

# Clinical profile of stroke: The experience at King Abdulaziz University Hospital

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## المظاهر الإكلينيكية للسكتة الشللية الدماغية في مستشفى جامعة الملك عبد العزيز

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**الملخص: الهدف:** معرفة المظاهر الإكلينيكية و العوامل الخطرة للسكتة الشللية الدماغية للمرضى الذين تم تنويمهم في مستشفى جامعة الملك عبد العزيز في المنطقة الغربية للمملكة العربية السعودية. **الطريقة:** تمت دراسة جميع حالات السكتة الشللية الدماغية للمرضى الذين تم تنويمهم في الفترة ما بين يناير ١٩٩٥م إلى ديسمبر ١٩٩٩م. **النتائج:** تمت دراسة ١٠٣ حالة منهم ٥٦% سعوديين و ٤٤% غير سعوديين وقد لوحظ زيادة نسبة الذكور بمتوسط أعمار للسعوديين ٦٦ و ٦٣ سنة لغير السعوديين. كان سبب معظم الحالات في السعوديين قلة الدموية الموضعية (٧٤%) أما النزيف فكان السبب في (١٠%) من الحالات ولم يحدد السبب في ١٦% حالة أخرى، أما في غير السعوديين فكانت النسب ٦٣%، ٢٩%، ٩% على التوالي. وقد لوحظ زيادة نسبة الإصابة بالسكتة الشللية الدماغية مع زيادة العمر في السعوديين أما عند غير السعوديين فقد قلت نسبة الإصابة بعد العقد السادس من العمر. لم يلاحظ أي اختلاف في العوامل الخطرة أو نسبة الوفاة بين السعوديين و غير السعوديين. **الخلاصة:** المظاهر الإكلينيكية للسكتة الشللية الدماغية و العوامل الخطرة في الحالات التي تم تنويمها في مستشفى جامعة الملك عبد العزيز بجدة كانت مشابهة لنتائج الدراسات الأخرى التي أجريت في مناطق أخرى من المملكة العربية السعودية ومن العالم.

**ABSTRACT. Objectives:** To determine the pattern and risk factors of stroke in Saudi nationals and non-Saudis, at King Abdulaziz University Hospital (KAUH), in the western province of Saudi Arabia. **Method:** All cases of stroke admitted to KAUH in the period between January 1995 and December 1999 were studied. Demographic data of the patients, stroke types, risk factors and mortality were reported. **Results:** Of the 103 patients studied, 56% were Saudis and 44 % non-Saudis with male predominance and mean ages of 66 and 62 years respectively. In Saudis, the stroke types were 74% ischemic, 10% hemorrhagic and 16% unspecified, whereas in non-Saudis, the figures were respectively 62%, 29% and 9%. The frequency of stroke increased steadily with age in Saudis but dropped after the sixth decade in non-Saudis. There was no significant difference between the Saudis and the non-Saudis in the occurrence of risk factors for stroke or in mortality. **Conclusion:** The pattern and risk factors of cases of stroke treated at KAUH are similar to those reported from other regions of Saudi Arabia and other parts of the world.

**Key words:** stroke, risk factors, Saudis, non- Saudis

STROKE IS ONE OF THE LEADING CAUSES OF DEATH, long-term disability, and hospital admission in the industrialized world.<sup>1</sup> The loss of the affected individuals from work force and the extended hospitalisation they require during recovery make the economic impact of the disease among the most devastating. In Sweden, the prevalence of home-bound stroke victims with residual dysfunctions after an average 95.2 days' hospitalisation has been estimated at 0.74 per 1000.<sup>2</sup> Studies in USA suggest an annual cost of at least \$ 30-40 billion.<sup>3,4</sup> The frequency of different types of stroke, their risk factors and incidence rates vary in different regions of the world.<sup>5-11</sup> There are

several reports on the pattern and risk factors of stroke in the middle and eastern provinces of Saudi Arabia.<sup>9,12-15</sup> We report our experience regarding Saudi nationals and non-Saudis at King Abdulaziz University Hospital (KAUH) in the western province of Saudi Arabia.

