A Comparative Study Between Levetiracetam and Phenytoin to Find Out Their Use in Prevention of Seizures in Stroke Patient

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Abstract

Stroke: A stroke, also known as a brain attack, occurs when blood supply to a part of the brain is cut off or when a blood vessel in the brain bursts. Parts of the brain are damaged or die in either case. A stroke can result in long-term brain damage, disability, or even death.

Ischemic stroke:

IS occurs when a blood clot blocks or narrows a cerebral artery. A blood clot frequently forms in arteries that have been damaged by plaque build-up (atherosclerosis). It can happen in the CA of the neck and other arteries. This type of stroke is the most common. The most common type of stroke is an ischemic stroke. They occur when a blood clot prevents blood and oxygen from reaching the brain. These blood clots typically form in areas where fatty deposits have narrowed or blocked the arteries over time (plaques).

Haemorrhagic stroke:

A medical emergency in which a ruptured blood vessel causes internal bleeding in the brain. High blood pressure and trauma are two of the most common causes. Taking blood thinners may also increase one's risk.

Transient ischemic attack:

A stroke-like attack that, despite resolving in minutes to hours, necessitates immediate medical attention to differentiate from a true stroke. A transient ischaemic attack could be a precursor to a future stroke.

Sample size and methods-130 Total 65-who take Levetiracetam, 65 – who take Phenytoin.

Results:

Data Analysis was performed using Statistical Package of Social Sciences (SPSS) version.

Data presented as frequency, percentage for categorical variables. In case of normal distribution, mean with SD was used for descriptive statistics.

Conclusion:

The following conclusion were drowning on the basis of the finding of the study. The association between the level of score and socio demographic variables on the basis of frequency and percentage. There is

significance association between the level of scores and other demographic variables (Age, Gender, Education Level, Type of Residence) the calculated Chi-Squares values are greater than table values at 0.05 level of significance.

The Chi-squares values shows that there are no significance association between the level of scores and variable (Smoking factor, drinking factor, Physical Activity, First ever stroke, Medical History), the calculated chi square values were less than the tables value at 0.05 level of significance.

The Chi-squares values shows that there are significant association between the level of scores and variable (Family History of stroke, Previous/Ongoing medications, Seizure like events), the calculated chi square values are greater than the tables value at 0.05 level of significance.

The Chi-squares values shows that there are significant association between the level of scores and variable (Any Other Side Effects, do you fund treatment useful), the calculated chi square values are greater than the tables value at 0.05 level of significance.

Introduction

Stroke:

A stroke, also known as a brain attack, occurs when blood supply to a part of the brain is cut off or when a blood vessel in the brain bursts. Parts of the brain are damaged or die in either case. A stroke can result in long-term brain damage, disability, or even death.

Types of stroke:

Ischemic stroke

Haemorrhagic stroke

Transient Ischemic stroke

Ischemic stroke:

Ischemic stroke occurs when a blood clot blocks or narrows a cerebral artery. A blood clot frequently forms in arteries that have been damaged by plaque build up (atherosclerosis). It can happen in the carotid artery of the neck and other arteries. This type of stroke is the most common. The most common type of stroke is an ischemic stroke.

They occur when a blood clot prevents blood and oxygen from reaching the brain. These blood clots typically form in areas where fatty deposits have narrowed or blocked the arteries over time (plaques). This is referred to as atherosclerosis.

Sign & Symptoms:

If you or someone you love is at risk for stroke, recognizing the signs and symptoms could help save a life. Stroke symptoms usually come on suddenly and may include: Severe headache without a known cause Numbness or weakness of the face, arm or leg, especially on one side of the body Confusion Trouble seeing in one or both eyes Trouble walking, dizziness, loss of balance or coordination

Haemorrhagic stroke:

A medical emergency in which a ruptured blood vessel causes internal bleeding in the brain. High blood

pressure and trauma are two of the most common causes. Taking blood thinners may also increase one's risk. Symptoms vary depending on where the haemorrhage is in the brain, but they may include numbness or weakness in a part of the face, difficulty speaking, or difficulty walking. Cerebral haemorrhage necessitates immediate medical attention. Medication and close monitoring in an intensive care unit are usually involved. Surgery may be required in rare cases to relieve pressure on the brain.

