the headache may be the only presenting feature without any chest discomfort, and may be confused with migraine. Failure to distinguish such headache, caused by CAD, from migraine may result in wrong treatment with disastrous fate. Elderly patients with the presence of cardiovascular risk factors having recent onset exertional headache should be evaluated for the presence of cardiac cephalgia. We intend to report a 60-year-old hypertensive, diabetic patient with a 6-months history of episodic exertional headaches, who turned out to be a case of headache angina (cardiac cephalgia). [Journal of National Institute of Neurosciences Bangladesh, 2019;5(1): 81-86]

Keywords: Headache angina; Cardiac cephalgia; Cardiac cephalalgia

Introduction
The clinical features of coronary artery disease (CAD) vary, and patients may present with symptoms other than chest pain. Patients with CAD who present without chest pain are frequently misdiagnosed and undertreated. These patients may have pain at other sites such as arm, shoulder, back, jaw, or epigastrum. Pain at each of these sites may occur alone or in combinations1,2. Headache as the only symptom of myocardial ischemia is quite rare and there are only a few case reports in the literature on cardiac cephalgia or cephalalgia3,4.

Case Presentation
A 60-year-old hypertensive, diabetic patient presented in September 2018 with a 6-month history of episodic headaches. All attacks occurred only on exertion, initially after walking for about 10 to 15 min and later on after walking for just 1 to 2 min. The headache was also provoked by activities such as lifting heavy objects. The headache was intense, excruciating in quality, and rated as 9 in severity on the visual analog scale. This intense and excruciating pain subsided to last for 10 to 60 min in each attack. The headache used to subside with complete rest. His routine and social activities were seriously hampered. The pain used to start posteriorly, becoming holoccephalic within seconds. On a few occasions, the headache was associated with nausea. However, there was no vomiting, photophobia, phonophobia, or any aura. He never had any abdominal pain, chest discomfort, or typical chest pain, jaw claudication, or breathlessness associated with exertion or headache. He was diabetic for 10 years and...
hypertensive for 12 years. Neurological examinations were normal; blood pressure was 170/90 mm-Hg. Routine hematological and biochemical investigations were normal. A resting electrocardiogram (ECG) was within normal limits (Figure I). Echocardiogram showed no regional wallmotion abnormality with good ejection fraction (63.0%). He had undergone magnetic resonance imaging (MRI) of the brain and cervical spine, which did not reveal any abnormality. Prior treatments with various drugs such as, amitriptyline, valproates, topiramate, flunarizine, paracetamol, indomethacin, and ibuprofen provided no benefit.

In view of exertional-only headache, a possibility of cardiac cephalgia or headache angina was considered. The patient got complete relief from headache within minutes of taking single tablet of sublingual nitroglycerine which he described as the best response with any drug. Improvement with nitroglycerine strongly suggested cardiac cephalgia. During stress test, the patient had similar headache which was associated with 2 mm depression of ST segment in inferolateral leads. The patient did not feel any chest symptom during stress testing. Headache
in September 2018 with a 6-month history of episodic chest pain. A 60-year-old hypertensive, diabetic patient presented with chest pain frequently misdiagnosed and undertreated.

**Case Presentation**

**Introduction**

The clinical features of coronary artery disease (CAD) vary, and patients may present with symptoms other than chest pain. About 50.0% of cases of CAD are recognized because of the chest pain. However, chest pain may arise in or radiate to the neck, jaws, tongue, teeth, throat, occiput, cheeks, tip of the nose, ears, shoulders, arms, hands, and to the epigastrium. An exertional headache has broad differential diagnoses, which includes both primary and secondary headache disorders. Vast majority of exertional headaches are benign. The secondary causes associated with exertional headaches include space-occupying lesions especially of posterior fossa, vascular abnormalities like aneurysm or arteriovenous malformation, Chiari malformation, and other obstructions of CSF flow. Cardiac cephalgia is an extremely rare type of exertional headache. There are about 33 cases of cardiac cephalalgia in the literature. Knowledge of cardiac cephalgia and an early diagnosis is important to prevent any catastrophe.

