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Stroke Care in Europe, Emergency Medicine Role

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CVD occupy from the first to the third place in mortality rate in European countries, and there is an important variation in adjusted mortality rates in between countries, with other factors like sex and sociodemographic factors, producing important variations. The data reflects a clear East-West gradient in CVD mortality this differences can be due to risk factors or to different models of care in which EMS can play a vital role.

Parallelism in the physiopathology between CVD and ICD has developed a similar approach of care. The Stroke Recovery chain is familiar to EMS members and reflects the Key elements to produce the more favourable outcome.

Special emphasis must be put on the identification phase in which the population knowledge of stroke symptoms is crucial to access to Dispatch centres. The second link of the chain, the prioritisation in dispatch center, using protocols to identify Stroke symptoms as an emergency situation and therefore produce a high level response. The care on scene and rapid transport to adequate center for final diagnosis and treatment are the final elements of this chain

The representation of the process of care as a chain reflects the importance of every element and the EMS and ED forms part of Stroke integral care.

Key Learning Points

- Important differences in outcome may reflect deficiencies in care and identify areas that need improvement.
- The role of Emergency Medicine in the prehospital and in the ED is clearly define in guidelines and consensus documents.
- Stroke patients are at risk situation and emergency management is need.
- EMS must be integrated as a vital part of stroke care.
- More high quality research is need to clarify the best model of care

Stroke Care in Europe

Setting

Europe is multiracial multicultural continent, with more than 800.000.000 habitants, 43 countries speaking 45 languages, with and aging population (15% >65 years). This diversity is also present when we look at de adjusted mortality rate for CVD, figures go from the lowest in Switzerland with 64 per 100.00 habitants in males to 273,4 per 100.000 habitants in Russia for females. This difference has a geographical consistency sowing an East West and North South gradient that persists in both sexes.

Stroke is also the first cause of disability and health cost, 5% of the total health cost in England and 6% in Finland.

Incidence of stroke follows a similar country pattern with 147 new cases per 100.000 habitants for males in London to 81 for females in Dijon France.

Stroke Care Process

Several European groups and scientific societies have defined recommendations and guidelines for Stroke Care son of then are listed below:

- Pan European Consensus Meeting on Stroke Management, (1995);
- European Federation of Neurological Societies Task Force, (1997);
- European Ad Hoc Consensus Group, (1996);
- WHO Task Force on Stroke and other Cerebrovascular Disorders, (1989).
- European Stroke Initiative (EUSI) including: European Federation of Neurological Societies (EFNS),

European Neurological Society (ENS) and European Stroke Council (ESC). (2000)

In relation to prehospital phase and ED all of them empathize the following points:

1. Education of the population in Stroke signs and symptoms, recommend de use of EMS.

2. Need to identify strokes as emergency situations. Using protocols to identify Stroke symptoms and produce a high level response in the dispatch center.

3. Transport to the hospital must be quick enough to allow thrombolisys (3 hour window) in those with indications.

4. Emergency stabilization and care is necessary.

5. Transport must be done to a hospital with Stroke Unit, with neuroimaging capability and well organized team.

6. In the ED rapid evaluation of vital signs and neurologic exam avoiding any delay

The implementation of these recommendations has wide variations across Europe.

Stroke Care outcomes

Hospital based registries demonstrate important differences in survival at 3 month in between countries and also in between institutions of the same country. While France has a 3 month mortally of 17%, Portugal has 31%. But also in the some country like in UK mortality ranks from 29-38%. Case mix and level of resources used do not explain this differences, although is not clear what elements of care must be included. Measuring functional situation using the Barthel index similar differences are found.

Not all patients with Stroke are admitted to hospital and this difference in practices also reflects the East-West gradient; in WE (West Europe) non admitted stroke patients are close to 20% while in EE (East Europe) ranks 25-60%.
CT use has a wide variation, while most WE ranks 50-95% of the patients have a CT in EE only 5-50% have the study. The subtype of CVA also have different distribution in WE Haemorrhagic strokes are close to18% while EE 15-35%, this differences can explain part of the outcome results;30 days mortally in WE is 12-20% while EE ranks 25-35%.

