ORIGINAL **PROF-702**

STROKE IN HYPERTENSIVE PATIENTS

DR SYED HASHIM RAZA, FCPS (MED)
Senior Registrar Medical Unit III
Bahawal victoria Hospital Bahawalpur

DR. ALI IMRAN, FCPS (MED)
Senior Registrar Medical Unit III
Bahawal victoria Hospital Bahawalpur

DR. MOHAMMAD USMAN GHANI, FCPS (MED)
Professor of Medicine
Quaid-e-Azam Medical College Bahawalpur

Dr. Shahid Irfan, FCPS (Med)
Assiastant Professor of Medicine
Quaid-e- Azam Medical College, Bahawalpur

Dr. Qazi Masroor Ali
Associate Professor of Medicine
Quaid-e-Azam Medical College, Bahawalpur

ABSTRACT

Objective: To find the incidence of hypertension in stroke patients comparing it with other common risk factors and to determine the frequency of occurrence of reactive rise in blood pressure in the acute stage of stroke in normotensive patients. **Design:** A prospective study. **Place & Duration:** The study was conducted in Medical Unit III B V Hospital Bahawalpur from Feb 2001 to May 2002. **Patients& Methods:** One hundred consecutive CT Scan confirmed patients of stroke from emergency department were evaluated for various risk factors by using a proforma to record the biodata, history of hypertension, diabetes mellitus, ischemic heart disease, transient ischemic attacks, smoking and past history of stroke. After segregating the hypertensive stroke patients, the reactive rise in blood pressure due to acute stage of stroke was also studied in the normotensive patients. **Results:** Out of the 1334 admitted patients 7.49% (100 patients) accounted for acute stroke. There were 64 (64%) males and 36 (36%) female patient. 78 patients (78%) had cerebral infarction while 22 (22%) were having hemorrhagic stroke. 49 patients (49%) were hypertensive. Out of these 30 (61.22%) were males and 19 (38.77%) were females. 35 patients (71.42%) had cerebral infarction while 14 (28.57%) patients had hemorrhagic stroke. Hypertension was a risk factor in 35 out of 78 patients (44.87%) with cerebral infarction, while it was present in 14 out of 22 patients (63.63%) with hemorrhagic stroke. Comparing hypertension 49% to the other commonly encountered risk factors in the study, smoking was found in 30%, diabetes mellitus in 19%, ischemic heart disease in 18%, atrial fibrillation in 6% and other cardiac diseases in 4% of all the cases of stroke. Reactive rise in blood pressure in normotensive patients with acute stroke was found in 51 % (26 out of 51) cases. **Conclusion:** Hypertension is the most common risk factor for all types of strokes and a significantly high proportion of normotensive patients show a reactive rise in blood pressure in the acute stage of stroke, which usually becomes normal within a week, without any anti-hypertensive therapy.

KEY WORDS: Stroke, Hypertension. Cerebral infarction, Hemorrhagic stroke.

INTRODUCTION

Stroke is still a common and devastating disorder in spite of new post stroke treatment strategies. Being a worldwide health problem it makes an important contribution to morbidity, mortality and disability. It ranks in too four causes of death in most countries of the world[1].

The incidence of stroke increases dramatically with advancing age due to progressive carotid atherosclerosis, cardiac arrhythmias, emboli and vascular changes[2]. After age, ypertension is the most powerful stroke risk factor[3,4]. It increases stroke risk by

accelerating the progression of atherosclerosis and predisposing to small vessel disease. The results from 18 controlled trials have shown a reduction in relative risk of stroke of 25-47% among treated hypertensive patients[5,10]. A study conducted in two hospitals Karachi has shown incidence of stroke in 6.4% patients admitted in medical wards. Hypertension, diabetes mellitus and cardiac diseases were commonly involved risk factors and overall mortality was 30%[6]. The unfavorable prognostic factors were old age, hypertension and impairment of consciousness.

Hypertension in Pakistan remains a major health problem; with a prevalence of 17.9% in the adult population, there are an estimated 10 million hypertensives[7]. Keeping in view the importance of hypertension in causing stroke, this study was conducted to determine the incidence of systemic hypertension as a risk factor had its incidence in cerebral infarction / intra cerebral hemorrhage. A reactive rise in blood pressure in acute stage of stroke in normotensive patients was also studied. Moreover, a comparison of systemic hypertension with other commonly encountered risk factors was also made.

