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Annals of Vascular Medicine & Research

Research Article

Stroke Epidemiology, Survival and Disability in A Mediterranean Population According Malmgren's Criteria. Ebrictus Cohort

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Submitted: 03 August 2014

Accepted: 14 September 2014

Published: 15 September 2014

Keywords
- Stroke
- Epidemiology
- Incidence
- Survival
- Disability

Abstract

Introduction: The epidemology and results on survival and disability are described from the begining of the Ictus code in a mediterranean population according to the modified Malgrem criteria. We want identify the main priorities in the quality policies about the Stroke Code.

Materials and methods: Ebrictus Project is a study based on a cohort population from incident cases on the first stroke episode (included those patients with transient ischemic attack (TIA), recurrent strokes, and those treated with thrombolysis) from 01/04/2006 to 31/12/2013 participated by Primary care and neurological service referent.

Results: The standardized population incidence is 11.7/10^4(CI95% 10.3-13.2) in women and 11.5/10^4 /year (CI95% 9.8-13.1) in men .The epidemiology is similar between men and women until they are 75-84 years old in which the incident cases per year increase as it is duplicated (15,67 vs 28,65) between women. In the 32.5% from the Ictus episodes, the Ictus code is activated (CI95% 24.3-43.4). According to the non-treated ischemic strokes and the ones that are from hemorrhage in the group treated with thrombolysis (8.6%) was the one that presented mayor clinical severity but better results in mortality RRR 39.8% RRA 18%, and NNT 5, and in functional RRR de 46.3% RRA de 9.4% y NNT 10 to a moderate dependency (Barthel <60). The risk of mortality among men is IR=3.2 (CI95% 1.2-8.0) in difference to women. After the stroke episode it is reduced in the half the number of individuals with initial dependency, with a meaningful loss (p 0.023) superior in women rather than men in the Barthel index (83.18 vs 75.8). Not giving secondary cardiovascular prevention after the ictus, it increases 7 times the risk of mortality.

Conclusions: The standardized incidence on the Ictus is inferior to similar studies. The treatment with thrombolysis reduces the mortality and disability after an stroke episode, especially among women and with the secondary cardiovascular prevention it reduces 7 times the risk of mortality.

ABBREVIATIONS

ABVD: Basic activities daily life; **ADL**: Activities daily living; **AF:** Atrial fibrillation; **CHA_2DS_2-VAS_c** score: Congestive heart failure (or Left ventricular systolic dysfunction); Hypertension (blood pressure consistently above 140/90 mmHg (or treated hypertension on medication); Age ≥75 years, Diabetes Mellitus; Prior Stroke or TIA or thromboembolism; Vascular disease (e.g. peripheral artery disease, myocardial infarction, aortic plaque); Age 65–74 years; Sex category (i.e. female sex). **FRCV:** Cardiovascular risk factors, **ICD**: International Classification of Diseases; **ICS**: Catalan Institute of Health. **IR:** Standardized Incidence Ratio; **MRI:** Magnetic Resonance Image, **NIHSS:** *National Institutes of Health Stroke Scale,* **NNT:** *Number Needed to Treat;* **P50**: percentile-50, **RR:** Relative Risk; **RRR:**

Relative risk reduction; **RRA:** *Absolute* Risk *Reduction;* **TAC** *Axial computerized tomography*

INTRODUCTION

In Spain the available epidemiological data about the cerebrovascular illness is controversial. Moreover, the same happens in Iberoamerican countries. This makes difficult the comparison between other countries from Europe and America. The majority part of the information we have about analytical epidemiology on the cerebrovascular brain illness in Spain has been obtained from hospital series.

There is still no standard method of assessment in the completeness of stroke case ascertainment. The great challenge that this epidemiological investigation has is the methodology. The information is useless if it is no comparison from one study with the others. In 1987, Malmgren et al [1] published a list of 12 core criteria for "ideal" stroke incidence studies that were related to definitions, methods, and mode of data presentation, by which the quality of population-based studies of stroke could be judged. These criteria have been updated by Bonita [2], Sudlow and Warlow [3], Guiu [4], and Feigin [5,6] for "ideal" population-based stroke incidence study (Table 1).

On the other hand, nowadays different facts have changed radically the assistance scenery on stroke. The Helsinborg [7] declaration established the recommendation for Europe that every patient with stroke should have an easy access to the efficient treatments during the intense period, so that inspired the political and coordinated performances declaration lead to improve the attention. The result of the need to guarantee the attention to the patients, independently from the place they were, meant the Brain illness director Plan and the set of the Stroke Code in all the territory which extrahospitality appliance allows a quick patient identification, notification and movement to the urgent medical services, allowing the first performances and standard procedures such as the direct assessment by a professional stroke team, the preferential neuroimage practice and the thrombolysis treatment, if it was indicated.

The main aim of this study is to describe the epidemiologic part from Stroke in a Mediterranean population according to the modified Malmgrem criteria [9], and the results on survival and disability from the beginning of the stroke code in the territory.

MATERIALS AND METHODS

Ebrictus [10,11] project is a study from a cohort history on a population formed by the incident cases on its first episode of severe stroke in the territory (Figure 1).

The population studied are all the people assigned to eight basic areas of health on primary care which takes the territories from Baix Ebre and Montsià region (Terres de l'Ebre (Figure 2) located in the south of Catalonia and the north-east of Spain, in the latitude N 40º60' and longitude E 0º59' with more 150 km. littoral sea coastline, the Mediterranean. The territory surface consists of 3.300 km^2 and represents the 10% of Catalonia and it is formed by 52 towns. The territory is formed by a low density of population in comparison to the Catalan average, with a tax about a 53.6 inhabitants/km2 significantly lower than the Catalan average that is about 212 inhabitants /km^2. A 46.1% of inhabitants live in big towns (>10.000 inhabit.), the 16.4% in towns with less than 1000 and the rest of them are divided into medium towns. The income per capita is significantly

Table 1: Gold Standards for an "Ideal" Stroke Incidence Study.