Risk Factors:

Blood vessel malformations are risk factors for intracerebral haemorrhage. Cerebral cavernous malformation: This occurs when small blood vessels called capillaries collect in the brain, causing them to enlarge and become misshapen, potentially impairing blood flow. An aneurysm in the brain is a bulge in the wall of a blood vessel. An aneurysm can grow in size, weakening the artery wall. If an aneurysm ruptures, it can cause uncontrollable bleeding. AVM (arteriovenous malformation) is a genetic condition that typically affects the brain and spine. If it occurs in the brain, the blood vessels can rupture, resulting in brain bleeding. This is a rare disorder.

Transient ischemic attack:

A stroke-like attack that, despite resolving in minutes to hours, necessitates immediate medical attention to differentiate from a true stroke. A transient ischaemic attack could be a precursor to a future stroke. Symptoms include one-sided weakness, vision problems, and slurred speech. These are usually transient and resolve within 24 hours.

Risk Factors that are changeable:

The following risk factors for TIA and stroke cannot be changed. However, knowing that you are at risk can motivate you to change your lifestyle in order to reduce other risks. A family trees. If a family member has had a TIA or a stroke, your risk may be increased. Your risk increases with age, especially after the age of 55. Sex, Men are slightly more likely than women to have a TIA or a stroke. However, as women age, their risk of having a stroke increase. Transient ischemic attack in the past. You are much more likely to have a stroke if you have had one or more TIAs.Sickle cell disease is a genetic disorder. A common complication of sickle cell disease is stroke. This inherited disorder is also known as sickle cell anaemia. Risk factors that you can influence:

A number of risk factors for stroke can be controlled or treated, including certain health conditions and lifestyle choices. Having one or more of these risk factors does not guarantee you will have a stroke, but having two or more of them increases your risk

Prevention:

You should not smoke. Stopping smoking lowers your chances of having a TIA or a stroke. Limit your intake of cholesterol and fat. Cutting back on cholesterol and fat, particularly saturated and trans-fat, in your diet may help to reduce plaque build-up in the arteries. Consume an abundance of fruits and vegetables. These foods contain nutrients like potassium, folate, and antioxidants that may help prevent a TIA or stroke. Limit your sodium intake. If you have high blood pressure, avoiding salty foods and not adding salt to food may help. Excess sodium may raise blood pressure in people who are sensitive to sodium, but avoiding salt may not prevent hypertension.

Exercise on a regular basis.

Aims & Objectives

Aim:

The aim of this study is to do comparison between Levitracetam and Phenytoin to find out their use in prevention of seizures in Stroke patients.

Objectives:

To determine the effect of Levetiracetam in stroke patients. To determine the effect of Phenytoin in stroke patients. To determine the role of antiepileptic therapy in primary prevention of stroke seizures. To find out the most effective drug between Levetiracetam & Phenytoin.

Review of literature:

1. Kruer et al. conducted a retrospective observational study to assess seizure incidence seven days after TBI in patients treated with phenytoin and levetiracetam, as well as characterise AED selection practise [12] (Table (Table1).1). Patients under the age of 18 were barred from participating in the study. 89 of the 109 patients were given phenytoin, while 20 were given levetiracetam. In total, two patients, one from each group, had posttraumatic seizures. Kruer et al. concluded that following the approval of intravenous levetiracetam, there was a trend favouring levetiracetam for seizure prevention

2. Radic et al. conducted a retrospective cohort study to compare the efficacy and risk of using levetiracetam versus phenytoin for seizure prophylaxis following an acute or subacute subdural hematoma diagnosis. A total of 124 patients were assigned to the phenytoin group, while 164 were assigned to the levetiracetam group. There was no significant difference in clinical and/or electrographic seizure risk, but the levetiracetam group had a lower risk of adverse events.