PATIENTS & METHODS

This prospective study included 100 consecutive cases of stroke, admitted randomly through emergency department in Medical Unit II, Bahawal Victoria Hospital Bahawalpur from Jan 2001 to May 2002. All these patients were subjected to CT Scan of brain and those having cerebral infarction or hemorrhage were included in the study.

All cases of stroke were further studied in detail using a proforma (Anx 1) to record the bio-data , history of hypertension, diabetes mellitus, ischemic heart disease, transient ischemic attacks, smoking and past history of stroke.

Blood pressure in all of these cases was recorded by aneroid type of sphygmomanometer at the time of admission and during their stay in the ward at regular intervals. A detailed general physical, neurological and cardiovascular system examination was carried out. All patients were examined specifically for hypertensive retinopathy, cardiomegaly and left ventricular hypertrophy. State of consciousness was graded according to the Glasgow Coma Scale.

Investigations performed in all the patients included complete blood counts, ESR. complete urine examination, blood glucose, serum creatinine, electrocardiography and computerized tomography (CT) scan of brain. Investigations in selected cases included x-ray chest PA view (n=45), lipid profile (n=18), echocardiography (n=14), antinuclear antibodies (n=2), prothrombin time and activated partial thromboplastin time (n=3).

CRITERIA FOR STROKE PATIENTS

Stroke was defined according to the World Health Organization (WHO) criteria as rapidly developing symptoms and / or signs of focal and at times global loss of cerebral function lasting for 24 hours or more, with no apparent cause other than that of vascular origin[8].

Cerebral infarction was labeled when a hypodense area on CT scan of brain was detected corresponding to the clinical picture. Intra cerebral hemorrhage was diagnosed when a parenchymatous hyper dense area on the CT scan of brain with or without intra ventricular leak was seen.

EXCLUSION CRITERIA OF STROKE PATIENTS

The patients having CT scan findings suggestive of some other pathology than vascular one (e.g. brain abscess, brain tumour or any other space occupying lesion), history of recent head injury, traumatic intra cranial hemorrhage, subdural/extra dural haematoma, transient ischemic attacks and hypertensive encephalopathy were excluded from the study.

INCLUSION CRITERIA OF HYPERTENSION IN

STROKE PATIENTS

1. The patients having definite history fo intake of anti hypertensive medications prior to admission or having authentic previous medical record suggestive of hypertension.

2. The patients not fulfilling the above criteria but having high blood pressure readings i.e. > 160/90 mm Hg at the time of admission were considered to be hypertensive if clinical examination, EGG, x-ray chest and echocardiographic findings were consistent with the changes occurring due to hypertension.

CRITERIA OF REACTIVE RISE IN BLOOD PRESSURE

The patients having blood pressure readings > 160/90 mm Hg at the time of presentation, but their blood pressure came down within normal range without the use of any anti hypertensive medication during the first week of their presentation were regarded to be having reactive rise in blood pressure due to acute phase of stroke.