Domains	Core Criteria	Supplementary Criteria
Updated from Sudlow and Warlow. [3]		
Standard definitions	World Health Organization definition of stroke	Classification of ischemic stroke into subtypes (e.g. large artery disease, cardio embolic, small artery disease, other)
	At least 80% CT/MRI verification of the diagnosis of ischemic stroke, intra-cerebral hemorrhage, and subarachnoid hemorrhage	Recurrent stroke
	First-ever-in-a-lifetime stroke	
Standard methods	Complete, population-based case ascertainment, based on multiple overlapping sources of information (hospitals, outpatient clinics, general practitioners, death certificates)	Ascertainment of patients with TIA, recurrent strokes and those referred for brain, carotid, or cerebral vascular imaging
	Prospective study design	"Hot pursuit" of cases
	Large, well-defined, and stable population, allowing at least 100 000 person-years of observation	Direct assessment of under-ascertainment by regular checking of general practitioners' databases and hospital admissions for acute vascular problems and brain damage imaging studies and/or interventions
	Follow-up of patients' vital status for at least 1 month	
	Reliable method for estimating denominator (census data ≤5 years old)	
Standard data presentation	Complete calendar years of data; ≤5 years of data averaged together	Unpublished 5-year age bands available for comparison with other studies
	Men and women presented separately	
	Mid-decade age bands (eg, 55 to 64 years) used in publications, including oldest age group (≥85 years)	
	95% confidence interval around rates	

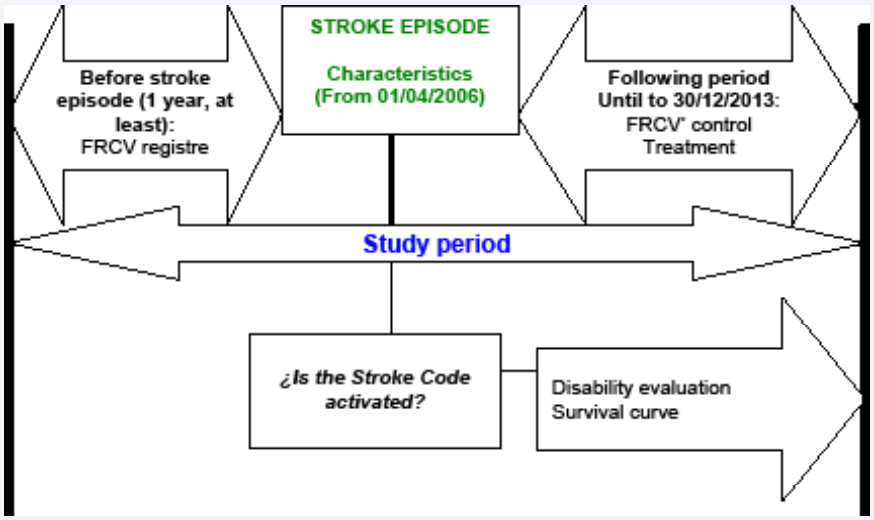

Figure 1 Chart of the study. Ebrictus study 2006-2013.

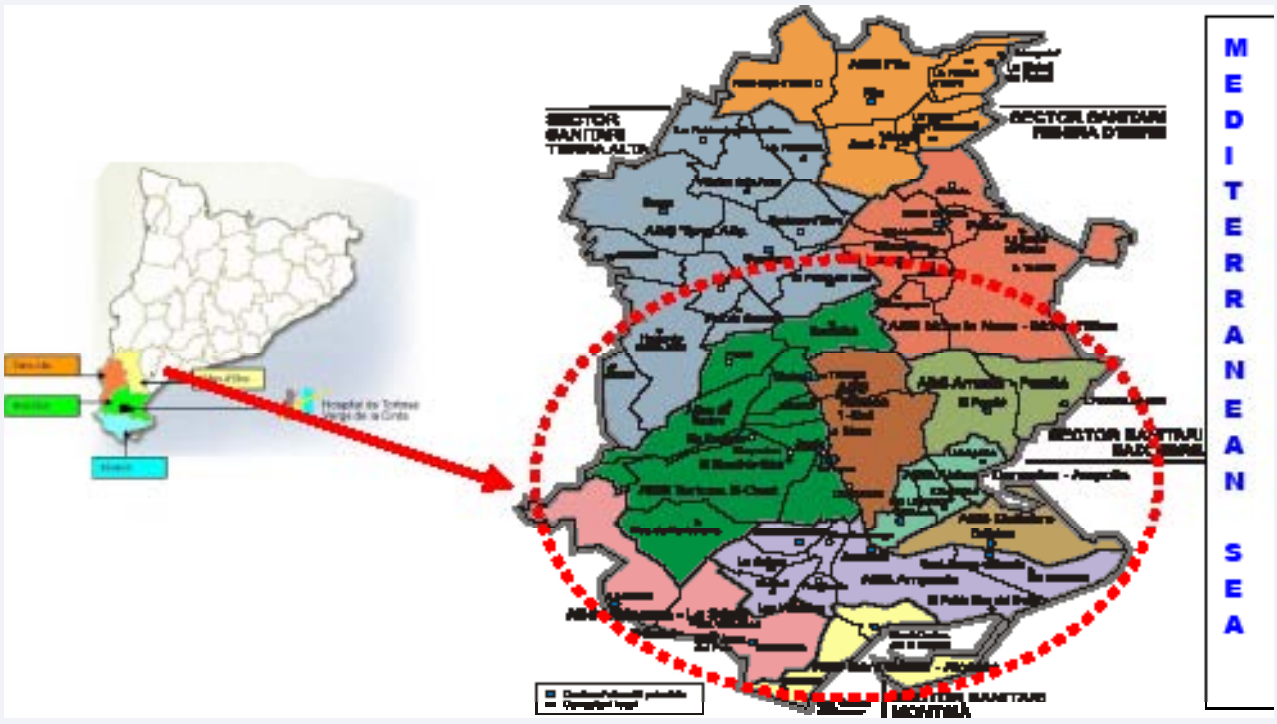

Figure 2 Study territory and primary care teams. Ebrictus study 2006-2013.

lower (93.7%) from the Catalonia average. Demographically speaking, in the last two decades the gross tax about the total demographic growth is characterized by the natural negative growth, the higher ageing factor and the quickly increase from 2000 (12.36/1000 inhabit.) to 2006 (26/1000 inhabit.) caused by migratory movements which meant a 14.71% from the actual population. The population over the eighties in the period 1986-2006 has increased its proportion in about a 66% taking a 3.5% to 5.9% from the total population, without changes between man-woman, but meaning a 60% of women in the population over 80 years old. The reference population included are 130.649 people (51.1% H, 48.9% D) taking into account the population census. From them a 92.5% arranges an active clinical registration in any of the participant centers. The population structure is described in Figure number 3.