3. Besli et al. compared the efficacy and safety profiles of levetiracetam and phenytoin in 277 children aged one month to 18 years to treat convulsive SE and acute repetitive seizures. Patients with acute repetitive seizures, unlike those with SE, regain consciousness between seizures. While there was no difference in the treatment of acute repetitive seizures between levetiracetam and phenytoin, levetiracetam showed significantly more seizure suppression activity in SE than phenytoin. Furthermore, phenytoin caused side effects, most notably hypotension. There were no such side effects reported with levetiracetam [25]. However, because of its retrospective design, this study had limitations.

4. The goal of Chakravarthi et al. was to compare the safety and efficacy of intravenous levetiracetam versus intravenous phenytoin in the treatment of status epilepticus [13]. In this study, 44 patients were randomly assigned to either phenytoin or levetiracetam treatment. The primary endpoint was successful clinical seizure activity termination within 30 minutes of drug administration. The recurrence of seizures within 24 hours was a secondary endpoint. In comparison to levetiracetam, phenytoin-controlled status epilepticus in 15 patients. In terms of outcome measures, this study concluded that levetiracetam is as effective as phenytoin. Levetiracetam is popular because of its ease of administration and lack of continuous monitoring. In the treatment of status epilepticus, levetiracetam is an appealing alternative to phenytoin.

5. Khan et al. conducted a separate randomised controlled trial to compare the efficacy of phenytoin and levetiracetam in the prevention of early posttraumatic seizures in moderate-to-severe TBI [14]. The 154 patients in this study were divided into two equal groups. In 73 patients, phenytoin was effective in preventing posttraumatic seizures, while levetiracetam effectively controlled seizures in 70 cases. The researchers concluded that there is no statistically significant difference between phenytoin and

levetiracetam in the prevention of early posttraumatic seizures in patients with moderate-to-severe TBI.

6. Noureen et al. compared the clinical efficacy and safety of intravenous levetiracetam versus intravenous phenytoin as second-line drugs in the treatment of paediatric status epilepticus [17]. In this open-label, randomised controlled trial, 300 children with status epilepticus received levetiracetam, while another 300 received phenytoin. Levetiracetam was effective in 278/300 cases, while phenytoin was effective in 259/300 cases. In addition, eight children in the phenytoin group experienced adverse events. The study concluded that levetiracetam is far more effective than phenytoin in treating paediatric status epilepticus.

7. Besli et al. conducted a study to compare the efficacy and safety profile of levetiracetam and phenytoin as second-line treatment agents in children with convulsive status epilepticus and acute repetitive seizures. Levetiracetam was given to 141 of the 227 patients, while phenytoin was given to 86. In children with convulsive status epilepticus, levetiracetam was effective in 77.6% of cases, while phenytoin was effective in 57.7% of cases. However, there was no statistically significant difference between levetiracetam and phenytoin efficacy rates for acute repetitive seizures (55.8% vs. 58.8%, respectively). The study concluded that levetiracetam appears to be as effective as phenytoin in treating children with acute repetitive seizures, but it is more effective in treating children with convulsive status epilepticus. Levetiracetam is an effective treatment for seizures in children.

Research Methodology

The methodology is the most important aspect of research because it serves as the framework for carrying out a study. It denotes the general pattern for organising the procedure using valid and trustworthy data or an investigation. It is a comparative study based on a survey. In this study, Patients were divided into 2 groups. One group will take Levetiracetam as anti-epileptic treatment and in another group Phenytoin will be given as primary treatment for Epilepsy

Data collection:

After potential participants meet the Inclusion Criteria, an internet-based questionnaire is created using Google Forms and distributed via social networking platforms such as WhatsApp, Instagram, and Facebook. The participants will be made aware of the benefits and drawbacks of participating in this study, and they will be asked to submit their responses after voluntarily agreeing to participate in the study.