### METHOD

KAUH is a teaching hospital with a capacity of 400 beds. The medical charts of all patients admitted to this hospital with a diagnosis of stroke from January 1995 to December 1999 were reviewed. Stroke was defined as per the World

Health Organization (WHO)'s definition: *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 vascular origin.*<sup>16</sup> Findings of brain computerized tomography (CT) scan performed within one week of the onset of stroke were used for classification of the type of stroke. Cerebral infarction was diagnosed based on typical CT scan findings of infarct or a normal CT scan when it was performed within two days of the onset of stroke, or the presence of a potential source of cerebral emboli such as the heart or carotid artery relevant to the side of the stroke. Patients with cerebral infarction were further classified into lacunar infarct (defined as infarct measuring up to 1.5 cm on CT scan of the brain) and non-lacunar infarct (defined as infarct measuring >1.5 cm on CT scan of the brain). Intracerebral haemorrhage (ICH) or subarachnoid haemorrhage (SAH) was diagnosed based on clinical and CT scan findings. Where none of these criteria were fulfilled, the cause was classified as unspecified type of stroke. In addition to the findings on neurological evaluation at the time of admission, results of clinical and investigative findings of cardiovascular systems were also analysed. Patient's age, sex, nationality, presence of diabetes mellitus (DM) (defined according to the WHO criteria),<sup>17</sup> hypertension (defined as systolic blood pressure >160 mmHg and /or diastolic blood pressure >95 mmHg at the time of admission and persisted even after that during the hospital stay or if the patient is already known hypertensive), hyperlipidemia (defined as total cholesterol >5.2mmol/l, triglyceride >2.3 mmol/l, HDL<0.9 mmol/l, LDL>3.4 mmol/l), history of smoking were recorded as well as history of transient ischemic attacks (TIA), presence

**Table1.** Distribution of stroke type in Saudi and non-Saudi by age group

Stroke type		<45 Years	45-65 Years	>65 Years	Total
<b>ICH</b>	S		2 (33)	4 (67)	6
	NS	2 (20)	3 (30)	5 (50)	10
<b>SAH</b>	S				
	NS		2 (67)	1 (33)	3
<b>LI</b>	S	1 (7)	7 (50)	6 (43)	14
	NS		4 (100)		4
<b>NLI</b>	S	1 (3)	13 (45)	15 (52)	29
	NS	3 (13)	10 (42)	11 (46)	24
<b>U</b>	S		5 (56)	4 (45)	9
	NS	1 (17)	2 (50)	1 (25)	4

ICH=intracerebral hemorrhage, SAH=subarachnoid hemorrhage, LI=lacunar infarct, NLI= non lacunar infarct, U=unspecified, S= Saudi, NS=non-Saudi

**Table2.** Relation between risk factors, stroke type and nationality

Stroke type	Total*	Nationality	HBP	DM	HL	Smoking
ICH	6	S	4 (67)	1 (17)	3 (50)	1 (17)
	10	NS	5 (50)	2 (20)	1 (10)	4 (40)
SAH		S				
	3	NS	2 (67)	2 (67)		2 (67)
LI	14	S	4 (29)	10 (71)	6 (43)	6 (43)
	4	NS	2 (50)	1 (25)	4 (100)	1 (25)
NLI	29	S	15 (52)	12 (41)	7 (24)	15 (52)
	24	NS	15 (63)	14 (58)	9 (38)	8 (33)
U	9	S	6 (67)	7 (78)	4 (44)	5 (56)
	4	NS	4 (100)	2 (50)		1 (25)

\* more than one risk factor in one patient

ICH= intracerebral haemorrhage, SAH= subarachnoid haemorrhage, LI=lacunar infarct, NLI= non-lacunar infarct, U= unspecified, S= Saudi, NS= non-Saudi, HBP= hypertension, DM=diabetes mellitus, HL=hyperlipidemia

of aphasia, loss of consciousness, recurrent stroke, presence of bilateral stroke, stroke in evolution, use of mechanical ventilation and mortality.

Statistical analysis was done using SPSS 7.5 software. A two-tailed student's t-test and chi-square ( $\chi^2$ ) were used as appropriate.  $p < 0.05$  was considered significant.