Access to the hospital is an important element, a quick transport increase the possibilities of thrombolysis producing more eligible patients. Information from the publications show than there is a wide rank from 5-40% of patients arrives in the first 3 hours after the onset of symptoms, and the same figure comes from local cases from Spain.

Role of Emergency Medicine

Stroke patients are on a risk situation that demands emergency medical interventions, in multicenter European stroke study was found that 20% of the cases have dismissed level of consciousness, and in more than 50% Systolic blood pressure was over 160 mmHg. These two situation requires medical intervention as soon as they are identify and any delay affects outcome.

Not to much information is publish about results of prehospital care in stroke patients. In a multicenter study in witch two EMS models where compare (Birmingham-Paramedic versus Bonn-Doctor) and specifically for CVA, using Mainz Score as a clinical indicator. Those patients treated in Bonn System have a higher and significant improvement compare to Birmingham, this results is explain because more interventions (airway management, drugs, fluids) where use in this system, no long term influence of this modification was analysed. Looking to this information with all the possible bias is clear that EMS can produce modifications on the clinical situation of ACVA patients that can influence final outcome.

EMS organization plays a vital role in the concept of integral care of any condition. In Austria the integration of EMS and the wide net of Stroke Units produce state of the art results on CVA. Stroke patients arrive to hospital more than 50% in less than 3 hours, using ground or air transport. 30% by ambulance with doctor providing treatment, and 80% have CT in the 30 first minutes after hospital arrival. This coordinated model demonstrated the benefices of a close integration of EMS with the next levels of care.

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5. Werner Hacke, Heidelberg GermanyMarkku Kaste, Helsinki Finland, Tom Skyhoj Olsen, Copenhagn Denmark, Jean-Marc Orgogozo Bordeaux France, Julien Bogousslavsky Lausanne Switzerland.European Stroke Initiative (EUSI). Recommendations for Stroke Management. Organisation of Stroke Care: Education, Referral, Emergency services and Stroke Units. 2003.http://www.eusi-stroke.com/l2_pres_intro.shtml

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Annotated Bibliography

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WHO Collaborating Centre for Surveillance of Cardiovascular Diseases Epidemiological Profiles of Cardiovascular and Cerebrovascular Diseases in the World

2. Charles D.A. Variations in Stroke Incidence and Survival in 3 Areas of Europe. Stroke; 31:2074-2079.
Using a population based registry differences were found in the incidence between Erlagen(Germany), London, and Dijon(France). Using Dijon as the base line Incidence rate was Dijon 1, London 1, 21, and Erlagem 1, 37.

3. Isabella Aboderin, Graham Venables. For de Pan European Consensus Meeting on Stroke management. Stroke Management in Europe. Journal of Internal Medicine 1996; 240:173-180.
Recommendations after a consensus conference produce five groups of recommendations. In the first related to Organization of stroke services recognized that improvement in the organization of the process of stroke care can improve outcomes. Specifies that Stroke is a medical emergency, but no explicitly link to emergency care was done.

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A explendid review of the key elements of the prehospital care: Identification, Dispatch triage, Emergency response, Treatment an Transport to adequate center with Stroke Unit (CT and Team) and Final diagnosis and treatment.

6. Mark J. Alberts, Brain Attack Coalition. Recommendations for the Establishment of Primary Stroke Centers. JAMA 2000; 283,3102-3109.
The treat of patients in Stroke Unit improves outcomes. It is recognize the vital role of Emergency Medical Services providing timely response, mainly with the previous experience of trauma an cardiac patients.
Recognizes the ED as a key component of the stroke team and point the recommendations to be integrated in the team. Ed plays a vital role selecting patients.