The World Health Organization definition of stroke is: "rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin"[12]. By applying this definition transient ischemic attack (TIA), which is defined to last less than 24 hours and presumed to be embolic or thrombotic vascular disease after adequate

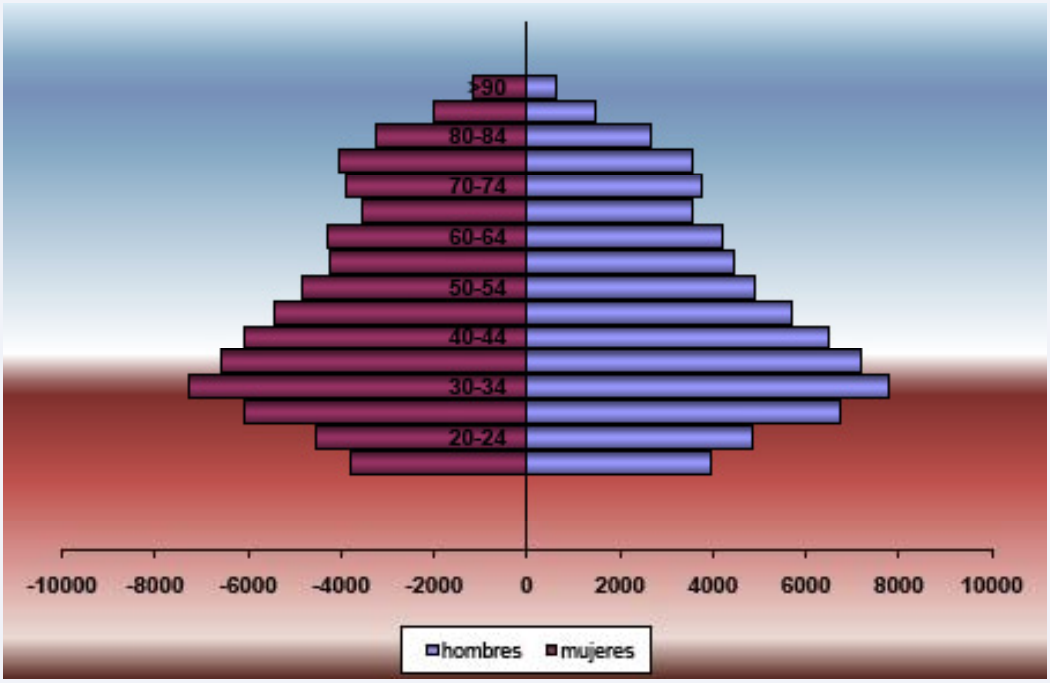

Figure 3 (A) – Population demographic structure. Ebrictus study 2006-2013.

investigation and patients with stroke symptoms caused by subdural haemorrhage, tumours, poisoning, or trauma are excluded [13]. They were used as exclusion criteria 1/ not having their habitual residence or EAP arrangement in the territory five years before suffering the episode; 2/patients< 15 years old o ≥ 90 years old 3/ having suffered an ictus episode before the date of the beginning of this research, whatever was the type of it; 4/ the impossibility to obtain enough data because of the lack, or insufficient or not having an access to the clinical registration.

The beginning of the research goes together with the implementation of the stroke code in the territory, the 1st of April 2006, in which moment the inclusion of the incident cases was done *(first-ever stroke in a lifetime).* The collection of data from the clinical histories which accomplish the inclusive criteria began in April 2006 (01/04/2006) and ended in March 2008(31/03/2008) as talking about incidence and in 31/12/2013 as the following of the vital status. It is considered as *complete history* those patients who have active information at least one year before the stroke episode, an objective medical report giving details of the disorder and documents which proves that. Moreover there should be the evolution after the stroke, no matter by a) ambulatory enquiry, b) hospital enquiry c) specific registration stroke code d) an access to medical reports in which the functional situation is described.

The main source of clinical information on the research is the clinical history registers computerized used by professionals from the Catalan Institute of Health.

In the International Classification of Diseases 9th and 10th revisions, cerebrovascular diseases are referred to with the codes 430 to 438 and I60 to I69. This data comes from the automatic and periodical exploitation of data base.

1. Weekly reviewed anonymized primary care computer-generated patient records of the whole study population (n= 130.649) attended by primary care teams and registered in the *e-CAP (estación clínica de Atención Primaria)* for all possible acute cerebral events. It uses the international codification ICD-10. In the basis of the clinical reports, those cases which doesn't have a medical report on the disorder will be rejected. It includes the assigned population in eight teams on primary care and participants (Figure 2).

2. Weekly reviewed anonymized hospital computer-generated patient records of the whole study population (n= 130.649) attended to daily clinic, emergency department, admission department, included died patients registered in the SAP *(Systems, Applications and Products)* system for all possible acute cerebral events. It used the codification ICD-9 and was crossed with the information in the *e-CAP.*

3. Monthly reviewed and followed-up all patients who had possible acute cerebrovascular events or a related elective investigation or intervention and got study inclusion criteria and quality criteria of Stroke Code.

In the territory a Stroke Code from 01/04/2006 is working: diagnosed cases as the stroke are derived in the only referent hospital in the territory, Verge de la Cinta Hospital in Tortosa, for the attention of the episode and the assessment on the possibility to treat it with thrombolysis which treatment protocol changed in 2011, spreading into all the people taking into account its Modified Ranking Scale [14], independently of their age. The evolution following of the episode was realized by one or various of the following procedures: a) register checking in the primary care enquiry b) searching and localization of the patient in the hospital registration from the stroke code in the moment of the episode c) updating the data paper which contains all the

variables by the succession of information obtained from the visits, reentries or inter-inquiries in any of the care centers.

