ISSN: 2755-0184

Journal of Diabetes Research Reviews & Reports

SCIENTIFIC Research and Community

Research Article

Open Access

Comparative Study of the Different Therapeutic Strategies of Stroke Patients in the Spanish Health System: About a Bibliographic Narrative Review

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ABSTRACT

Stroke is a focal or general neurological pathology of sudden onset. This condition is usually of vascular origin. It is considered a medical emergency, which requires rapid action and its evolution and cure is time-dependent, which requires immediate decisions based on evidence. The most widely used treatment is reperfusion by fibrinolysis. Objective: to compare the therapeutic strategies in the management of the stroke care plans of the different autonomies of the Spanish territory.

Methodology: This work is a bibliographic review. The search for the necessary information was carried out in the months of December 2022 and January 2023. The databases used were: Pubmed, Academic Google, Scielo, Scopus and Cochrane library.

Results: 14 articles were chosen after a review of 205 articles from databases and after applying the inclusion and exclusion criteria.

Conclusions: Despite the fact that the evidence supports the use of tenecteplase, only two Autonomous Communities include tenecteplase as a reperfusion treatment in their stroke care plans. Fibrinolytic treatment is possible up to 4.5 hours from the onset of symptoms and up to 6 hours, evaluating the patient individually. There is no evidence of age limitation. Both drugs, Alteplase and Tenecteplase, have similar characteristics, which is why studies with a larger sample scope are necessary. Nursing is a fundamental part of both clinical decision-making and early symptom recognition, and nursing care is included in all stroke care plans.

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Received: August 05, 2022; **Accepted:** August 18, 2022; **Published:** August 25, 2023

Keywords: Stroke, Emergencies, Alteplase, Fibrinolytic, Tenecteplase, Nursing Care, Thrombolysis, Cerebrovascular Accident, Emergencies, alteplase, fibrinolytic, Tenecteplase, Nursing care, Thrombolysis.

Abbreviations

AIS	Transient Ischemic Attack
ALT	Alteplase
CCAA	Autonomous Communities
CT	Computerized Axial Tomography
CVD	Cerebrovascular Diseases
IC	Stroke Code
ICP	Intracranial pressure
MRI	Magnetic Resonance
rtPA	Recombinant Tissue Plasminogen Activator
TNK	Tenecteplase

Introduction

Cerebrovascular diseases (CVD) are currently the third leading cause of death in developed countries [1]. In Spain, CVDs are the leading cause of death in women and the third in men. CVDs are also one of the most important causes of disability in adults, significantly reducing the quality of life of people who suffer from them [2].

In recent years, due to improvements and speed of care, mortality and disability have decreased. However, the incidence is increasing, promoted mainly by changes in lifestyles, which favor the appearance of numerous risk factors. Therefore, it is necessary to deepen the study of the pathology to improve, based on scientific evidence, the care applied to these patients. This care is fundamental in the emergency service since it is a time-dependent pathology. Health professionals have to carry out good health education for citizens, since it is of vital importance to prevent events of this type [2-4].

Definition of Neurological Involvement

Cerebrovascular diseases are pathologies secondary to a problem of vascular origin, whether transitory or definitive, the most acute manifestation being stroke or CVD [2-4]. The World Health Organization defines stroke as a general or focal neurological state, of sudden onset, lasting more than 24 hours or causing

death, and of presumed vascular origin [2]. It is considered a medical emergency, which requires rapid action and its evolution and healing is time dependent. These forces immediate decisions based on evidence [3].

Pathophysiology

Depending on the cause that produces it, the stroke can be of the ischemic type or of the hemorrhagic type. In the case of ischemic stroke, it is caused by an interruption of blood circulation in an area of the brain parenchyma. Symptoms appear immediately due to sudden suppression of glucose to brain cells and disruption of brain homeostasis. This alteration can be of qualitative origin, such as those produced by anemia, thrombocytopenia or polycythemia, or of quantitative origin, with causes such as thrombosis, embolism or low cardiac output. Ischemic stroke is the most common, causing up to 85% of cases. Depending on the area affected, they can be focal when they affect only one area of the brain. Depending on the duration of the symptoms, it can occur as (TIA), cerebral or global infarction. In the case of TIA, the symptoms disappear in less than 1 hour and no lesion is evident on imaging tests. Cerebral infarction has a duration of symptoms of more than 24 hours that cause tissue necrosis. In global stroke it affects all brain tissue. Hemorrhagic stroke presents with extravasation of blood from the circulatory system due to rupture of a blood vessel. These represent 15% of cases. Depending on their location, they can be intracerebral or subarachnoid. The Intracerebral presents blood in parenchyma or cerebral ventricles. The most common cause is hypertension. The Subarachnoid has free blood in the subarachnoid space. The most likely cause is a ruptured aneurysm. This type of event generates symptoms due to compression of the brain mass, due to the expansion of the blood and the increase in intracranial pressure. [3-6]