Statistical analysis:

The most significant step of the research process is data analysis and interpretation, which comprises the computation of specific measurements as well as the search for patterns of association that exist among data groupings. Data analysis and interpretation involve data compilation, editing, coding, classification, and presentation. Analysis is the process of breaking down a complex topic into smaller sections in order to acquire a better understanding of the data collected. It is also defined as a process of applying statistical and logical approaches to describe, summarize, and compare data in a systematic manner.

Analysis of quantitative data deals with information collected during research study, which can be quantified and statistical calculation, can be computed.

1. In present study, the investigator planned to analyse the data on the basis of the objectives of the study.
2. Significant (P value: $p > 0.05$)

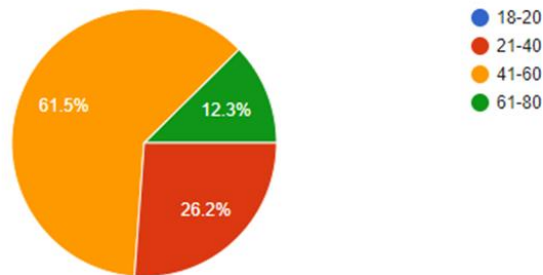3. Non-Significant (P value: p<0.05)

Age Frequency Percentage

Age	Frequency	Percentage
18-20	0	0
21-40	34	26.2
41-60	80	61.5
61-80	16	12.3
Total	130	100

Tab.1: Age of Participants: Out of 130 Participants,26.2% (n=34) belonged to age group of

21-40 years, followed by n=80 (61.5%) belonged to 41-60 age group followed by n= 16 (12.3%) falling in the age group of 61-80 years of age.

Your Age

130 responses

Gender	Frequency	Percentage
Male	75	57.7
Female	55	42.3
Total	130	100

Table 2: Gender of Participants: Out of 130 Participants, 57.7% (n=75) are males followed by n= 55 (42.3%) are females.

Gender

130 responses
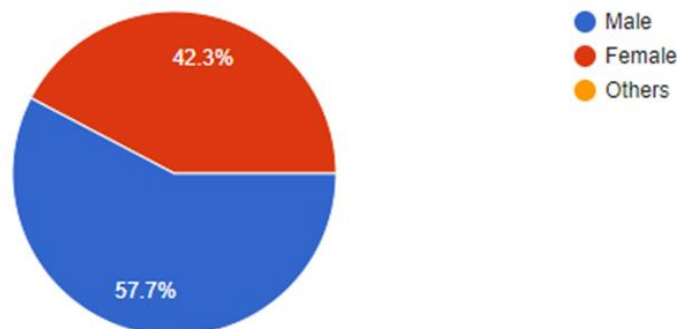
Education Level	Frequency	Percentage
Illetrate	9	6.9
Educated	31	23.8
Matriculation	0	0
Graduate	58	44.6
Post-graduate	32	24.6
Total	130	100

Results: -

Data Analysis and Interpretation of data is the most important phase of research process, which involves the computation of certain measure along with searching for patterns of relationship that existing among the data group, Data collection is followed by analysis andinterpretation of data in accordance with study objectives.

Discussion:

This study contains a total of 130 participants out of which 65 participants had taken Leve racetam in which mostly population around 55.38% are from age group of 41-60 years followed by 33.83% population are from 21-40 years and 8.75% population are from 61-80 years age group. Remaining 65 participants had taken Phenytoin in which mostly population around 55% are from age group of 41-60 years followed by 18.46% population are from 21-40 years and 13.84% population are from 61-80 years age group.

This data contains (p-value=0.135) that significant.

