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Cerebrospinal and cor meum disorders

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Abstract:

In this report I will discuss the relationship between the sophisticated motor organs in our bodies and how the effect on the brain due to certain disorders can lead to direct or indirect damage to the heart and this pathologic relationship involving the two is referred to as Brain-Heart-Disorders.

Introduction:

Numerous hereditary and non-hereditary central nervous system (CNS) disorders, affect the heart directly or indirectly leading to (brain-heart disorders). Examples of so would include epilepsy, stroke, subarachnoid bleeding, bacterial meningitis, and head injury. Also, multiple hereditary and non-hereditary neurodegenerative disorders may impair cardiac functions. effects on the heart would cause arrhythmias, cardiomyopathy, or autonomic dysfunction. Rarer cardiac complications of CNS disorders include heart failure, systolic or diastolic dysfunction, myocardial infarction, or arterial hypertension. Cardiomyopathy induced by hereditary CNS disease mainly include stress-induced myocardial dysfunction, known as Takotsubo syndrome (TTS). CNS disease triggering TTS includes epilepsy, ischemic stroke, subarachnoid bleeding, or PRES syndrome. Arrhythmias induced by hereditary CNS disease include supraventricular or ventricular arrhythmias leading to palpitations, dizziness, vertigo, fainting, syncope, (near) sudden cardiac death, or sudden unexplained death in epilepsy (SUDEP). Appropriate management of cardiac involvement in CNS-disorders is essential to improve outcome of affected patients.(1)

Discussion:

What is the link ?

brain and the heart are interdependent as mentioned previously The relationship between the two is caused by multiple structures and chemicals in the body and the term interdependent is used to describe how the cardiac muscle requires nerve innervations controlled by the brain and how the brain cannot function without appropriate blood supply from the heart so any affect on one or the other would result in some sort of malfunction in the other . the common idea is that the brain is constantly sending neural signals for the heart to respond to and carry out its function although this is true but the heart is actually sending more signals to the brain than the brain does the heart. These heart signals have highly important functions as the influence emotional processing along with higher cognitive faculties such as attention, perception, memory and problem solving.(2)

An example of the effect on each other is during stress when the heart rhythm pattern is disordered the corresponding pattern of neural signals travelling the heart to the brain inhibits higher cognitive functions; limiting the ability to think clearly, lean, reason, and make effective decisions. This process is only physiologic and the effect although depending on level of distress it is on a low level of change so we can only imagine what may occur in pathologic circumstances.(2)

Problems in the central nervous system effecting the heart:

Diseases of the central nervous system do manifest multiple cardiac complications some are extremely dangerous and may even lead to fatality. for example cardiac complications such as arrhythmias, myocardial infarction, and heart failure are reported after left insular stroke as well as intracerebral and subarachnoid haemorrhages. Also different sites of occurrence of haemorrhages manifest cardiac complication such as hemispheric and basal ganglia and epilepsy have been

associated with heart failure. Now to support the concept of neural-mediated cardiac injury a study has been conducted where baclofen was injected into the tract of nucleus solitarius produced hypertension and tachycardia and inhibited the depressor baroreflex response.(3)

Problems in the heart effecting the central nervous system:

The central nervous system is rather commonly directly or indirectly affected by cardiac disorders or by a similar pathologic process for example we have atherosclerosis that effects the heart. Numerous cardiovascular disease can cause signs and symptoms of CNS dysfunction such as hypertensive cerebrovascular disease(encephalopathy), cerebral atrioventricular malformation arteritis(takayabus, polyarteritis nodosa, lupus erythematosus). A full description of every neurological disorder is beyond this report. However both focal and diffuse neurological syndromes are seen .

An example of so is cerebral embolism as a person would commonly present with a sudden focal neurological deficit; the nature of the focal deficit primarily depends on the vessel involved. Cerebral emboli lodge, in decreasing order or frequency. The distribution is as follows cerebral arteries: middle cerebral, posterior cerebral, vertebral, cerebellar, and anterior cerebral. One of the main CNS disorders that follow cerebral embolism is seizures. Some of the entities that can cause cerebral embolism are myocardial infarction, left ventricular aneurysm.(4)

Conclusion:

To conclude the brain and the heart are the two most important organs in the body and it has become clear to me after this report that they are 'interdependent' and both work coherently to function appropriately in physiologic sense. Pathologically I have come to a realisation that one of the two systems the cardio vascular system and the central nervous system do indeed manifest signs of dysfunction as a complication of a disease or a disorder in the other. Although the relationship is rather complicated however in cases of hospitalization, clinically appropriate management of cardiac involvement in CNS disorders or the opposite is essential to improve outcome of effected patients as the dysfunction of one shouldn't mean the dysfunction of the other a good judgment on cases and a good knowledge of the topic should be used to avoid further complications.

References:

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