Textbook Chapter: Neurological Disorders

**Introduction to Neurological Disorders:**

 Neurological disorders are classified as diseases affecting the brain and nervous systems. In every disorder the damage to the brain or nervous system are different and they all lead to different outcomes which is what makes every disorder different. Examples of them include, Alzheimer’s, Epilepsy, and Migraines. Neurological disorders are acquired and treated in different ways. Some people may be born with them, some may be caused from infections that they may have had previously, or they also could have been caused from lifestyle and nutrition. While these may be examples of how people acquire neurological disorders there are many other scenarios that cause them and numerous factors that play a role in their severity. Although neurological disorders may cause damage to the brain and nervous system there are studies that have been done to find treatment and some of them have found things to be successful. Neurological disorders are much more common throughout the world than many people are aware of. Millions of people every day are experiencing some kind of neurological disorder. While unaffected people may not be aware of the impact that these disorders have, most of them are actually extremely life altering. However, many people may not be aware of the severity because oftentimes you can’t tell who is affected, as the symptoms aren’t always external.

**History:**

 Throughout the years neurological disorders have played a significant role in numerous people’s lives. Some people have been diagnosed with these disorders and some people have been affected by their friends or friends being diagnosed and they have seen firsthand the impact that it has had on their lives. For many years, studies have been done to try and identify biomarkers related to neurological disorders, but the process has not been easy. There are many challenges that come along with the research involving neurological disorders, such as lack of knowledge, equipment, and techniques, complexity of the brain, and several factors that make research difficult. (Dunckley) In 2009 an article titled “Application of mass spectrometry-based proteomics for biomarker discovery in neurological disorders” was written about a study done using mass spectrometry-based quantitative proteomics to possibly speed up the discovery of biomarkers for neurological disorders. They used these techniques to provide them with information such as genetic variability, DNA microarrays, proteomic patterns, and other information that can allow them to pinpoint biomarkers for diagnosis and therapy. (Venugopal) The goal of this study and many others that have been done throughout history is to provide more information about a topic that has involved many challenges making it hard to provide factual information. Throughout this study a few of the broader groups of neurological diseases that they identified includes psychosis, neurodegenerative diseases, neurotrauma, neuroplasms of the central nervous system, and HIV-associated cognitive impairment. (Venugopal) Finding biomarkers for early diagnosis of these diseases has benefited research when trying to find treatments and medications suitable for a disorder.

**Types of Neurological Disorders:**

 The term “neurological disorder” is a broad term that refers to a number of disorders caused by damage to different parts of the neurological pathway, the connection of all of the neurons in a person’s body. What is being referred to as one group of neurological disorders are broken down into more specific categories such as neurodegenerative diseases, neurotrauma and many others that were mentioned in Venugopal’s article. Some more specific examples of common neurological disorders that fall under bigger categories include Alzheimer’s disease (problems with memory, thinking and behavior), Epilepsy (abnormal brain activity), Multiple sclerosis (damages nerves), Parkinson’s disease (affects dopamine producing neurons and causes Migraines). (Psych Guides) Although these are well-known disorders, many people are not aware that these diseases are classified as neurological disorders, and they are also unaware of the millions of other neurological disorders around the world.

**Causes of Neurological Disorders:**

 There are numerous problems that can be related to neurological disorders, but they all stem from damage to nerves or a neurological pathway as a whole. The damage that is done to these nerves can be related to lifestyle, genetics, physical injuries, infections, nutrition, the environment, or other factors that may play a role in negatively impacting the nerves in a person’s body. (Psych Guides) Although some of the ways that the nerves are damaged can be avoided such as parts of your lifestyle, it is hard to avoid it when it comes to physical activity because it can also play a negative role on someone’s life if they cut out physical activity. However, things such as genetics are impossible to avoid since people don’t have control of their genetic makeup. Research has shown that while most neurological disorders are not inherited, a few of them are caused by mutations to genes that can be passed on from parent to offspring during reproduction.

**Signs and Symptoms:**

 Considering that most neurological disorders are not inherited and are acquired from normal activities, many people might not be aware that they have a disorder until they begin experiencing signs and symptoms that may be unusual. A few minor signs or symptoms that someone may notice but might not be as concerned about may include muscle weakness and unexplained pain. Other symptoms that may cause much greater concern include, paralysis, loss of sensation, seizures, difficulty with normal tasks such as reading and writing, and decreased alertness. (Psych guides) When considering only a few of the signs and symptoms that someone might experience, it makes you aware of how mild or severe different disorders can be. Once you begin noticing any unusual signs or symptoms make sure you consult your doctor so that you are properly diagnosed. Noticing these signs and contacting a doctor can help you find the treatment that is right for you and your neurological disorder.