Diagnosis

Due to the importance of rapid care in stroke, early diagnosis is necessary. The symptoms that indicate the appearance of a stroke are very varied, but the National Institute of Neurological Disorders establishes the following: sensation of sudden loss of strength in the arm, leg or facial region on one side of the body: it is due to loss of motor power. This loss of strength can be in one limb (monoparesis) or in both limbs on the same side of the body (hemiparesis). As ocular symptomatology: double vision or total or partial loss of it in one or both eyes. Very intense headache without cause. Also the sensation of loss of balance, sudden fall or instability accompanied by any of the symptoms described above, this is known as asergia [7].

The Spanish Society of Neurology also includes paresthesia as a clinical symptom, with a sensation of tingling or numbness in the arm, leg or facial region of half of the body. Loss of thermal sensitivity also often appears. Another institution, the National Stroke Foundation of Australia, also considers sudden-onset speech disturbances: dysarthria or aphasia. As well as changes in swallowing or drooling, caused by sudden dysphagia [6-7].

The diagnosis of stroke must also be established taking into account the patient's clinical history, neurological examination and confirmation by radiological tests [3,7-8]. It is of vital importance for the treatment, the time of onset of the symptoms, since it will determine the type of actions to be carried out.

The use of a standardized assessment scale for the diagnosis and treatment of stroke is very helpful. An example is that of the National Institute of Health Stroke Scale, which quantifies the deterioration caused and guides in choosing the appropriate treatment. In Spain, one of the most used is the Canadian Scale that assesses functional capacity and evolution in the early stages of the event [7].

Regarding neuroimaging tests, Computerized Axial Tomography (CT), CT-Angio, Magnetic Resonance Imaging (MRI) and, more specifically, Angiography through catheterization are very useful in the diagnosis [3,8].

Treatment

Currently, we have different treatments for stroke that will be applied depending on the patient's situation at the time the symptoms are detected. The most used are reperfusion and neuroprotection treatments [4,6,8].

Due to the limitation of public health systems, it is necessary to organize care systems in a standardized way to enable all patients to access the necessary care that facilitates rapid and quality care, since this type of treatment presents high advantages, but its use is conditioned by a narrow therapeutic window. Long experience has shown the usefulness of the so-called "Stroke Code" (IC), which is based on coordinated care for out-of-hospital emergencies with reference hospital centers that have a Stroke Unit, to minimize action times [9,10].

Arrival at the hospital should be less than 2 hours in order to benefit from reperfusion treatments [10]. Two levels of action are distinguished: out-of-hospital and in-hospital.

Intrahospital Stroke Code

It is a care protocol within a hospital with a multidisciplinary approach for the early recognition of an Acute Ischemic Stroke. It can be activated for 3 reasons, from the arrival at the hospital of an outpatient IC, from the emergency room admission of a patient with symptoms compatible with a stroke, or with symptoms compatible with a stroke in a hospitalized patient. Once it has been diagnosed from either of the two options (in-hospital and out-of-hospital), the most appropriate treatment for the patient is chosen [12].

Treatments are based on reperfusion of brain tissue subjected to ischemia and neuroprotection. Reperfusion treatments, aimed at restoring blood circulation by eliminating the obstruction in the damaged artery, thus enabling the correct perfusion of tissues subjected to ischemia [13]. Intravenous thrombolysis, through the administration of recombinant tissue plasminogen activator (rtPA) a lysis of the thrombus that is obstructing the artery causing the event is produced. Numerous studies show that the correct use of this procedure significantly reduces the risk of death and dependency [14].