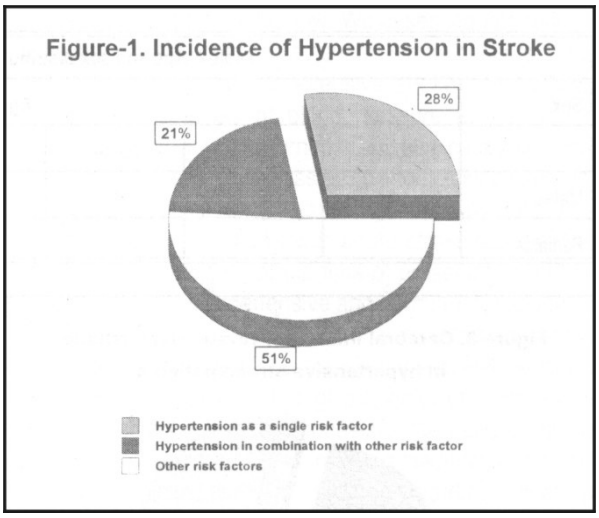
RESULTS

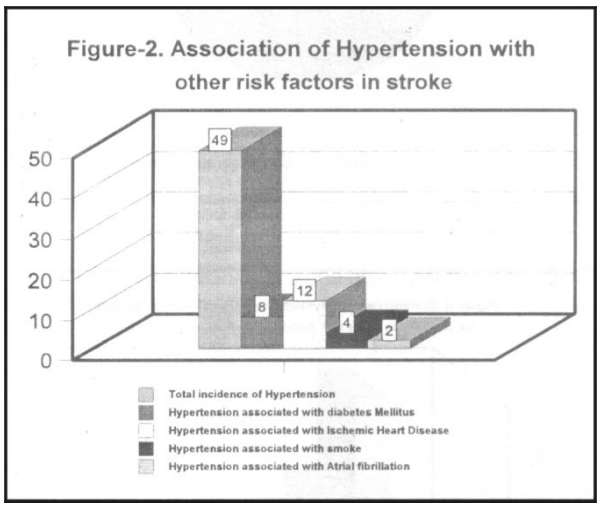
Out of 1334 patients, 100 were admitted with acute stroke, which constituted 7.5% of the ward admissions. Age range of stroke patients varied from 17 to 98 years, mean age being 56.83 years. The incidence of stroke was highest during the 7th decade of life. A higher incidence of stroke was found in males i.e. 64% (n=64) as compared to females 36% (n=36). The male to female ratio being 1.8:1. Seventy eight percent (n=78) were having cerebral infarction and 22% (n=22) hemorrhagic stroke.

Systemic hypertension was found in 49% (n=49) of stroke patients, either as a single risk factor 28% (n=28) or in combination with other risk factors 21% (n=21), like diabetes mellitus (n=12), ischemic heart disease (n=8), atrial fibrillation (n=2) and smoking (n=4) (Fig: 1, 2). In five patients hypertension was associated with more than one other risk factors i.e. diabetes mellitus and smoking (n=3), diabetes mellitus and ischemic heart disease (n=1) and ischemic heart disease and smoking (n=1), 61.22% (n=30) were males and 38.77% (n=19) were females.

The male to female ratio being 1.6:1. The most likely stroke prone age for both sexes in hypertensive patients was 55 to 64 years (table I). 71.42% (n=35) were having cerebral infarction and 28.57% (n=14) hemorrhagic stroke (Fig 3).

Hypertension was found in 44.87% (n=35) of all patients having cerebral infarction (n=78) and 63.63% (n=14) of all patients having hemorrhagic stroke (n=22) either as a single risk factor or in combination with other risk factors.



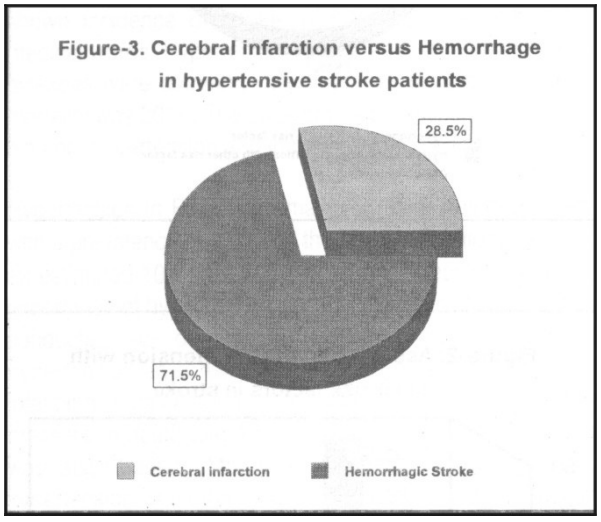


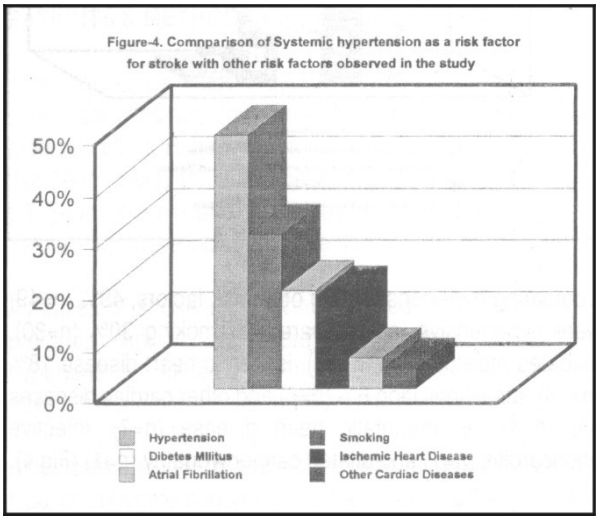
Comparison hypertension with other risk factors, 49% (n=49) were hypertensive, as compared to smoking 30% (n=30), diabetes mellitus 19% (n=19), ischemic heart disease 18% (n=18), atrial fibrillation 6% (n=6) and other cardiac diseases 4% (n=4) i.e. rheumatic heart disease (n=2), infective endocarditis (n=1) and dilated cardi myotherapy (n=1) (Fig 4).