A diagnosis of cardiac cephalgia is made according to International Classification of Headache Disorders (ICHD)-3 β criteria, which depend on the documentation of causation of headache by cardiac ischemia. Evidence of causation is suggested by the presence at least two of the following: Headache developed in temporal relation to onset of acute myocardial ischemia; Headache worsened with worsening of the myocardial ischemia or headache improvement with improvement in the myocardial ischemia; At least two of the following four characteristics like moderate to severe intensity, accompanied by nausea, not accompanied by paroxysmal angina in Bangladesh was by Chowdhury et al. in 2015. The first reported case of cardiac cephalgia from Bangladesh. The second case of cardiac cephalgia reported is presented with exertional headaches.

**Discussion**

Approximately 50.0% of cases of CAD are recognized because of the chest pain. However, chest pain may arise in or radiate to the neck, jaws, tongue, teeth, throat, occiput, cheeks, tip of the nose, ears, shoulders, arms, hands, and to the epigastrium. An exertional headache has broad differential diagnoses, which includes both primary and secondary headache disorders. Vast majority of exertional headaches are benign. The secondary causes associated with exertional headaches include space-occupying lesions especially of posterior fossa, vascular abnormalities.

**Figure III:** Coronary angiogram showing 95.0% stenosis in mid LAD involving origin of D1 artery. On 10th September 2018, a coronary angiogram revealed three vessel disease with 60-70% stenosis in proximal to mid right coronary artery (RCA), another 90% stenosis in distal RCA (Figure II), 95% stenosis in the mid LAD involving D1 (Figure III) and 30 to 40% stenosis in mid LCX and 80 to 90% stenosis in principle OM (Figure IV). Coronary artery bypass surgery was done with 4 grafts. At follow up, two weeks after discharge, the patient was completely symptom free.

**Figure IV:** Coronary angiogram showing 30 to 40% stenosis in the mid LCX and 80 to 90% stenosis in principal OM.
like aneurysm or arteriovenous malformation, Chiarimalformation, and other obstructions of CSF flow. Cardiac cephalgia is an extremely rare type of exertional headache. There are about 33 cases of cardiac cephalgia in the literature. Knowledge of cardiac cephalgia and an early diagnosis is important to prevent any catastrophe. A diagnosis of cardiac cephalgia is made according to International Classification of Headache Disorders (ICHD)-3 β criteria, which depend on the documentation of causation of headache by cardiac ischemia. Evidence of causation is suggested by the presence at least two of the following: Headache developed in temporal relation to onset of acute myocardial ischemia; Headache worsened with worsening of the myocardial ischemia or headache improvement with improvement in the myocardial ischemia; At least two of the following four characteristics like moderate to severe intensity, accompanied by nausea, not accompanied by photophobia or phonophobia, and aggravated by exertion; and headache is relieved by nitroglycerine or its derivatives. This patient showed all four features. Approximately 50.0% of cases of CAD are recognized because of the chest pain. However, chest pain may arise in or radiate to the neck, jaws, tongue, teeth, throat, occiput, cheeks, tip of the nose, ears, shoulders, arms, hands, and to the epigastrium. The association of headache with myocardial infarction was noted in 1971 by Sampson and Cheitlin. They observed that about 6% patients with CAD had headache with chest pain. Headache as the only presenting feature was first reported by Casky and Spierings. Thereafter, about 33 cases of cardiac cephalgia have been reported in the literature.