This study contains a total of 130 participants out of which 65 participants had taken Leve racetam in which mostly population around 63.07% are male and remaining 36.92% are females. Remaining 65 participants had taken phenytoin in which mostly population around 52.30% are males while remaining 47.69% are females.

This data contains (p-value=0.21) that is significant.

This study contains a total of 130 participants out of which 65 participants had taken Leveracetam in which mostly population around 66.15% are from Urban arears and remaining 33.84% belongs to Rural arears. Remaining 65 participants had taken Phenytoin in which mostly population around 80% belongs to Urban areas while remaining 20% belongs to Rural areas.

This data contains (p-value=0.075) that is significant.

This study contains a total of 130 participants out of which 65 participants had taken Leveracetam in which mostly population around 38.46% are graduated followed by 29.23% are Intermediates followed by 27.69% are post-graduates and remain 4.61% are illeterate. Remaining 65 participants had taken Phenytoin in which mostly population around 50.76% are graduates followed by 21.53 % are post-graduates followed by 18.46% are Intermediates and remain 9.23% are illiterate.

This data contains (p-value=0.24) that is significant.

This study contains a total of 130 participants out of which 65 participants had taken Leve racetam in which about 81.53% population do smoke while remaining 18.46% population does not smoke. Other 65 participants had taken Phenytoin in which mostly population around 55.38% population don't do

smoking while remaining 44.61% do smoking.

This data contains (p-value=0.001) that is non-significant.

This study contains a total of 130 participants out of which 65 participants had taken Leve racetam in which about 23.07% population consume alcohol while remaining 76.92% population do not consume alcohol. Other 65 participants had taken Phenytoin in which mostly population around 55.38% population don't consume alcohol while remaining 44.61% consume alcohol.

This data contains (p-value=0.009) that is non-significant.

This study contain a total of 130 participants out of which 65 participants had taken Levetiracetam in which mostly population about 75.38% do physical activities while remaining 24.61% population do not do any kind of physical activities. Other 65 participants had taken Phenytoin in which mostly population around 55.38% population don't do any physical activity while remaining 44.61% do physical activity.

This data contain (p-value=0.0003) that is non-significant.

This study contain a total of 130 participants out of which 65 participants had taken Levetiracetam in which 38.46% had their stroke for the first time while 61.53% population had their stroke again. Other 65 participants had taken Phenytoin in which mostly population around 69.23% had their stroke for the first time while remaining 30.76% had their stroke again.

This data contain (p-value=0.0004) that is non-significant.

This study contain a total of 130 participants out of which 65 participants had taken Levetiracetam in which 13.84% population had family history of stroke while 86.15% population do not have family history of stroke. Other 65 participants had taken Phenytoin in which 13.84% population had family history of stroke while 86.15% population do not have family history of stroke .

This data contain (p-value=1.0) that is significant.

sThis study contains a total of 130 participants out of which 65 participants had taken Levetiracetam in which 7.69% population had medical history of Hypertension and Diabetes both followed by 15.38% had a history of Hypertension followed by 13.84% had history of diabetes followed by 1.53% had history of Diabetes and CAD both followed by 1.53% had other medical history which they are not comfortable in telling while about 60% population had no medical history. Other 65 participants have taken d Phenytoin in which 32.30% population had medical history of Hypertension and Diabetes both followed by 13.84% had a history of Hypertension followed by 9.23% had history of diabetes and remaining population about 44.61% had no medical history.

This data contains (p-value=0.007) that is non-significant.

This study contain a total of 130 participants out of which 65 participants had taken Levetiracetam in which 12.30% population are on Anti-Diabetic medications followed by 7.69% population are on Anti-Diabetic ,Anti-Hypertensive medications followed by 1.53% are on Anti-Diabetic, Anti-Hypertensive & Anti-Platelets medications followed by 9.23% population are on Anti-Hypertensive medication followed by 4.61% population are on Anti-Platelet therapy followed by 7.69% population are on any other kind of medication which they are not comfortable in telling while other 56.92% are not on any kind of medications. Other 65 participants had taken Phenytoin in which 6.15% population are on Anti-Diabetic medications followed by 30.76% population are on Anti- Diabetic, Anti-Hypertensive medications followed by 4.61% are on Anti-Diabetic, Anti-Hypertensive & Anti-Platelets medications followed by 10.76% population are on Anti-Hypertensive medication followed by 3.07% population are on Anti-Platelet therapy followed by 4.61% population are on any other kind

of medication which they are not comfortable in telling while other 40% are not on any kind of medications.

