Disorders of the Central Nervous System

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The central nervous system is the hardwiring that helps the human body work smoothly and efficiently. When there is a disruption in this system, it can and will effect many different parts of the body in a seemingly endless amount of ways. Disorders of the central nervous system can be difficult to detect and diagnosis. This is because the diseases can have such a slow onset that the symptoms are easily overlooked. Major overlap of symptoms is also present between diseases which increases the chances of a misdiagnosis.

Cerebrovascular Accidents

A cerebrovascular accident, also known as a stroke, is caused by a significant decrease or total blockage of blood flow to a part of the brain due to blockage or rupture of a vessel. When the vessel is blocked, the stroke is classified as an ischemic stroke. When the vessel ruptures it is referred to as a hemorrhagic stroke (Ellis & Han, 2018). If the brain cannot get blood or oxygen, the brain cells will start to die (American Stroke Association, 2020). The longer a stoke patient goes without treatment, the more brain cells will die and the worse the long term effects of the stroke will be.

Symptoms and Diagnosis

Because it is so important to receive care fast, the acronym FAST is used to identify questions that should be asked when assessing for a cerebrovascular accident. The F in FAST stands for face and is associated with the question “does one side of the face droop?”. A stands for arm. When a person holds both of their arms out strait and one begins to drop, that is a sign

of a stroke. The S stands for speech. When a patient is having a stroke, it is very common for their speech to become slurred. So, another good question to ask when assessing for a stroke is if their speech is slurred or abnormal. The last letter in the acronym stands for time, meaning if any of these signs are noted when asking the first three questions, it is time to call 911 and get help as quickly as possible (Ellis & Han, 2018).

Intracranial Tumors

In simple terms, intracranial tumors are brain tumors, however, they can also occur in the cranial nerves, meninges and other structures. According to the Merck Manual, there are two types of brain tumors, primary tumors and secondary tumors. A primary tumor is when the tumor or growth originates in the brain, whereas secondary tumors originate in tissue outside of the brain and, over time, spread to the brain. Tumors can also be malignant or benign, but even benign tumors can be dangerous because there is no room for expansion in the skull. This can cause unwanted pressure on the brain and possible neurologic dysfunction (Goldman & Mohile, 2018).

Symptoms and Diagnosis

Most of the symptoms related to brain tumors come from an increase in intracranial pressure such as headaches, deterioration in mental status and focal brain dysfunction. When doing an assessment for an intracranial tumor, it would be important to ask the patient if they have had a recent onset of unexplained headaches that get worse while sleeping, any new unexplained seizures, or any unexplained vomiting (Goldman & Mohile, 2018).

Encephalitis

Encephalitis is swelling or inflammation of brain tissue that is normally caused by an infection but can also occur due to and autoimmune response. Infectious Encephalitis is caused by a viral infection. According to John Hopkins Medicine, the most common viruses to cause encephalitis are herpes simplex virus types one and two, varicella zoster virus, and enteroviruses. Autoimmune encephalitis occurs when one's own immune cells or antibodies attack their own brain (John Hopkins Medicine , 2020).

Symptoms and Diagnosis

Symptoms of encephalitis tend to have a gradual onset. It starts with flu-like symptoms and continues until it starts to effect the patient's mental status. Seizures, movement disorders, and neck stiffness are all common physical symptoms. In severe cases, even partial paralysis of the arms and legs can be present. There are also many cognitive symptoms such as confusion, hallucinations, and memory loss. When assessing for the possibility of encephalitis, the physician might ask the patient if they have been having a cluster of symptoms such as seizures, fever, altered mental state, or changes in movement and behavior. It would also be important to ask about the patient's vaccination records which, if up to date, could greatly decrease their chances of having encephalitis. A history of recent tick bites and other insect or animal bites that could have transmitted a virus to the patient would also be helpful information to recieve (John Hopkins Medicine , 2020).

Meningitis

Meningitis is swelling and inflammation of the meninges usually due to infection (Mayo Clinic, 2020). According to Shiel, MD, meninges are the three membranes that cover the brain

and spinal cord (Shiel, 2018). There are many different types and causes of meningitis such as bacterial, viral, chronic, fungal, and parasitic meningitis and they can all lead to death if the infection is not treated very quickly (Mayo Clinic, 2020).