31% (n=15) of the hypertensive stroke patients were taking anti-hypertensive medication, while 61% (n=30) were irregular in treatment and 8% (n=4) had never taken the anti-hypertensive medication.

Table-1 Age and sex distribution of hypertensive stroke patients

Sex	Age in years							Total
	15-24	25-34	35-44	45-54	55-64	65-74	75 +	
Male	1	1	1	8	9	8	2	30
Female				5	7	5	2	19





Out of 51 normotensive patients, 51% showed reactive rise in blood pressure in the acute phases of stroke. The blood pressure in all of these cases came down to the normal levels within a week, without anti-hypertensive therapy.

DISCUSSION

Several epidemiological studies have reported increased frequency of stroke in hypertensive as compared to normotensive patinets[9,17-26]. Elevated systolic or diastolic blood pressure or both increase the risk of stroke by accelerating the progress of atherosclerosis and predisposing to small vessel disease. In our study hypertension was found in 49% of the cases. Nearly similar figure 52.2% and 50% has been reported by Bernstein NM et al[22] and Vohra EA et al[6]. However, our figure is significantly lower than reported by Fayyaz et al[11] (58%) and Khawaja and Shakoor[12] (56%). The lower incidence of hypertension in our study may be partly explained by the very'strict criteria for labeling hypertension, segregating the reactive rise in blood pressure due to the acute phase of stroke. Hypertension was found in 45% of the total cases of cerebral infarction, which is comparable to the figure reported by Fayyaz et al (47.5%). About 64% patients with hemorrhagic stroke were hypertensive. Nearly similar figure in this regard has been reported by Memon AR et al[13] (62%) and Ali L et al[14] (68%). However Villas AP et al has reported hypertension in 80% cases of hemorrhagic stroke and was the most common risk factor[15]. Systemic arterial hypertension was also the most frequent etiology in the hemorrhagic stroke group in a study conducted by Zetola VH etal[16].

In this study the male to female ratio of 1.6:1 was found in hypertensive stroke patients. Almost similar male preponderance (M:F = 1.5:1) was also observed by Khawaja and Shakoor[12].. The most vulnerable age group in both the sexes was 55-64 years. This value however does not correspond to the vulnerable age groups for men (65 - 74 years) and women (45 - 54 years) observed by Khawaja and Shakoor[12]. The fact that stroke associated with hypertension occurs in younger age group in Asians has also been reported by Singh RB et al[27].

Regarding the type of stroke in hypertensive patients, it has been reported in the literature that cerebral infarction is common as compared to the cerebral hemorrhage[28,29]. In our study also, cerebral infarction was common (71.5%) as compared to the hemorrhagic strokes (28.5%). Cerebral infarction is secondary to the increased atherosclerosis observed in hypertensive patients, while cerebral hemorrhage is the result of both the elevated arterial pressure and the development of cerebral vascular micro-aneurysms (Charcoat Bouchard aneurysms).

Comparing he incidence of hypertension (49%) as a riskfactor for stroke with other important risk factors in our study, like smoking (30%), diabetes mellitus (19%), ischemic heart disease (18%), atrial fibrillation (6%) and other cardiac diseases (4%), it has been confirmed that hypertension is the most common and important modifiable risk factor in the aetiology of stroke. Similar conclusions were also obtained by Khawaja and Shakoor, Fayyaz et al and several other studies[9,22-26].

Keeping in view the importance of hypertension in stroke patients, the compliance of anti-hypertensive therapy prior to the development of stroke was also observed in this study. It was found that 31% of the hypertensive stroke patients were taking the anti-hypertensive medications and 8% had never taken the anti-hypertensive medications. Similar results egarding to non-compliance / sub-optimal compliance of anti-hypertensive therapy has also been reported by Zafar R[30] and Memon AR et al[13]. The very high proportion (i.e. > 2/3rd) of hypertensive stroke patients having non compliant anti-hypertensive treatment history, reflects very poor awareness of our patients regarding the treatment and consequences of hypertension. In order to reduce the morbidity from untreated/sub-optimally treated hypertension, emphasis has to be made for patients education and compliance on National Level.