This data contains (p-value=0.076) that is significant.

This study contain a total of 130 participants out of which 65 participants had taken Levetiracetam in which mostly population about 84.61% does not face any kind of Seizures followed by 4.61% population had seizures after their treatment while 10.76% population was not sure whether they had seizure or not. Other 65 participants had taken Phenytoin in which mostly population about 52.30% had Seizures followed by 41.53% population does not had any kind of seizures after their treatment while 6.15% population was not sure whether they had seizure or not.

This data contain (p-value=0.926) that is significant.

This study contain a total of 130 participants out of which 65 participants had taken Levetiracetam in which 18.46% population facing headache after treatment followed by 6.15% population had headache & Loss of Consciousness followed by 1.53% population had headache , Loss of Consciousness & Weakness in Arm/Leg followed by 4.61% population had headache and weakness in Arm/Leg followed by 4.61% population had loss of Consciousness followed by 1.53% population had Loss of Consciousness & Weakness in Arm/Leg followed by 18.46% faced Weakness in Arm/Leg and other 44.61% population does not face any kind of side effects. Other 65 participants had taken Phenytoin in which 33.84% population facing headache after treatment followed by 4.61% population had headache, Loss of Consciousness & Weakness in Arm/Leg followed by 3.07% population had headache and weakness in Arm/Leg followed by 4.61% population had loss of Consciousness followed by 53.84% population does not face any kind of side effects

This data contains (p-value=0.106) that is significant.

This study contains a total of 130 participants out of which 65 participants had taken Levetiracetam in which mostly population about 95.38% does not had any kind of other side effects while 4.61% population face other side effects like Dizziness, Vomitting. Other 65 participants had taken Phenytoin in which mostly population about 96.92% does not had any kind of other side effects while 3.07% population face other side effects like Dizziness, Vomiting.

This data contain (p-value=0.648) that is significant.

This study contain a total of 130 participants out of which 65 participants had taken Levetiracetam in which mostly population about 92.30% find their treatment usefull followed by 3.07% population don't find their treatment usefull while 4,61% population are those which are not sure whether their treatment is usefull or not. .Other 65 participants had taken Phenytoin in which mostly population about 52.30% find their treatment not usefull followed by 38.46% population find their treatment usefull while 9.23% population are those which are not sure whether their treatment is usefull or not. This data contain (p-value=0.916) that is significant.

Conclusion:

The conclusion was drawn on the basis of the present study.The following conclusion were drawn on the basis of finding of the study.The following conclusion were drown on the basis of the finding of the study.The association between the level of score and socio demographic variables on the basis of frequency and percentage. There is significance association between the level of scores and other demographic variables (Age,Gender,Education Level,Type of Residence) the calculated Chi-Squares values are greater than table values at 0.05 level of significance.The Chi-squares values shows that

there are no significance association between the level of scores and variable (Smoking factor, Drinking factor, Physical Activity, First ever stroke, Medical History), the calculated chi square values were less than the tables value at 0.05 level of significance. The Chi-squares values shows that there are significant association between the level of scores and variable (Family History of stroke, Previous/Ongoing medications, Seizure like events), the calculated chi square values are greater than the tables value at 0.05 level of significance . The Chi-squares values shows that there are significant association between the level of scores and variable (Any Other Side Effects , Do you fund treatment usefull), the calculated chi square values are greater than the tables value at 0.05 level of significance.

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