Symptoms and Diagnosis

Signs of meningitis are similar to encephalitis. They start out as more common flu-like symptoms such as fever, unrelenting headache, vomiting, stiff neck, and confusion, but can quickly progress. The long term effects of meningitis can be quite severe. Meningitis can cause a loss of hearing, brain damage, musculoskeletal problems, learning disabilities and, if the infection is bad enough, it can be fatal. When doing an assessment for meningitis, it would be important for the doctor to assess and question about the presence of certain risk factors such as diseases or practices that can compromise the immune system, pregnancy, which vaccinations the patient has received, and the setting in which the patient lives. Patients who live in community settings are at a higher risk for infections that cause encephalitis (Mayo Clinic, 2020).

Bell's Palsy

Bell's palsy consists of temporary paralysis of the muscles of the face causing one side of the face to become stiff or droopy due to the inflammation or compression of the seventh cranial nerve. It normally occurs a couple of weeks after having a cold or other infection of the eyes or ears. Some of the common viruses and bacteria that are known to cause Bell's palsy are herpes simplex, Human immunodeficiency virus (HIV), Sarcoidosis, herpes zoster virus, Epstein-Barr virus, and Lyme disease (Kahn & Han, 2019).

Symptoms and Diagnosis

Symptoms are usually noticed in the morning when a person wakes up or when they are trying to eat or drink food. The most common symptom of Bell's palsy is unilateral facial drooping, however, other symptoms can include, facial muscle twitches, headache, irritated eye on the effected side, drooling, and dry eye and mouth. When assessing for Bell's palsy, it would be important for the physician to ask about the patient's recent history of ear and eye infections as well as any colds. The physician would also want to ask when the symptoms started and how long the patient has had those symptoms (Kahn & Han, 2019).

Comparing Disorders of the Central Nervous System

Some diseases of the central nervous system have similar causes, symptoms, and lasting long term effects. Understanding similarities between the diseases can help to prevent misdiagnosis and increase understanding of each disorder.

Cerebrovascular Accident Vs Bell's Palsy

Facial paralysis is one of the most common symptoms of Bell's palsy and a cerebrovascular accident. Being able to distinguish quickly between the two disorders is very important because strokes need time sensitive care and any delay in treatment can result in the loss of more brain cells and further brain damage. According to the Journal of Emergency Medical Services, understanding the anatomy of facial muscle control and how the nerves innervate those muscles is critical. When assessing a stroke patient, the facial paralysis will be unilateral, but only on the lower half of the effected side. The upper half of the facial region, such as the eyes and forehead, will have minimal to no signs of paralysis. With Bell's palsy, the

facial weakness will be in a peripheral pattern and will involve weakness of the mouth, eye, and forehead (Mullen & Loomis, 2019).

Encephalitis Vs. Meningitis

Encephalitis and meningitis are both most commonly caused by infections that cause swelling in the cranial region. The main difference is where the infection is located. Encephalitis is the inflammation of the actual brain tissue, while meningitis is inflammation of the meninges and tissues that surround the brain and spinal cord. They can also have very similar symptoms including flu-like symptoms such as fever, headaches, vomiting, seizures and stiff neck. Both of these disorders, if not treated quickly, can be fatal and have long lasting effects on the body (National Institute of Neurological Disorders and Stroke , 2019).

Cerebrovascular Accident Vs Intracranial Tumors

Cerebrovascular accident and brain tumor symptoms can be confused because they are very similar in some cases. Brain tumors can cause unilateral numbness in an arm or in a leg, they can lose vision on one side of their body, and they can have mood swings or emotional outbursts for no reason, which are all also symptoms of stroke patients. The biggest difference between the symptoms of a stroke and a brain tumor is that stoke symptoms tend to have a quick onset. Stoke symptoms will normally manifest in a matter of minutes, whereas with a brain tumor, the symptoms have a more gradual onset. They can be so subtle that many people will ignore the symptoms until the tumor and symptoms worsen (Mitchell, 2017).