Many patients show a reactive rise in blood pressure in

the acute stage of stroke, which may persist upto 10 days (and sometimes upto 14 days)[31], when in most of the cases the blood pressure gradually returns spontaneously te normal level[32,33]. This is a compensatory change attempting to maintain the cerebral blood flow. We assessed this reactive rise in blood pressure in normotensive stroke patients. It was found that 51% of the normotensive stroke patients were having elevated levels of blood pressure at the time of presentation, which was returned in all of the cases to normal level within a week of admission, without taking any anti-hypertensive medication. It has been reported by Briton M et al[34] that 70% of the patients with acute stroke has elevated levels of blood pressure at the time of presentation, but his study included both hypertensive and normotensive patients, in contrast to our results in which only normotensive stroke patients were included. The transiently elevated levels of blood pressure in significantly high proportion of normotensive patients after acute stroke emphasizes the need of careful monitoring of blood pressure in the immediate post stroke period, because any sort of intervention regarding lowering of blood pressure at this stage can be detrimental.

CONCLUSION

Hypertension is the most common, important and modifiable risk factor in the aetiology of stroke. So, its early detection and regular treatment will decrease a formidable burden of disability in the community.

Reactive rise in blood pressure occurs in significantly high proportion of normotensive patients in the acute stage of stroke. Careful monitoring of blood pressure in these patients in the immediate post stroke period is required, because injudicious lowering of blood pressure at this stage may be harmful

REFERENCES

1. Ralph SL. Pathogenesis, Classification and Epidemiology of cerebrovascular disease. In Lewis P, Rowland, eds. Merit's Textbook of Neurology. 9th ed. Baltimore. Williams and Wilkins 1995:227-42
2. Shuaib A, Boyle C. Stroke in the Elderly. Curr-Opin-Neurol. 1994 Feb: 7(1): 41-7.
3. Pearson BJ, Bath PM, Spence JD. Hypertension in patients presenting with stroke. Curr Hypertens Rep 20 Dec; 2(6): 551-7.
4. Qizilbash N, Lewington S, Duffy S et al. Cholesterol,diastolic blood pressure and stroke. 13000 strokes in 450,000 people in 45 prospective cohorts. Lancet, 1995; 346:1647-1653.
5. Collins R, Peto R, MacMahon S et al. Blood pressure, stroke, and coronary heart disease. Part 2. Short term reductions in blood pressure, overview of randomized drug trials in their epidermiological context. Lancet 1990; 335: 827-838.
6. Vohra EA, Ahmed WU, All M. Aetiology and prognostic factors of patients admitted for stroke. J Pak Med Asso 2000 Jul; 50(7): 234-6.
7. National Health Survey of Pakistan 1990-94. Pakistan Medical Research Council, Islamabad Pakistan 1998.
8. Park JE, Park K. Stroke: Textbook of Preventive and Social Medcine. 15th ed. Jabalpur. M/S Banarsidas Bhanot Publishers, 1995:245-46
9. Thrift AG, Me Neil JJ, Forbes A, Donnan GA. Risk factors for cerebral hemorrhage in the era of well controlled hypertension. Melbourne Risk Factor Study (MERFS) Group. Stroke. 1996 Nov; 27(11): 2020-5.
10. O Brien AA, Rajkumar C, Bulpitt CJ. Blood pressure lowering for the primary and secondary prevention of stroke, treatment of hypertension redues the risk of stroke. J Cardiovasc Risk 1999 Aug; 6(4): 203-5.
11. Fayyaz M, Hassan MA, Attique MUH. Risk factors and early prognosis in stroke. Annals 1999 Jan-Mar; 5(1): 12-15.
12. Khawaja I, Shakoor Z. Hypertension is a major risk factor for stroke in men and women of all ages. Journal of Pakistan Institute of Medical Sciences. 1993; 4(1 & 2): 191-94.
13. Memon AR, Hussain T, Qurashi MS. Hemorrhagic stroke. Incidence, Risk factors and Mortality. J. Coll Physi and Surg Pak. 1995 Nov Dec; 5(6): 267-69.
14. AL L, Jamil L, Shah MA. Risk factors in stroke. J Coll Phys Surg Pakistan. 1997; 7(1): 7-10.