The research variables were obtained in the previous year of the episode and all patients were followed-up for the duration of the study period by clinical review at going out the hospital, 3 and 12 months alter event and annually until ending the study. From the first year, it only followed the vital status of the patient. The variables were:

1) Patient Identification Code: individualized number TIS (Individual Sanitary Card used in Catalonia). 2) Socio-demographic information: age, gender, living place. 3) Cardiovascular risk factors measures and cardiovascular comorbidities: cardiovascular pre-recorded episode of stroke and vascular risk by Framingham, CHA_2DS_2VASc scale in patients with atrial fibrillation recorded, and calculation of risk of recurrence of stroke by Essen Stroke Risk Score [15].4) Clinical: origin activation (patient environment by 061 primary care, hospital itself): type of stroke (ischemic –TIA or definite- or hemorrhagic), if the *code stroke* was activated. Characteristics of hospital episode: if there hospital care (no evidence, only emergency department, hospital admission); performance of CT and / or MRI; elapsed time in hours from the onset of symptoms of stroke code activation, to the completion of TAC, and thrombolysis, if any; value NIHSS on admission; whether or not there was thrombolysis therapy; causes of exclusion of thrombolysis and related complications; average hospital stay duration, and destination at discharge (hospital more complex, home, hospital nursing / long stay, death). 5) Prescription drugs in active. 6) If there were new inter-current events (recurrent stroke / cardiovascular / major surgery / neoplasm / respiratory disease / genitourinary / other). 7) Functional autonomy index by Barthel [16] classified as follows: <20 (total dependence); 20-35 (severe dependence); 40-55 (moderate dependence); > 60 (mild dependence); 100 (independence). 8) Vital status death dates (all-cause mortality). Patients who died during hospitalization for the initial stroke or within the first month after the same are considered "immediate death". 9) Years of potential life lost (YPLL) methodologically the 1-70 year period is used. It is expressed in both male and female 10^4 per year.

Statistical analysis

The analysis plan is implementation of computerized statistical analysis with the following: a) descriptive study to characterize the sample used basic statistics and standard deviation; b) the overall incidence of first episode of stroke by broad age group and sex, and the risks related to factors supposedly associated with the development of stroke was calculated; c) use characteristics and Stroke activation code; d) rate of patients treated with thrombolytic therapy and their characteristics; e) differences in functional outcome and its evolution before and after the episode determined the possible effects on mortality and residual deficits classified by different categories of thrombolytic or no treatment; f) study of mortality and survival by estimating the incidence (survival curves / stroke-free survival Kaplan-Meier) and conducting analysis of factors potentially involved; g) calculation of potential years of life lost.

In the descriptive analysis, data for categorical variables are expressed as number of cases and percentage and, data for continuous variables are expressed as mean with its standard deviation. Categorical variables were compared to using $\chi 2$ test or Fisher's exact test as required. They were also compared to continuous variables using Student's test or Mann-Whitney test depending on the normality distribution assumption. An usual distribution was checked by the Shapiro-Wilk test. Crude rates and standardized rates were calculated by sex and five-year age groups per 10,000 person years adjusted by the direct method using as reference the European population standard 17. The survival curve and the risk of death were assessed using non variable and multivariate analyzes Kaplan-Meier survival curve and comparisons with log-rank. Factors that were independently associated in the non variable analysis, being at least marginally significant ($p \leq 0.1$) were included using a backward step-wise strategy. A multivariate logistic regression analysis was performed to find risk factors associated to survival (all-cause mortality) of the population with first stroke. A p-value of less than 0.05 was following and has been considered to a statistical significance. The analysis was carried out with the SPSS statistical software package (version 19). Cox regression models constructed to model the time to a next stroke or death controlled for age, sex and CHA_2DS_2-VASc score.

RESULTS

The general characteristics of the cohort are described in Table 2. The average following was 3.1±2.5 years. A total of 1678 first-ever strokes were identified. However, of these, we excluded 122 (7.2%) to occur in patients over 90 years, 145 (8.6%) for not having their usual residence in the territory, and 74 (4.4%) due to insufficient clinical data records of their medical history. The cohort has a mean age of 74.06±11.9 years (25-90) with a higher percentage (p 0.004) than men (54.1%), and significant differences (p <0.001) in the mean age men (72.34±11.9) and females (76.09±11.7) and significantly higher (p <0.001) than those in the thrombolysis (68.8±12.0) was performed.

Stroke incidence

The crude overall rate of the first episode is $21.1/10^4$ inhabitants per year (CI95% 19.4-22.9); 18.9/104 women per year (CI95% 16.7-21.1) and adjusted to European population 11.7/104 (CI95% 10.3-13.2); men and 19.6/104 year (CI95% 17.3-22.9) and adjusted to European population 11.5/104 / year (CI95% 9.8-13.1 The clinical profile of patients suffering a first stroke is: patient> 70 years, hypertension blood associated with active smoking and / or ischemic heart disease and / or atrial fibrillation. The arterial hypertension (RR 12) and atrial fibrillation (RR 8) has the higher relative risk for experiencing a first episode of stroke. The average cardiovascular risk Framingham is significantly higher in men (p <0.001).

40.2% of all hemorrhagic strokes occurred over ≥80-year-old, but 48.4% of ischemic episodes under ≤80-year-old, significantly more common among men (60.2%). Thus, the incidence of first stroke episode presents a different epidemiological pattern by gender after a progressive increase with age, from 70 years in women the incidence rate remains virtually unchanged; while men from period 75-79, where it has its peak, progressively decreases more than 60% (Figure 4).

Table 2: General characteristics. Ebrictus, 2014.