It should be administered in a narrow therapeutic window of less than 4.5 hours from the onset of symptoms, as supported by the ECAS III Study [15]. The dose to be used is 0.9 mg/kg of weight, reaching a maximum dose of 90 mg. 10% of the total dose is administered as a slow bolus over 1-2 min and the rest as a continuous infusion over 1 hour [6,10,12-14].

It is very important to carry out serial evaluations of the patient during the administration of the drug: at 15 minutes from the beginning of the administration, at 2 hours and at 24 hours, as well as if worsening symptoms are observed. This assessment can be made using scales such as the Canadian Scale or the National

Institute of Health Stroke Scale mentioned above [13-14].

The greatest complication of this treatment is the potential hemorrhage that can occur in the patient [14].

Mechanical thrombectomy: this is the removal or rupture of the thrombus using a mechanical device. It consists of the introduction of a catheter through the femoral route, mainly, which carries a "stent" that traps or breaks the thrombus [16].

It is the treatment of choice in patients who do not meet the necessary criteria for inclusion in intravenous thrombolysis [14,16].

The main advantages of this treatment are that it does not cause hemorrhagic complications due to rupture of the treated vessel and that the therapeutic window is wider. It is also an advantage that the treatment allows the fibrinolytics to act more quickly by breaking the thrombus into smaller fragments [16].

Neuroprotection Treatments: aimed at preventing the progression of symptoms and their control. They are activities aimed at maintaining the homeostasis of the body. They are based on the control of blood pressure, blood glucose, oxygen saturation or the use of drugs that inhibit biochemical enzymes that cause brain damage, such as statins, oral anticoagulants or acetylsalicylic acid [6,16].

The objective of this study is to compare the different therapeutic strategies in the management of stroke patient care plans in the different autonomous communities (CCAA) of the Spanish territory.

Materials and Methods

The preparation of this work was carried out through a systematic bibliographic review of the articles found by searching the following databases: Medline/Pubmed, WOS, Scielo, Scopus, and Google Scholar. To find the best possible scientific evidence, a series of inclusion and exclusion criteria were applied.

The keywords for this review are: Stroke, Emergencies, Alteplase (ALT), Fibrinolytic, Tenecteplase (TNK), Nursing Care and Thrombolysis. To carry out the bibliographic search, different keywords in English were used, such as: "Stroke", "Emergencies", "Alteplase", "Fibrinolytic", "Tenecteplase", "Nursing Care" and "Thrombolysis". These have been validated by the DeCS and MeSH. Once selected, the corresponding Boolean operators were used: AND/OR, as well as the necessary parentheses and quotation marks. The final search string is as follows: (stroke) AND (cerebrovascular accident) AND (emergency) AND (fibrinolytic) AND (drugs) AND (alteplase) OR (tenecteplase) AND (thrombolysis) AND (Nursing care) NOT (children) NOT (surgical). The criteria that were taken into account for the selection of the relevant studies were the following. Inclusion criteria: the period between 2010 and 2023; article type: article review and article research; field: medicine; English language; sample in adult population; and studies that provide scientific evidence justified by the level of indexing of articles in journals according to the latest certainties. Exclusion criteria: articles prior to 2010; language: not English; studies in which the population was minors; studies that do not provide scientific evidence justified by the level of indexing of articles in journals according to the latest certainties.

For the methodological evaluation of the individual studies and the detection of possible biases, the evaluation was carried out using the PEDro Evaluation Scale. This scale consists of 11 items, providing one point for each element that is fulfilled. The articles that obtained a score of 9–10 points have an excellent quality, those between 6 and 8 points have a good quality, those that obtained 4–5 points have an intermediate quality, and, finally, those articles that obtained less than 4 points have a poor methodological quality article (Appendix A) [19].