15. Vilas AP, Veiga MZ, Santos ME, Abecasis P. [Hemorrhagic stroke, experience of an internal medicine department]; Rev Port Cardiol 2001 Feb; 20(2): 157-65.

16. Zetola VH, Novak EM, Camargo CH, Carraro H Jr, Coral P, Muzzio JA, Iwamoto FM, Coleta MV, Werneck LC. Stroke in you adults, analysis of 164 patients. Arq Neuropsiquiatr 2001 Sep; 59 (3-B): 740-5.

17. He J, Klag MJ, Wu Z, Whelton PK. Stroke in the People's Republic of China II. Metanalysis of hypertension and risk of stroke. Stroke 1995 Dec; 26(12): 2228-32.

18. Boysen G, Kure A, Enovoldsen E, Moller G, Schou G, Greve E, et al. Apoplexy the acute stage. Nord Med. 1993; 108(8-9): 24-7.

19. Nakayama T, Date C, Yokoyama T, Yoshiike N, Yamaguchi M, Tanaka H. A 15.5 years follow up study of stroke in a Japanese provincial city. The Shibata Study. Stroke 1997 Jan; 28(1): 45-52.

20. Dala PM, Stroke in the elderly. Prevalence, risk factors and the strategies for prevention. Indian J Med Res. 1997 Oct; 106: 325-32.

21. Feigin VL, Wiebers DO, Niktin YP, O'Fallon WM, Whiisnant JP. Risk factors for ischemic stroke in a Russian Community. A population based case control study. Stroke, 1998 Jan; 29(1): 34-9.

22. Bormsteir NM, Aronovick BD, Karepov VG, Treves TA, Oved M, Kerczyn AD. The Tel Aviv Stroke registry. 3600 consecutive patients. Stroke 1996 Oct; 27(10): 1770-3.

23. Qureshi Al, Suri MA. Safdar K, Ottenlips JR, Janseen RS, Frankel MR. Intracerebral hemorrhage in blacks. Risk factors, subtypes and outcome. Stroke 1997 May; 28(5): 961-4.

24. Zechner H, Schmidt R, Reinhart B, Grieshofer P, Eber B, Fazekas F et al. Cerebrovascular risk factors in an elderly Austrian population. First year results of the Austrian Stroke Prevention Study (ASPS). Wien Klin Woehenschir 1993; 105(14): 398-403.

25. Moulin T, Tatu L, Creptin-Leblond T, Charot D, Berger S, Rumbach T. The Besancon Stroke Registry. An acute stroke registry of 2,500 consecutive patients. Eur-Neurol 1997; 38(1): 10-20.

26. He J, Klag MJ, Wu Z, Whelton PK. Stroke in the People's Republic of China I. Geographic variations in incidence and risk factors. Stroke 1995 Dec; 26(12): 222-7.

27. Singh RB, Suh IL, Singh VP et al. Hypertension and stroke in Asia. Prevalence, control and strategies in developing countries for prevention. J Hum Hypertens 2000 Oct-Nov; 14(10-1}" 749-64.

28. Beevers DG, Mac Gregor GA. Hypertension in special circumstances. Hypertension in practice 2nd ed. Martin Dunitz Ltd 1995:195-241.

29. Broderick J Brott T, Basan W, Haley EC, Levy D, Marler J, Sheppard G, Blum C. Blood pressure during the first minutes of focal cerebral ischemia. Ann EmergMed, 1993; 22: 1438-1443.

30. Zafar R. Systemic Hypertension in local population. Biomedica 1998 Jan-Jun; 14: 63-65.

31. Loyke HG. The three phases of blood pressure in stroke. South MedJ. 1990; 83:660-3.

32. Chammorro A, Vila N, Ascaso C, Elices E, Schonewille W, Blanc R. Blood pressure and functional recovery in acute ischemic stroke. Stroke 1998; 29:1850-1853.

33. Wallace JD, Levy LL. Blood pressure after stroke. JAMA 1981; 246: 2177-2180.

34. Britton M, Carlsson A, de Faire U. Blood pressure course in patients with a acute stroke and matched controls. Stroke 1986; 17: 861-64.