All	Men	Women	P	All
Average age	72.1±12.7	76.0±12.1	<0.001	73.9±12.5
Genre	723 (54.1%)	614 (45.9%)	0.004	1337
Average score NIHSS* N	7.14±6.8 321	8.47±7.8 206	0.036	7.6±7.0 527
Average score Barthel pre-stroke N	94.9±15.1 493	91.3±19.7 391	0.002	93.3±17.4 88 (65.7%)
Average staying hospital (days)	7.9±8.16	9.02±7.82	0.05	8.6±8.3
Average score Barthel post-stroke N	83.18±25.21 182	75.8±30.81 149	0.019	79.8±28.0 331 (24.62%)
Average survival (months)	54.1±1.6 (CI95% 50.9-57.4)	51.9±1.7 (CI95% 48.6-55.8)	ns	53.8±1.2 (CI95% 51.4-56.2)
Standardized Incidence Ratio (1000 people/month)	13.6 (CI95% 12.2-15.1)	13.5 (CI95% 12.0-15.1)	0.951	13.6 (CI95% 12.5-14.6)
Ischemic stroke	602 (83.1%)	538 (86.8%)	ns	1140 (84.82%)
Average age	71.9±12.3	76.2±11.5	<0.001	74.0±12.1
Average score NIHSS*	6.62±6.56	8.3±7.4	0.011	7.3±6.95
Average staying hospital (days)	7.7±7.5	8.8±7.9	0.03	8.2±7.7
Average score Barthel post-stroke	84.2±24.9	75.1±31.2	0.006	80.0±28.37
Deaths (%)	275 (37.9%)	247 (39.8%)	ns	522 (45.78%)
Average survival (months)				56.6±1.3 (CI95% 54.1-59.2)
Standardized Incidence Ratio (1000 people/month)				12.1 (CI95% 11.1-13.2)
Hemorrhagic stroke	120 (16.6%)	79 (12.7%)	ns	199 (14.8%)
Average age	72.7±14.2	74.6±15.3	ns	73.4±14.8
Average score NIHSS*	10.5±7.6	10.0±7.34	ns	10.4±7.48
Average staying hospital (days)	10.8±10.6	7.8±7.6	0.04	9.6±9.7
Average score Barthel post-stroke	75.0±27.0	82.7±23.7	ns	77.4±25.8
Deaths (%)	67 (55.8%)	57 (72.1%)	0.020	124 (62.31%)
Average survival (months)				37.5±3.0 (CI95% 31.5-43.4)
Standardized Incidence Ratio (1000 people/month)				26.7 (22.2-31.8)
Thrombolytic treatment	50 (8.3%)	48 (8.92%)	ns	98 (8.6%)
Average age	68.0±11.7	69.6±12.5	ns	68.8±12.5
Average score NIHSS*	13.9±6.4	12.3±6.0	0.03	13.1±6.27
Average staying hospital (days)	10.3±12.3	10.0±6.6	ns	10.2±9.9
Average score Barthel post-stroke	83.3±25.7	87.5±24.9	0,01	85.4±25.2
Deaths (%)	19 (38%)	9 (18.7)	0.034	28 (28.57%)
Average survival (months)				66.1±4.1 (CI95% 58.0-74.3)
Standardized Incidence Ratio (1000 people/month)				8.0 (5.3-11.5)
Functional Results	63 (9.36%)	59 (10.26%)	ns	122 (9.77%)
Death	172 (25.55%)	145 (25.21%)	ns	317 (25.4%)
House autonomy	315 (46.8%)	246 (42.78%)	ns	561 (44.95%)
House with care-taker	20 (2.97%)	16 (2.78%)	ns	36 (2.88%)
Referral to higher level hospital	103 (15.3%)	109 (18.95%)	ns	212 (16.98%)
Referral chronic social care services				
Subtotal	673	575		1248

***NIHSS:** *National Institutes of Health Stroke Scale*

Stroke clinical characteristics

As the severity of the episode, the NIHSS register objectives significant differences in score by gender (p 0.036) with higher severity in women NIHSS. In 32.5% of episodes (CI95% 24.3-43.4) code is activated. 77.8% of stroke codes were activated during hospitalization and in 98.4% (CI95% 95.1- 99.6) of the same TAC and / or MRI was performed. The average NIHSS of the total group was 7.6±7.0, significantly more severe (p <0.001) among those receiving thrombolysis (13.1±6.27) and those with hemorrhagic stroke (10.4±7.4) than among those with ischemic stroke without thrombolytic treatment (7.3±6.95). 49.3% had a score ≤ 4 (Table 4); 29.3% 5-13; 18.4% between 14 to 23; and 3%> 23, reaching the P50 in a NIHSS score of 4 in the total group, 12 in the group treated with thrombolysis, 9 in hemorrhagic and 3 in the ischemic group without thrombolysis. The average hospital stay was 8.65±8.33 days significantly higher in women (p 0.05) and in the group of ischemic stroke treated with thrombolysis (p 0.011). The NIHSS is predictive of functional outcome and correlates with the post-episode Barthel (p 0.022) and survival (p <0.001). In those patients in whom there is no record on the initial hospital discharge report for NIHSS value, the proportion of those with a value in the Barthel ≤ 60 is 39.3% but the mortality endpoint represents 55.9 % of the total. When the NIHSS score is higher 12, it gets the highest percentage of patients with a Barthel ≤ 60 (26.2%), of early mortality (5.83%), and mortality at the end of the study (50.0%)

Categorized incident strokes

14.8% of all strokes were hemorrhagic and are those with the worst prognosis (p <0.001) with the highest mortality (31.4%), referral to chronic care centers (24.9%) and other hospitals for severity and associated complications (11.4%). 20,25% (CI95% 13,4-29,2) were TIA with crude rate 42,8/10^5/year (CI95% 34,9-50,8) in people younger (71,4± 11,5) than ischemic, but older than hemorrhagic episodes. According to Essen Stroke Risk Score, 20-30% of patients are at high risk of recurrence of stroke episode. In 15.7% of patients new episodes were recorded, of which 48.3% were 13.8% neurological and cardiovascular. Stroke recurrence was 7.6% (CI95% 5.5-10.1).

The stroke Code was activated in 32,5% of episodes (CI95% 24,3-43,4) indoor hospital in 77,8% .The 8.6% of ischemic stroke were treated with thrombolysis. Their mean age was 68.02±11.9 years. Of these 41 (45.1%) were women with a mean age of 66.6±13.7 years, and 50 (54.9%) men with a mean age of 69.3 ± 10.3 years. Over 50% were performed in patients >70 year-old. There are no significant differences, except for the fact that the group of men having a baseline cardiovascular risk and a percentage of active smokers significantly higher than women. The percentage of women <50 year-old (14.6%) with thrombolysis is higher than men (4.0%), but does not become significant (p 0.07).

The group treated with thrombolysis, despite being the averaging mean greater clinical severity (NIHSS 13), is the one with the highest average Barthel score (85.4) and with no cases of moderate to hospital discharge (Table 3).

Secondary cardiovascular prevention

As for secondary cardiovascular prevention outcomes at 3 months after the episode not only significantly increases the prevalence of cardiovascular risk factors recorded as hypertension (74.9%vs82.8%), atrial fibrillation (10.2%vs16%) and dyslipidemia (37.8%vs 49.8%) but a significant improvement is also produced in the control thereof. The percentage of patients in whom no specific treatment consisted of hypertension in their medical history decreases very significantly (45.9% to 7.4%). Improved the percentage of AF treated with oral anticoagulants (64.3% to 81%) and increased the number of patients that were treated with secondary cardiovascular prevention (17.9% to 80.6%). While our results suggest that female gender is associated with improved survival and is an important clinical marker among those patients most likely to benefit from treatment with thrombolysis, secondary prevention after episode seems more the resource value in primary care reduce mortality. In our study we mentioned that if the patient did not receive secondary cardiovascular prevention after stroke increases 7.7 times the risk of mortality. That group of men has a higher cardiovascular risk prior episode of stroke than women and less coverage in secondary prevention that could favor different prognosis. Necessarily increased cardiovascular risk should reflect differences in cardiovascular events.