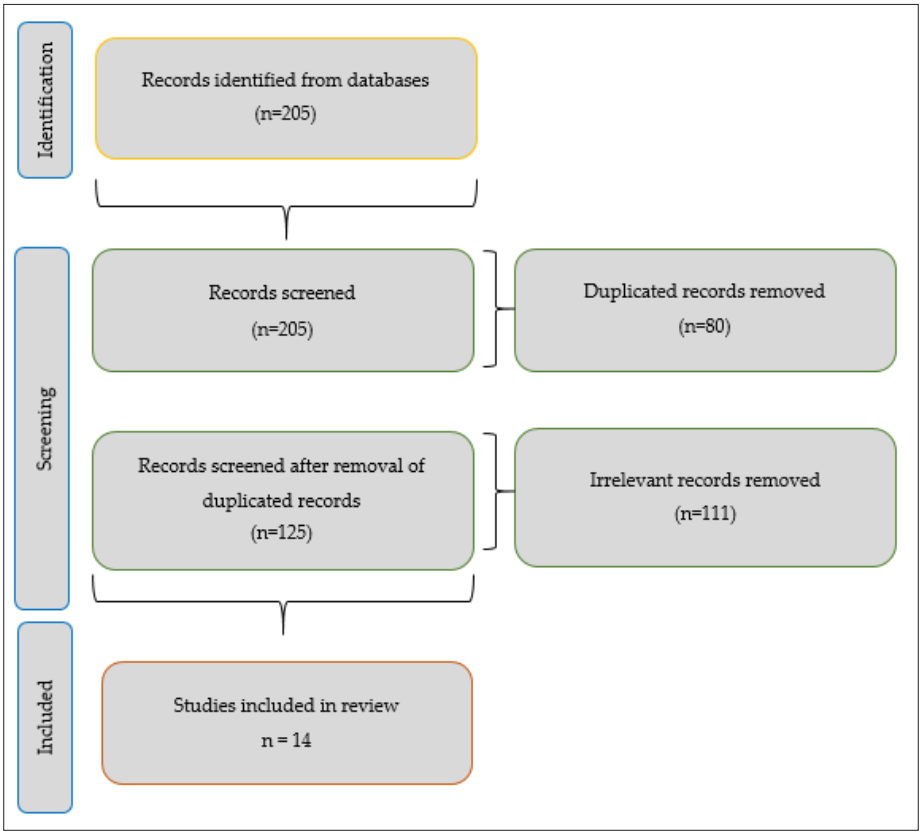
Appendix A: PEDro evaluation scale - Articles Table

ARTICLE CRITERIA	Kennedy R et al	Campbell B et al	Huang X et al	Parsons et al	Logallo N et al
The selection criteria are specified.	YES	YES	YES	YES	YES
Subjects were randomly assigned to groups.	YES	YES	YES	YES	YES
The allocation was hidden.	YES	YES	YES	YES	YES
The groups were similar with respect to the most important indicators.	YES	YES	YES	YES	YES
All subjects were blinded.	YES	YES	YES	YES	YES
All individuals administering therapy were blinded.	YES	NO	NO	NO	NO
All assessors were blinded.	YES	YES	YES	NO	YES
At least one of the key results was obtained in more than 85% of the subjects.	NO	YES	YES	YES	YES
Results for all subjects were presented.	YES	YES	YES	YES	YES
Comparisons of at least one key outcome were obtained.	YES	YES	YES	YES	YES
The study provides point and variability measures for at least one key outcome	YES	NO	YES	YES	YES
Result	10	9	9	9	10

The Scottish Intercollegiate Guidelines Network classification was used in the data analysis and assessment of the levels of evidence, which focused on the quantitative analysis of systematic reviews and the reduction of systematic error. Although it took into account the quality of the methodology, it did not assess the scientific or technological reality of the recommendations [20].

Results

The research question was constructed following the PICO format (Population/patient, Intervention, Comparator, and Outcomes/Outcomes). Detailed as P (Patients): Patients with pneumonia associated with mechanical ventilation, I (Intervention): Preventive measures/microorganisms/nursing knowledge/costs, C (Comparison): Not compared/Not precise/Find the answer/No intervention, O (Outcomes, Results): Decrease in VAP incidence. (Scheme 1).



Scheme 1: Flow diagram

Below is a table that shows the search strategy used to select the 14 articles selected from the 5 databases, following the criteria of identified studies, duplicate studies, title, abstract, full text, and valid studies of a definitive nature (Table 1).

