http://www.banglajol.info/index.php/JNINB
Journal of National Institute of Neurosciences Bangladesh ISSN (Online) 2518-6612
January 2023, Vol. 9, No. 1, pp. 1 ISSN (Print) 2410-8030

Editorial

Neurocardiology or Cardioneurology: Interplay of Brain-Heart Axis

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Neurocardiology refers to interplay between the nervous system and the cardiovascular system. The central nervous system has an extensive physiological influence on the cardiovascular system, and cardiovascular system in turn has both physiological and pathological influences on the central nervous system. This brain–heart disease is more frequent than assumed previously.

The effects of neurological disorders on the cardiovascular system has been well recognized throughout history but have gained attention and expanded only in the last two decades. Cardiovascular disease that occurs secondary to an underlying neurological disorder is either related to direct involvement of the heart or caused by induced neurohormonal abnormalities that act on the heart. These cardiac abnormalities may be responsible for a greater risk of morbidity and premature mortality than neurological manifestations.

The cardiac complications of a number of hereditary and non-hereditary neurogenic diseases have been well recognized. The most well-known of these are ischemic stroke, intra-cerebral hemorrhage (ICH), subarachnoid hemorrhage (SAH), epilepsy, bacterial meningitis, traumatic brain injury, sleep apnea syndrome and migraine. In addition to these, many neuromuscular diseases (NMD), movement disorders and neurodegenerative disorders may impair cardiac function. Cardiac dysfunctions are mostly evident for cerebrovascular accidents. These cardiac complications are frequent but in most circumstances benign. Detrimental cardiac effects include serious arrhythmias and repolarization abnormalities on electrocardiogram, elevated cardiac markers, left ventricular systolic or diastolic dysfunction, arterial hypertension or hypotension, myocardial infarction, stress-related cardiomyopathy and sudden cardiac death (SCD). The mechanisms by which these cardiac derangements occur with neurological diseases are mostly related to transient or chronic autonomic dysfunction.

On the other hand, several cardiac diseases have fatal cerebral consequences. Frequent cerebral complications of cardiac disease include embolic stroke, intracerebral bleeding, and syncope. Rare complications include brain abscess, meningitis, metastasis, dementia, or aneurysm formation. The most frequent and well-known cardiac cause of neurological complications is cardiac embolism. At least one in six ischemic strokes is caused by cardiogenic embolism. Structural heart disease and cardiac arrhythmias are the principal sources of cerebral embolism. Valvular heart disease, heart failure, ischemic heart disease, myocardial aneurysm, endocarditis/myocarditis, dilated cardiomyopathy (DCM) and non-compaction are major causes of cerebral embolism. Atrial fibrillation (AF) has the greatest documented potential of all cardiac arrhythmias to afford a milieu for cerebral embolism. Chronic non-valvular atrial fibrillation (AF) is associated with a fivefold increased incidence of stroke compared with a normal age-matched population. In young patients with cryptogenic stroke, cardiac structural abnormalities are probably the major source of cerebral embolism. Besides these, patients undergoing cardiac surgery and post-operative brain injury can contribute to increased morbidity and mortality. Brain injury after cardiac arrest is the main cause of death and long-term disability in those who survive after cardiopulmonary resuscitation (CPR).

Hear-brain and brain-heart relationships are important and common in our daily clinical practice. The cardiologist must consider the neurological consequences of heart disease, and the neurologist cannot ignore the heart. Heart-brain disorders require a bi-disciplinary diagnostic and therapeutic approach which in turn improves the outcome significantly.

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