Bell's Palsy Vs Intracranial Tumors

Because Bell's palsy is such a common cause of facial paralysis, brain tumors can be misdiagnosed as Bell's palsy if other symptoms are not evaluated. Brain tumors located in the right place in the brain could also very easily cause facial paralysis. Bell's palsy can be considered idiopathic and does not have any established guidelines for diagnosis. Because of this, it is very important for physicians to gain a thorough history and physical examination of the patient to determine if further labs and assessments are needed to diagnose a possible brain tumor or a more critical condition (Fahimi, Navi, Kamel, 2014).

Peripheral Neuropathy Vs Multiple Sclerosis

Peripheral neuropathy and Multiple sclerosis both have symptoms including abnormal sensations, tingling, numbness, and can make the use of peripheral extremities difficult and painful. Although these diseases do have very similar symptoms, they are very different diseases. They are very different because multiple sclerosis affects the central nervous system and peripheral neuropathy tends to effect the peripheral nervous system. Some of the differences that can help determine if a patient has multiple sclerosis or peripheral neuropathy depend on the timing and pattern of the symptoms. With multiple sclerosis, the symptoms will typically develop quickly, whereas the symptoms of peripheral neuropathy tend to be more gradual and develop slowly over time. Cognitive difficulties may also be present with multiple sclerosis where with peripheral neuropathy there will only be sensory problems. Multiple sclerosis is also more likely to affect only one side of the body and peripheral neuropathy will commonly affect both sides (Stachowiak, 2019).

Conclusion

Disorders of the central nervous system can be very serious conditions if they are not diagnosis correctly and treated quickly. Because of the common slow onset and overlap of symptoms between diseases, it becomes very difficult in some situations to recognize and diagnose the disorders. Thorough yet timely investigation, by the physician, into a patient's health history, as well as a complete assessment of the patient's physical and cognitive symptoms, play a major role in the correct diagnosis, treatment, and recovery of the patient.

References

American Stroke Association. (2020). About strokes. Retrieved October 31, 2020, from https://www.stroke.org/en/about-stroke

Ellis, M. (2018, September 29). Cerebrovascular accident: Symptoms, treatment, and prevention (1021166326 784530032 S. Han MD, Ed.). https://www.healthline.com/health/cerebrovascular-accident

Fahimi, J., Navi, B. B., & Kamel, H. (2014). Potential misdiagnoses of bell's palsy in the emergency department. *Annals of Emergency Medicine*, *63*(4), 428–434. https://doi.org/10.1016/j.annemergmed.2013.06.022

Goldman, S. A., MD, & Mohile, N. A., MD. (2018, June). Overview of intracranial tumors - Neurologic disorders. https://www.merckmanuals.com/professional/neurologic-disorders/intracranial-and-spinal-tumors/overview-of-intracranial-tumors

John Hopkins Medicine. (2020). Encephalitis. https://www.hopkinsmedicine.org/health/conditions-and-diseases/encephalitis

Kahn, A. (2019, March 26). Bell's Palsy: Causes, Symptoms, Diagnosis, and More (1021377622 784656799 S. Han MD, Ed.). https://www.healthline.com/health/bells-palsy

Mayo Clinic. (2020, October 01). Meningitis. https://www.mayoclinic.org/diseases-conditions/meningitis/symptoms-causes/syc-20350508

Mitchell, L. (2017, July 20). The most common symptoms of a brain tumor. https://healthcare.utah.edu/healthfeed/postings/2017/07/stroke-brain-tumor.php

Mullen, M. T., MD, & Loomis, C., MD. (2019, November 13). Differentiating facial weakness caused by bell's palsy vs. acute stroke. https://www.jems.com/2014/05/07/differentiating-facial-weakness-caused-b/

National Institute of Neurological Disorders and Stroke. (2019, March 27). Meningitis and encephalitis information page. https://www.ninds.nih.gov/Disorders/All-Disorders/Meningitis-and-Encephalitis-Information-Page

Stachowiak, J., PhD. (2019, December 01). Peripheral neuropathy and multiple sclerosis have some similarities. https://www.verywellhealth.com/peripheral-neuropathy-and-ms-2440549