Stroke mortality

The mean follow-up was 3.12±2.51 years. The average disease duration is 6.67 years. Of the total 1337 patients, 10.32% (95% CI 8.65-11.99) die per month; 25.2% (95% CI 22.9-27.6) per year; at five years and 44.9% (CI95% 42.2-47.6). No differences in adjusted mortality rates between sexes (Figure 5). The incidence rate ratio by sex is 1.003 (95% CI 0.86-1.17). Overall mortality at 90 days was similar in men and women (Figure 7) produced 34.8% of deaths. The cumulative probability of overall survival is 0.92 ± 0.08 the first month, 0.77 ± 0.01 in the first year and 0.52 ± 0.01 at five years. The mortality curves among the ischemic and hemorrhagic strokes are significantly (p <0.001) different (Figure 6). The Incidence Ratio is 0.45 (CI95% 0.37- 0.55).

Table 3: Clinic profile according to sort of stroke. Ebrictus, 2014

	All	Hemorrhagic stroke	Ischemic stroke without thrombolytic treatment	Ischemic stroke with thrombolytic treatment
N	1252	185	964	98
Average score NIHSS	7.6±7.0	10.4±7.4	7.3±6.9	13.1±6.2
P50 NIHSS*	4	9	3	12
Average score Barthel post-stroke	79.8±28.0	77.4±25.8	80.0±28.3	85.4±25.3
Percentage patients with score Barthel <60 post-stroke	11.4%	27.6%	11.8%	0%

***NIHSS:** *National Institutes of Health Stroke Scale*

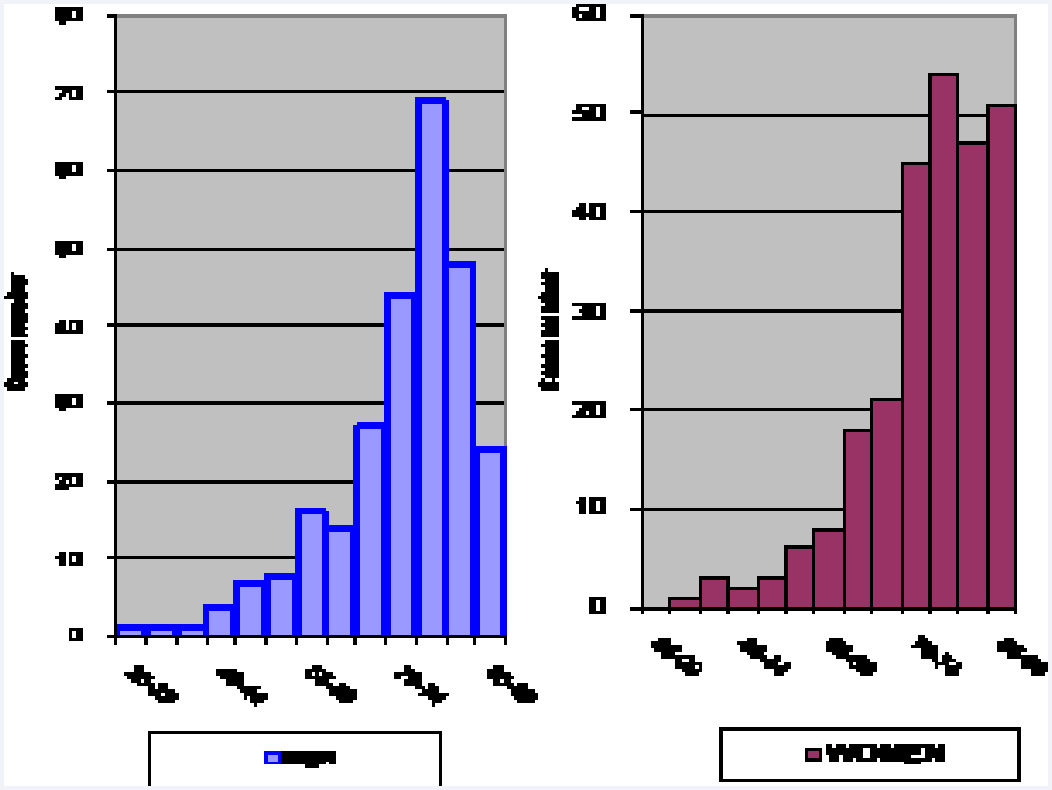

Figure 4 (A) – Stroke incidence according to genre. Ebrictus study 2006-2013.

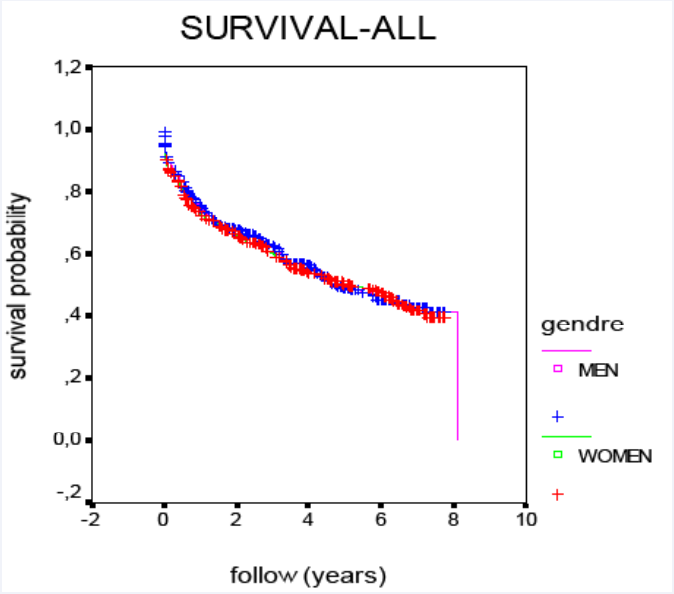

Figure 5 (A) – Survival curve for all strokes by genre. Ebrictus study 2006-2013.