**Treatment, Medication, and side effects:**

 When talking about neurological disorders and understanding what causes them and the damage that is caused to the brain and nervous system it is scary and hard to comprehend. However, most of these disorders are not something that have to go untreated and a person does not always have to suffer for the rest of their lives. There are a few options for treatments and medications but the methods and type of medication is specific to the disorder. In the article “System for Treatment of Neurological Disorders” it explained the research that done involving EEG signals. They performed this treatment by placing electrodes near the brain or within the tissues so that when a neurological event occurred it would be able to detect it and respond properly to that specific action. (Fischell) Another article called “Rho kinase, a promising drug target for neurological disorders” talked about the research that they performed involving ROCK inhibitors. For their research they used the ROCK inhibitor on animals that had experienced spinal cord injuries and found that the ROCK inhibitor induced neurite outgrowth and enhanced the preservation of tissues which both allowed for functional recovery. (Bernhard) While these articles explain treatment studies done using different mechanisms, another option that is more common are neurological drugs. A few possible options for patients may include corticosteroids or dopamine-affecting drugs, but it depends on the type of disorder that they are suffer from and they will have to find a drug that is specific to that disorder. With any medication comes the possibility of side effects. When considering medication for a neurological disorder you should consult with your doctor and once you begin taking it while also watching for side effects that may be alarming.

**Examples of Specific Disorders: Causes, Signs, Symptoms, and Treatments:**

Alzheimer’s Disease:

 This neurological disorder is classified as a form of dementia causing problems with memory, behavior, their ability to think and many other cognitive abilities that used to be normal to them. (alz.org) Many people may be familiar with this disorder because they may have a grandparent or great-grandparent that experienced it. Normally people are not diagnosed with this disease until later on in life. Symptoms that many patients diagnosed with Alzheimer’s disease experience include difficulty communicating, gradual loss of memory and slowing of their ability to respond. Although currently there is not a cure for Alzheimer’s there are treatment and medication options.

Epilepsy:

 Epilepsy, also sometimes known as “seizure disorder”, causes unpredictable and unprovoked seizures. Because of this, the type of seizure that one person diagnosed with epilepsy may experience could be completely different from another person diagnosed with this disorder. Although seizures are the main side effect of this disease, seizures may also cause other health issues such as a brain injury. Having an unprovoked seizure is normally the first sign that a person has epilepsy. While seizures may the first sign that a person notices, the actual electrical event that causes the seizures occurs in the brain.

Multiple Sclerosis:

 Like Epilepsy, Multiple Sclerosis is another neurological disorder that is unpredictable and affects the central nervous system. Because of the way it effects the nervous system, it causes the flow of information in the brain to be disrupted making it hard for that information to reach the body (national MS) In the article written by the National MS Society, there is not shown to be any specific causes related to this disease but it is said that environmental and genetic factors such as immunology, epidemiology, genetics and infectious agents do play a role. (national MS) When it comes to symptoms, this is the main part of the disease that makes in unpredictable. The signs and symptoms seem to vary from person to person. Treatment for this disease is still a study that is in the works. However, there are medication options for modifying the course of the disease.

Parkinson’s Disease:

 Parkinson’s disease is an example of a neurological disorder that falls under the neurodegenerative disorder category. The main effect that this disorder has on the dopamine-producing neurons in the brain is on the part of the brain called the substantia nigra. (Parkinson’s Foundation) Symptoms that people with Parkinson’s disease experience include limb rigidity, gait and balance problems. (Parkinson’s Foundation) With particular disease however many people do not experience the symptoms until they have had the disease for an extended period of time. When it comes to a cure for this disorder, one has yet to be discovered. However, like many other disorders there are a few medication options and for this disorder and there is also an option for surgery.

Migraines:

 Of all Neurological disorders this is probably the most commonly heard of but many are unaware that it is considered a neurological disorder. When people hear the word migraine they normally think of a headache the everyone experiences every once and a while. Migraines are found to be a neurological disorder that involves brain chemicals and nerve pathways. Symptoms for migraines are very obvious when you experience them. The pain you feel will most likely be a throbbing recurring pain on the side of your head around your temple. These symptoms often cause people to have side effects such as dizziness, nausea, vomiting, sensitivity and disturbances to vision such as blurred vision. (migraineresearch) Treatment for this disorder for many people consists of over the counter medicines such as Tylenol and Ibuprofen. While medication may work for most people, if symptoms continue to become worse it is recommended that you see a doctor to make sure that there is not something else causing these symptoms.

**Recent Studies/ Research:**

 In the article “Transplantation of Human Chorion-Derived Cholinergic Progenitor Cells: A Novel Treatment for Neurological Disorders” the author explained the research that was done involving a treatment for Alzheimer’s disease. While explaining how they performed their research to try and find treatments for this disorder, they explained that there were a few obstacles and potential risks involved. One part of the research that they found to be an obstacle,was the differentiation between different cell types that was needed for cell therapy. (springer) However, when they did research involving basal forebrain cholinergic progenitor cells (BFCN) they eventually experience improvement in cognitive assessments. (springer) This article is only one example of the many types of research that has been done for one of the many neurological disorders. From this research you are able to see just how difficult it is to find a cure or even a treatment for the disorders.

**Conclusion:**

 Neurological disorders are much more relevant to people’s everyday lives than most are aware of. Many are not aware of the numerous types of disorder that range from severe to minor. Examples include more severe disorders like Alzheimer’s to more easily treated disorders such as migraines. No matter how severe or mild the disorder may be, they still continue to have drastic impacts on the lives of those affected. Not only do disorders differ in their severity but they also have very different causes, signs, and symptoms, and the treatment is very different for each type. Learning about the different signs and symptoms for neurological disorders would make many people become more aware of the symptoms- allowing them to diagnose the disorder in a much earlier stage, making it possible to prevent it from becoming worse or possibly to have to opportunity to treat it depending on the type of disorder.

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