Table 1: Databases consulted

Item Criteria	Medline/Pubmed	Google Scholar	Cochrane library	Scielo	Scopus	Total
Identified	23	122	9	7	44	205
Duplicates	12	11	6	5	12	125
Title	11	10	4	4	11	40
Abstract	11	9	4	4	10	38
Text complete	11	8	3	3	9	34
Valid	2	7	1	1	3	14

Scientific Evidence of the Most Relevant Selected Studies

In the investigation carried out by Kennedy et al, the early administration of rtPA is evaluated to demonstrate if the time in the administration of the drug after 3 hours influences the results. It brings together data from trials such as ECASS III with 821 patients, EPITHET with 100 patients and 6 other trials with a total of 2775 participants. Using statistical regression, they evaluated the relationship between the start of transient ischemic attack (AIS) and the start of treatment and their results through the modified classification scale at 90 days. A group treated with Alteplase of 1850 patients and another with placebo of 1820 patients were studied. The treatment was started in the first 360 minutes from the AIS. They conclude that the greatest benefit is obtained when the drug is administered as soon as possible from the onset of symptoms. The risk outweighs the benefit after 4.5 hours from the onset of symptoms [21]. In the study by Campbell et al, it is verified whether Tenecteplase, which has greater fibrin specificity, longer activity and faster administration since it can be applied as a bolus, can serve as an alternative to Alteplase and if it causes better reperfusion

vascular. The analysis was carried out with 2 randomly assigned groups with a sample of 101 people in each group, with no age limit. One group received Alteplase and the other Tenecteplase within a maximum time of 4.5 hours from the onset of symptoms. The results show that Tenecteplase is not inferior to Alteplase, and even presents a 22% improvement in reperfusion, with a 95% CI. Results improve 90 days after treatment [22]. In the article published by Torres and Pérez, they consider a possible use of Tenecteplase if there is a shortage of Alteplase, so they decide to study the available evidence. Through a narrative review of 30 articles, it is concluded that TNK is as safe and effective as ALT. It does not produce a higher risk of bleeding or higher mortality in the following 90 days, so it can be a good alternative to consider [23].

The study by Huang X et al is a randomized, double-blind clinical trial comparing the efficacy and safety of Tenecteplase in a group of 355 patients with AIS. They were divided into two groups and one was treated with Alteplase versus the other treated with Tenecteplase within a time not exceeding 4.5 hours from the onset of symptoms. The study demonstrates through radiological images that there are no significant differences in terms of safety or post-drug hemorrhage. It also concludes that the reperfusion rate is similar, 68% in both groups, which is why further research is necessary in larger groups and in a longer therapeutic window [24]. The study by Parsons et al included a total of 75 patients divided into 3 groups: treated with alteplase at a dose of 0.9 mg/kg in a 1-hour infusion, treated with tenecteplase at a dose of 0.1 mg/kg in a bolus and treated with tenecteplase at a maximum dose of 0.25 mg/kg in bolus. The treatments were carried out in a therapeutic window of 6 hours, in patients older than 18 years, but without age limit. It is concluded that the group treated with the maximum dose of Tenecteplase has had greater benefits, with a higher reperfusion rate and fewer subsequent complications, as well as greater long-term survival. Given the small size of the sample, more studies with a larger sample are needed [25]. The Logallo et al trial investigates the safety and efficacy of TNK versus ALT. It was carried out in Norway and includes 1100 patients divided into 2 groups: one treated with Alteplase and the other with Tenecteplase, both in a window period of 4.5 hours from the onset of symptoms. It concludes that both drugs have similar characteristics in terms of safety and efficacy, showing no evidence of superiority of TNK, so they believe that further studies are necessary [26].

In a systematic review carried out by Potla N, Ganti L. information is collected from 1675 patients who have been divided into two groups, one treated with Alteplase and the other with Tenecteplase. Its objectives are to measure the rate of post-drug hemorrhage, the functional result in 90 days and the degree of reperfusion of the two groups. It concludes that, both in the rate of hemorrhage and in the degree of reperfusion, tenecteplase presents better results. In the functional result at 90 days there are no significant differences between those treated with one or another drug [27].

In the research by Bivard A, Lin L, Parsonsb M., the main drugs used in the treatment of TIA are listed. Emphasizes urokinase, streptokinase and tissue plasminogen activator. Supports the use of Tenecteplase as a safe treatment for cerebral ischemia. It invites further research with new 3rd generation drugs [28]. A prospective observational study carried out by Psychogios K et al, studies mortality, incidence of hemorrhage, improvement in 24 hours and at discharge in a sample of 58 patients randomly treated with Alteplase and Tenecteplase. They conclude that Tenecteplase obtains better results in all items. They recommend studies with a larger sample number [29].