The mortality curves among the ischemic with or without thrombolysis are significantly (p <0.003) different (Figure 7). The Incidence Ratio is 0.57 (CI95% 0.39-0.83). The reduction in RRR is 39.8% and ARR 18%, and the NNT 5 to prevent one death. Were identified as protective factors of mortality: the realization of thrombolysis (CI95% 0.37-0.80 p 0.002), and Barthel ≥ 60 (CI95% 0.81- 0.94 p 0.002) score. Risk factors associated with mortality were age (CI95% 1.03-1.05 p <0.001), hemorrhagic stroke (CI95% 1.25-1.53 p <0.001) and increased clinical severity assessed by NIHSS> 13 (CI95% 1.53-2.78 95% p <0.001). Among the 65-79 age-adjusted death rate ($37.1/10^4$ CI95% 26.2-49.3) among men is significantly higher than in women ($14.7/10^4$

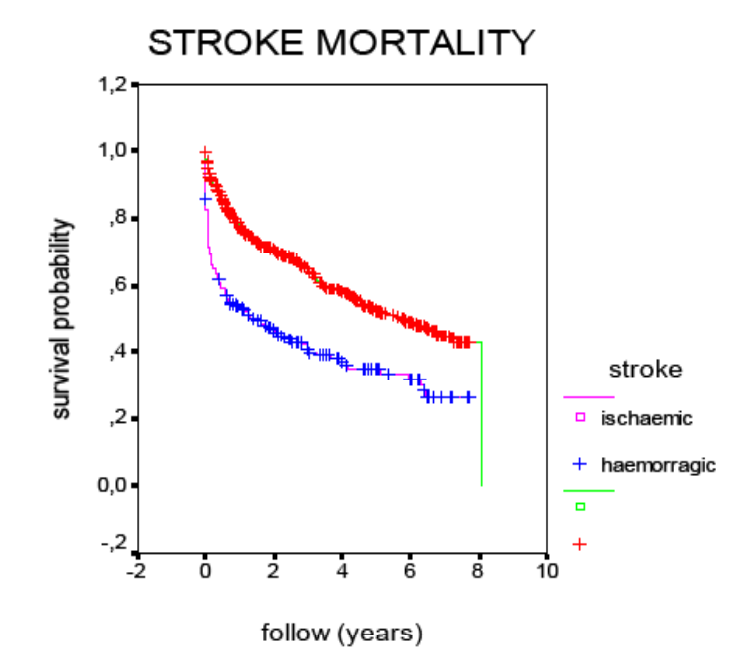

Figure 6 Survival curve for haemorrhagic stroke vs ischemic stroke. Ebrictus study 2006-2013.

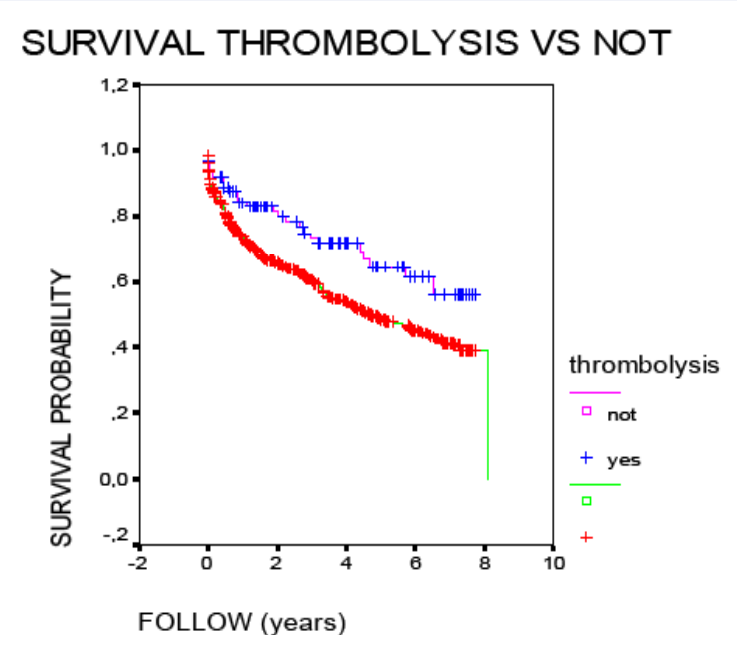

Figure 7 (A) – Survival curve for ischemic stroke with/without thrombolytic treatment. Ebrictus study 2006-2013.

CI95% 7.7-21.8) and when produced the highest percentage mortality among men (48% CI95% 36.7-59.6) coinciding with the period of peak incidence, while in women 64.6% (CI95% 52.1-75.9) mortality occurs from 80-89.

Among those treated with thrombolysis, the difference in the number of deaths by gender increases progressively with the duration of the monitoring period so that at end of period survival is significantly lower in women. The probability of survival at end of study among women was 0.75±0.06 and 0.54±0.09 men, a statistically significant difference (p 0.012). The incidence density of mortality for the group was 8.5/100 cases/ year follow up (CI95% 5.4-12.8); in the group of women was 4.2/100 cases/ year (CI95% 1.5-9.2); and men, 13.4/100 cases/year (CI95% 7.8-21.5) and was statistically significant (p 0.01) and showed an increased risk in men compared to women IR = 3.2 (CI95% 1.2-8.0), we can indicate that exposure to thrombolysis in women is much more protective than men. The challenge is whether these

data can achieve better health outcomes through the selection of patients with a more favorable risk versus thrombolytic profile.

The adjusted YPLL <70 years was significantly higher in men (12.0 CI95% 10.7-13.3) than women (6.5 CI95% 5.6-7.4 6.5).

Stroke disability

As for the average assessment of functional status for ADL is a variable that appears recorded in 65.7% of cases when it comes to their pre-stroke assessment, but only 24.6% of well in all cases of hospital reports held high in specific indicators in primary care. The average score before the episode (Table 2) was close to full independence (93.3±17.4) being significantly (p 0.002) higher in men (94.97 vs 91.30) than women. 79.1% of cases were independent before the stroke and only 5.5% had a moderate or greater dependency of stroke prior to the episode. Overall, after the episode of stroke the percentage of individuals in the degree of dependency triples at least halving the number of individuals with initial independence, and the percentage of patients with moderate or greater dependency increases to 19.3% with a significantly higher loss (p 0.023) in women than in men in the Barthel index (75.8vs83.18), thus increasing the previous difference. Thrombolysis has a RRR of 46.3% and an ARR of 9.4% and NNT of 10 for moderate dependency (Barthel <60). Age (p <0.001) and NIHSS <12 (p 0.045) were identified as the only prognostic factors associated with a mild dependence (Barthel> 60) respectively (OR CI95% 0.81-0.90 and OR CI95% 0.01-0.94).