7. Chales DA. Wolfe, BIOMED Study of Stroke Care Group Stroke 1999; 30:350-356.
Using a hospital based stroke care register they identify important differences between centers comparing West countries and central Europe. While in France and Germany dead at 3 mo are17% and 18% in Hungary Portugal 22% and in Portugal 31%. Also found differences in the same country UK from 29-56%.

8. M. Brainin. N Borstein, G Boysen and V Demarin Acute neurological stroke care in Europe: Results of the European Stroke Care Inventory Eu J Neurol 2000;7:5-10
Stroke care data from 22 countries representing 500.000.000 habitants. The epidemiological data confirms the previous East-West gradient for incidence, mortality rate, while and opposite gradient exist for stroke hospitalisation or CT use. Most of the Western countries have a fatality rate under 20% while Easter mostly are over 20%. Some of this differences can be due to the severity with more haemorrhagic cases. On the other hand resources like Stroke Units are more common in the Eastern countries.

9. R. Beech PhD; M. Ratcliffe, MSc; K Tilling, MSc; C Wolfe MD; Hospital Services for Stroke Care. A European Perspective
This article identifies inequalities in the process of stroke care in within and across countries. The non hospitalised Stroke patients rank from 0 to 16% in countries included. Access to emergency CT 30-98%.
More research is needed to identify which patterns of care are the most effective.

10. NU. Weir MBChB; P.A.G Sandercock DM; S.C. Lewis PhD; D.F. Signorini PhD; C.P. Warlow MD, on behalf of the IST Collaborative Group. Variations Between Countries in Outcome After Stroke in International Stroke Trial (IST) Stroke 2001;32:1370-77
This international outcome comparation study give us Information from this study allows us to know the clinical condition of stroke patients and the need of emergency medical care. More then 50% of the cases have SBP>160 mmHg, and more than 20% have depress level of consciousness.

11. Steiner MM, Brainin M, The participants in the Austrian Stroke Registry for Acute Stroke Units.The quality of acute Stroke units on a nation-wide level: the Austrian Stroke Registry for acute Stroke Units. Eur J Neurol. 2003;4:353-60
The article describes the experience of Austrian Network of Stroke Units from 1998-2000. Results related to emergency show a 57% of cases before 3 hours arrive to hospital. 27% transported with doctor in ambulance. CT was done in 54% in the first 30 minutes after arrival. With 3 months mortally of 12.9%.

Questions

1) **What is the difference in mortality for CVD from the Easter to the Western countries in Europe?**
   a. No difference
   b. More mortality in EE
   c. More Mortality in WE
   d. The mortality is relate to sex

2) **What is the difference in subtypes of CVA between WE and EE?**
   a. More haemorrhagic in EE
   b. More SAH in EE
   c. More haemorrhagic in WE
   d. More isquemic in EE

3) **Identify the reasons of excess of mortality due to CVD in EU.**
   a. More risk factors
   b. Less resources
   c. More severity
   d. All of then

4) **Delays in access to hospital reduces de possibility of thrombolysis, the EMS systems have the following recommendations except one.**
   a. To identify call with Stroke symptoms
   b. To transport to the nearest hospital
   c. To do a quick transport
   d. To alert the Stroke Team

5) **How much 3 months mortality can be reduce?**
   a. To 13%
   b. To 15%
   c. To 18%
   d. To 20%

Answers

1. **Answer b.**
   EE have higher incidence and mortality ratios or 3 months mortality.

2. **Answer a.**
   EE have a higher incidence of Haemorrhagic strokes and this produces a more severity group, explain part of the excess of mortality.

3. **Answer d.**
   All elements can take part in the excess in mortality.

4. **Answer b.**
   The recommendation is quick transport to the hospital with Stroke Unit, not to the nearest one.

5. **Answer a.**
   From publications we know that good integration of the prehospital with a net of stroke units can produce 3 months mortality as low as 13%.