In the study by Tejada H, Saldaña I, Serrano D, Arac J, Moreno M, the possible implementation of a protocol of measures for faster IC care is studied. It collects a sample of 607 patients to whom the protocol was applied, achieving a significant improvement in door-to-needle times and early fibrinolysis in <60 minutes that benefit the patient. It highlights the role of nursing care in order to carry out the implementation of the measures [30]. The review by Sanjuan E. et al lists a series of general evidence-based recommendations that are currently available to guide professionals who care for patients with acute stroke. Nurses play a crucial role in stroke care and in the administration of fibrinolytic treatments, although the evidence is insufficient for recommendations on this care. Future research with greater scientific rigor should be directed by these professionals [31]. The study by López Fernández J et al., collects data from the Autonomous Communities regarding the availability of beds in the IU, neurologists on duty 24 hours, nurses trained in TIA with a ¼ ratio and number of thrombolysis performed. After analyzing the data, it is concluded that the implementation of the Stroke Units has been carried out unequally, they are insufficient and show geographic inequalities, so the communities are urged to continue with the necessary changes to greater achievement of the objectives set [32].

Through a systematic review, Warach J, Dula N, Milling T, state that the scientific evidence and the AHA/ASA clinical practice guidelines support the use of Tenecteplase in a therapeutic window of 4.5 hours. Superiority over Alteplase has not been confirmed, so further investigation is urged [33]. The study by Oliveira M, Fidalgo M, Fontão L, Antão J, Marques S, Afreixo V, Gregorio T., compares Alteplase versus Tenecteplase with the items: improvement in 3 months using the mRs scale, recanalization rate, early improvement and mortality. The total sample was 2031 patients. They conclude that tenecteplase is an alternative to alteplase for stroke thrombolysis, with lower cost and a more favorable pharmacokinetic profile [34].

Results Action Plans of the Autonomous Communities of Spain
There is great disparity in results regarding the age limits, from 18 years to 80 years, and even the limit action time, from 3 hours to 4.5 hours (Table 2).

Table 2: Age and Time Limits for Fibrinolysis in CCAA Plans

Autonomous Community	Age Limit	Time of Action Limit
ANDALUCÍA	Age equal to or less than 80 years	< 4 hours from symptom onset
BALEARES	Age > 18 years and < 80 years.	< 3 hours from symptom onset
CANARIAS	Individualized.	< 4.5 hours from symptom onset
CANTABRIA	Age > 18 years and < 80 years.	< 3 hours from symptom onset
CASTILLA LA MANCHA	Individualized	< 4.5 hours from symptom onset
CASTILLA LEON	Age > 18 years with no upper limit.	< 3 hours: in >18 years with no upper age limit. < 4.5 hours: in >18 years and <80
CATALUÑA	Individualized	< 4.5 hours from symptom onset
MADRID	Individualized	< 4.5 hours from symptom onset
NAVARRA	Individualized	< 4.5 hours from symptom onset
C. VALENCIANA	Individualized	< 4.5 hours from symptom onset
EXTREMADURA	Age > 18 (in > 80 years it is assessed individually between 3-4.5 hours of evolution).	< 4.5 hours from symptom onset
GALICIA	Age > 18 years with no upper limit.	< 4.5 hours from symptom onset
ASTURIAS	Age > 18 years with no upper limit.	< 4.5 hours from symptom onset
MURCIA	Age > 18 years and < 80 years.	< 3 hours. Assess individually between 3-4.5 hours.
LA RIOJA	Age > 18 years with no upper limit.	< 4.5 hours from symptom onset
ARAGÓN	Age > 18 years with no upper limit.	< 4.5 hours from symptom onset

Regarding the pharmacological recommendations of each CCAA, 100% of the CCAA use alteplase and 12.5% use tenecteplase.