Our case presented with exertional headaches. Structural intracranial pathology was ruled out by neuroimaging. This case fulfilled the ICHD-3 criteria of cardiac cephalgia. Headache was always exertional and the patient had immediate symptomatic relief with sublingual nitrate. Moreover, he had complete relief by coronary bypass surgery confirming that the pain was cardiac in origin. To the best of our knowledge, this is the second case of cardiac cephalgia reported from Bangladesh. The first reported case of headache angina in Bangladesh was by Chowdhury et al in 2015. Most reported cases of cardiac cephalgia had headache as the main presenting feature. However, only 27% patients reported headache as the only manifestation of cardiac ischemia. About 50%, patients also had mild nonspecific pain in chest, epigastrium, arm or mandible. Cardiac cephalgia may closely mimic migraine. Both cardiac cephalgia and migraine produce severe exertional headache with autonomic features particularly nausea. Up to 30% patients with cardiac cephalgia may have either nausea or vomiting. This patient felt nausea on a few occasions, but he denied the presence of any other symptoms. It is extremely important to differentiate cardiac cephalgia with migraine as erroneous use of tryptans may progress cardiac ischemia. Interestingly, nitroglycerine which induces migraine provides relief in patients with cardiac cephalgia.

Majority of these patients have one or more risk factors for cardiovascular events, such as hypertension, diabetes, smoking, dyslipidemia and positive family history. This patient was diabetic and hypertensive.

Cardiac pain is mediated by sympathetic and/or parasympathetic vagal fibers. These fibers converge to the somatic fibers of the various structures of the body. Anginal pain is mediated by sympathetic fibers from C8 to T5 in 50 to 60% of cases, by vagal fibers in 10 to 20%, and through both neural fibers in 30 to 40%. These variations in convergence of fibers are largely responsible for the variation of cardiac pain. If parasympathetic fibers are involved, the patients would get pain in the neck and head distribution. A recent observation on 326 patients with confirmed myocardial ischemia demonstrated increased prevalence of craniofacial pain with inferior wall ischemia. It is a well-known fact that symptoms of inferior wall ischemia are mediated by parasympathetic fibers of vagus nerve.

A few other hypotheses have also been suggested to explain the craniofacial pain in CAD. Elevations in intracranial pressure, release of neurochemical mediators, or spasm of cranial vasculatures are few other explanations for the headache in patients with CAD.

Unrecognized myocardial infarction is quite common in the elderly people. About 21.0 to 33.0% elderly men and 26.0 to 54.0% elderly female with myocardial infarction may escape clinical attention. Therefore, it is possible that a large number of patients with cardiac cephalgia remain undiagnosed. It can also be speculated that a subset of patient with myocardial ischemia who escape attention may have headache as a sole presentation.

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headache with chest pain. Headache as the only presenting feature was first reported by Casky and Spierings. Thereafter, about 33 cases of cardiac cephalgia have been reported in the literature. Our case presented with exertional headaches. Structural intracranial pathology was ruled out by neuroimaging. This case fulfilled the ICHD-3 criteria of cardiac cephalgia. Headache was always exertional and the patient had immediate symptomatic relief with sublingual nitrate. Moreover, he had complete relief by coronary bypass surgery confirming that the pain was cardiac in origin. To the best of our knowledge, this is the second case of cardiac cephalgia reported from Bangladesh. The first reported case of headache angina in Bangladesh was by Chowdhury et al in 2015.

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**Conclusion**

Diagnosis of cardiac cephalgia is very important. Review of the literature suggest mortality rate of about 12.0% for cardiac cephalgia. Therefore, it could be suggested that any elderly patients with the presence of cardiovascular risk factor having recent onset exertional headache should be evaluated for the presence of cardiac cephalgia.

**References**

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Kreiner M, Alvarez R, Waldenström A, Michelis V, Muñiz R, Isberg A. Craniofacial pain of cardiac origin is associated with
Leening MJG, Elias-Smale SE, Felix JF, Kors JA, Deckers JW, Hofman A, et al. Unrecognised myocardial infarction and

central sensitization phenomena in patients with migraine without
12. Meller ST, Gebhart GF. A critical review of the afferent
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12. Meller ST, Gebhart GF. A critical review of the afferent
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