DISCUSSION

The main value provided by the work is the knowledge on the entire process of stroke care: from before of it and its consequences in morbidity and mortality. Not only attempts to quantify the burden of stroke on health resources, but to identify the most sensitive and priority points about we can improve our interventions in a longitudinal and comprehensive way.

While standardized incidence of stroke is lower than the European and the results of treatment with thrombolysis signify a progress in health outcomes, differences related to gender as different epidemiological pattern of the first episode of stroke by gender, rates mortality and years of potential life lost, the differences in the results of the primary and secondary prevention, the differences in outcomes of thrombolytic therapy, and consequences of disability and loss of autonomy on the basic activities of daily living are hot points to consider.

Since in the study cohort Ebrictus, age of patients with thrombolytic therapy is significantly lower (p <0.001) than the rest, this data should be reviewed and evaluated prospectively in the same protocols in order to move the thrombolysis to older patients. And also describe cardiovascular risk than the average it was higher in men, and the adjusted mortality rates in the period of 65-79 years was significantly higher in men than in women so that women 64.6% mortality occurred from 80-89. We should investigate to explain the lower average age of the same along with the possibility of intensifying the control objectives of CVRF in primary prevention. Women tend to have more cardiovascular health criteria that define the new concept of cardiovascular health ideal [19]. Though our results suggest that female gender is associated with improved survival and is an important clinical marker among those patients most likely to benefit from thrombolysis, the secondary prevention after episode seems more the resource value in primary care to reduce mortality.

Epidemiologically and clinically, an increase in the percentage of hemorrhagic stroke is seen, progressing from 7.9% (period 2006-2008) to 14.8% (2013), a statistically significant (p <0.001) difference. Since 40% of hemorrhagic strokes occurred in patients ≥ 80 years, including the expected [20] prevalence of atrial fibrillation is 24% and hemorrhagic stroke is having a more unfavorable outcome mortality and loss of autonomy it is necessary to consider it as an essential element in the planning of home care including the prevention of accidents and the use of drugs, frequently polypharmacy, and their interactions.

It is observed a relative low percentage of records not only the NIHSS, mainly hospital indicator, but also of the assessment of ABVD at hospital discharge, primarily an indicator in primary care. Possibly those cases with clinical severity and worse prognosis have reports without NIHSS and Barthel score at discharge given that in those cases without such records are concentrated 40% of cases with Barthel score ≤ 60 and 56% of mortality. However this does not obviate the need for them in the planning of more complex home care. To improve this deficiency reports suggest the availability of high hospital standardized to include all variables related to the episode of stroke to provide epidemiological, clinical, disability outcomes and prognosis of stroke episode. Both in hospitals and in primary care appropriate assessment of the episode and its effects on ABVD should be linked to clinical outcomes and quality of records centers, while mean a value added in the coordination and synergy of different levels and care providers.

Currently our health care system may have a large amount of clinical and prognostic information that is stratified into different levels of care (hospital, primary care) and different providers (primary social assistance, Welfare Department, etc ...) that hinder the evaluation, planning and resolution of the specific needs of affected patients. Obviously should have continuity in the standardization of individualized Care Plan Primary Care, and the simplification and unification of processes assessment of the situation of dependency on the part of all public administrations.

Potential shortcomings

[Due to the number of cases and variables to consider, the quality of the information depends on the methodology used in data collection and storage and handling of the data. The information collected in this study was introduced on a personal computer with a specific database proceeding to a specific quality control program to detect errors. The “ideal” stroke incidence studies based on both core and supplementary criteria are the most valuable source of information for developing evidence-based strategies for stroke prevention and health services and, therefore, should be used whenever possible. The advancements in computerized medical record-linkage systems are likely to facilitate such studies. The question of validity of capture–recapture methods of case ascertainment in stroke incidence studies remains to be answered. However, refinement of both

direct and indirect methods will take us closer to the elusive gold standard.]

CONCLUSIONS

The CVRF are under diagnosed and under treated. The average cardiovascular risk score is higher among the men especially for avoidable factors as smoking. The standardized tax on the European population is $11.7/10^4$ (IC95% 10.3-13.2) in women and $11.5/10^4$ /year (IC95% 9.8-13.1) in men with different epidemic incidence. The 32.5% of the ictus episodes the Stroke code is activated (CI95% 24.3-43.4), but indoor hospital en ¾ of cases. The average NIHSS from the total group was 7.6±7.0, meaningfully from a bigger severity ($p < 0.001$) in which the ones who received thrombolysis (13.1±6.27), but the hemorrhagic stroke has the worst outcome. Those treated with thrombolysis are significantly younger. An increase was seen in the percentage of hemorrhagic ictus from 7.9% to 14.8%. The women treated with thrombolysis have the best survival curve. The men 65-79 year-old have the higher mortality rate. The percentage of patients with an evaluation of their disability is poor (24.6%). Not receiving secondary cardiovascular prevention after the ictus it increases 7 times the risk on mortality. We have got new research opportunities and can make decisions about managing the stroke more efficiently.

ACKNOWLEDGEMENTS

This work was granted by Spanish Family and Community Medicine Society, Grant Isabel Fernández de la Sociedad Española de Medicina Familiar y Comunitaria, and supported by the Cerebral Vascular Disease' Management Plan in Catalonia, Health Department from Generalitat de Catalunya. The study complies with the Declaration of Helsinki.

This work was awarded as Degree doctoral Thesis MD. Ebrictus Study. First stroke Epidemiology: Primary and secondary prevention results, survival and lost life years. Extraordinary Award by Universidad Miguel Hernández. Clinic Medical Department. Elche. Alicante. Spain]

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Cite this article

Clua-Espuny JL, Garcés-Redondo M, Lucas-Noll J, Panisello-Tafalla A, Queralt-Tomas LL, et al. (2014) Stroke Epidemiology, Survival and Disability in A Mediterranean Population According Malmgren's Criteria. Ebrictus Cohort. Ann Vasc Med Res 1(1): 1004.