Discussion

AIS remains the leading cause of disability worldwide and significantly reduces the quality of life for patients and their caregivers. Therefore, there is great interest in investigating new treatments that can improve quality of life and long-term survival. Both alteplase and tenecteplase are thrombolytic drugs that achieve their effect by binding to fibrin and converting trapped plasminogen to plasmin, which breaks up the thrombus. Alteplase is the only drug approved by the Food and Drug Administration (FDA) for ischemic stroke. It was licensed for the treatment of acute myocardial infarction in 1987, acute massive pulmonary embolism in 1990, and acute ischemic stroke in 1996 [28-30]. Tenecteplase is a modified alteplase molecule that converts it into a larger molecule with a longer half-life, allowing it to be administered in a single bolus [28]. The main characteristics of Tenecteplase are: it can be administered in less time, which is more comfortable for the patient, easier for the hospital staff and more suitable for the necessary transfers. It is also significantly cheaper [28-29].

Regarding the therapeutic window available to administer fibrinolytic therapy, most of the evidence consulted agrees that the greatest benefits are obtained by administering the drug in the shortest time possible from the onset of symptoms. Establishing itself with a maximum of 4.5 hours, after which the risks would outweigh the benefits of fibrinolytic therapy [21-22,24,26,33]. It is not included in all the care plans of the Autonomous Communities, since some, such as the Balearic Islands, Cantabria or Murcia, set the maximum administration of fibrinolytics at 3 hours [37,47,50]. No CCAA contemplates the administration of fibrinolytic treatment beyond 6 hours from the onset of symptoms, although the window between 4.5-6 hours can be considered individually.

Regarding the age established as the maximum for performing the treatment, most of the evidence reflects benefits without establishing an upper age limit. However, there are still Autonomous Communities that establish a maximum limit of 80 years for the administration of the fibrinolytic drug, for example, Andalusia, the Balearic Islands, Cantabria and Murcia [37,47,48,50].

In relation to the choice of the recommended drug for fibrinolysis, the evidence is discussed between those who defend that TNK has a higher reperfusion rate than ALT [22,25,27-29,34] and those who place both drugs in equal conditions [23,24,26,33].

In terms of safety in administration and long-term results in terms of survival, mortality and quality of life, the evidence supports the use of both drugs equally [22-33].

However, the action plans against stroke of the Autonomous Communities do not reflect this evidence, recommending the use of TNK only 2 Autonomous Communities: Madrid and La Rioja [35,43].

To carry out the necessary treatments in patients suffering from AIS, the evidence shows that nurses have their own body of knowledge that allows them to participate, not only in the administration of the drug of choice for fibrinolysis, but also in making decisions that affect the final results of the treatment. They are of vital importance in the early recognition of symptoms and in the correct application of nursing care that improves the prognosis of the disease and the patient's long-term quality of life [30-32].

This is reflected in the plans of the Autonomous Communities that, in their entirety, include nursing care as essential in the treatment of this pathology [35-50].

Limitations

It should be noted that the Basque Country stroke care plan is not available for public access and has not been included in this review.

Conclusion

When comparing the therapeutic strategies in the management of the stroke care plans of the different autonomous communities of the Spanish territory, despite the scientific evidence, most of the Autonomous Communities only contemplate a single fibrinolytic therapy, Alteplase, and only two autonomous communities, Madrid and La Rioja, include the Tenecteplase drug option in their care plans. There are also different criteria in the duration of the therapeutic window, which the evidence marks at 4.5 hours from the onset of symptoms, with the possibility of individualizing treatments up to 6 hours, but there are Autonomous Communities that set the limit at 3 hours. Despite the fact that the evidence does not consider it, there is still an age limit for administering fibrinolytic treatment, which the majority of the Autonomous Communities set at 80 years, when it is shown that the decision must be individualized and not respond to age criteria. In order to relate the characteristics of the different pharmacological treatments used in each Autonomous Community, the evidence is debated between those who support that Tenecteplase has a higher reperfusion rate than Alteplase and those who position both drugs in equal conditions, for what is done Research with a larger number of participants is necessary to consolidate the results. In terms of safety in administration and long-term results in terms of survival, mortality and quality of life, the evidence supports the use of both drugs equally. In order to demonstrate the therapeutic attitude of nurses in the hospital management of stroke and to analyze the different interventions in the nursing care of a patient after a stroke, the evidence shows that nurses have their own body of knowledge that enables them to participate, not only in the administration of the drug of choice for fibrinolysis but also in making decisions that affect the final results of treatment. They are of vital importance in the early recognition of symptoms and in the correct application of nursing Pcare. This is reflected in the plans of the Autonomous Communities that, in their entirety, include nursing care as essential in the treatment of this pathology.

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