## RESULTS

A total of 103 patients were studied, out of which 58 (56%) were Saudis and 45 (44%) non-Saudis with a male:female ratio of 1.4:1 versus 1.6:1 and mean age of  $65.8 \pm 12.6$  years versus  $61.75 \pm 14.75$  years ( $p$  0.7 and 0.1 respectively). In Saudis, ischemic stroke constituted the majority of cases, 43/58 (74%), [14/43 (33%) lacunar infarct and 29 /43 (67%) non-lacunar infarct], while hemorrhagic stroke were reported in 6/58 (10%) and unspecified in 9/58 (16%). In non-Saudis ischemic stroke constituted 28/45 (62%), [4/28 (14%) lacunar infarct and 24/28 (86%) non-lacunar infarct], hemorrhagic stroke 13/45 (29%), [10/13 (77%) ICH and 3/13 (23%) SAH], and unspecified in 4/45 (9%). Hemorrhagic stroke was encountered more often in non-Saudis ( $p$  0.03). The incidence of stroke – both ischemic and hemorrhagic – increased progressively after the age of 45 in Saudis, while in non-Saudis ischemic stroke was mainly in the age group 45–65 and hemorrhagic stroke increased with age [Table 1]. Risk factors for stroke such as hypertension, DM, hyperlipidemia and smoking were present in both Saudis and non-Saudis with no significant

**Table 3.** Comparison between Saudis and non-Saudis in relation to some stroke characteristics

Sign	Saudi N=58	Non-Saudi N=45	P value
Aphasia N (%)	19 (33)	22 (49)	0.09
Loss of consciousness N (%)	13 (22)	17 (38)	0.08
Rt. Hemiplegia N (%)	24 (41)	25 (56)	0.2
Bilateral Stroke N (%)	10 (17)	6 (13)	0.5
Recurrent stroke N (%)	16 (28)	8 (18)	0.2
Stroke in evolution N (%)	4 (7)	2 (4)	0.5
Transient ischemic attack N (%)	6 (10)	5 (11)	0.9
Mechanical ventilation N (%)	5 (9)	1 (2)	0.1

difference between the two: 29/58 (50%), 30/58 (52%), 20/58 (35%), 27/58 (47%) in Saudis and 28/45 (62%), 21/45 (47%), 14/45 (31%), 16/45 (36%) in non-Saudis (p 0.2, 0.6, 0.7, 0.5 respectively). Hypercholesterolemia was the commonest type of hyperlipidemia found in our patients in both Saudis and non-Saudis. While 15/20 (75%) of the Saudis had isolated hypercholesterolemia, 3/20 (15%) had mixed hyperlipidemia and 2/20 (10%) had hypertriglyceridemia, the corresponding figures for non-Saudis were 10/14 (71%), 3/14 (21%) and 1/14 (7%). As shown in Table 2, hypertension was the commonest risk factor for both ischemic and hemorrhagic strokes in both Saudis and non-Saudis. Aphasia and loss of consciousness were reported more frequently in non-Saudis while there was no significant difference in the other stroke characteristics between Saudis and non-Saudis (Table 3). Parietal area and cerebellum were the areas most often involved in both Saudis and non-Saudis, 21/58 (36%) and 10/58 (17%) versus 14/45 (31%) and 21/45 (27%) (p 0.5, 0.3 respectively). Nine of 58 (16%) of the Saudis patients died versus 12/45 (28%) non-Saudis (p 0.16).

## DISCUSSION

Our results showed that stroke was more frequent in the sixth decade of life with male predominance in both Saudis and non-Saudis, a finding similar to what has been reported by others.<sup>9,10,12,14</sup> Ischemic stroke had been reported to be more frequent than hemorrhagic stroke.<sup>10,18,19</sup> It accounted for 74% of cases in Saudis while ICH was more frequent than SAH; both were encountered more in non-Saudis, which is consistent with what had been reported from

other regions of Saudi Arabia.<sup>12,14,15</sup> The frequency of stroke increased steadily with age in Saudis and dropped after the sixth decade in non-Saudis, a finding in agreement with what had been reported by Al-rajeh et al.<sup>14</sup> Reports from other parts of the world also show that frequency of stroke increases with age.<sup>10,19</sup> We reported a mortality of 16% in Saudis, which is similar to that reported from Riyadh area<sup>9</sup> and other parts of the world.<sup>19</sup>

Several risk factors for stroke have been identified, including age, hypertension, DM, cigarette smoking and hyperlipidemia.<sup>20-22</sup> The frequency of these risk factors is high in both Saudis and non-Saudis with hypertension being the commonest in both ischemic and hemorrhagic stroke. Hypertension, including borderline hypertension, is probably the most important risk factor for stroke based on the degree of risk and prevalence as described by Sacco.<sup>23</sup> Data from the Harvard Stroke Registry, the Stroke Data Bank, and the New England Medical Center Registries indicate that multiple potential stroke aetiologies are frequent.<sup>24-26</sup> Among the 407 patients in the New England Medical Center Registry, 20% had two, and 2% had three potential aetiologies for ischemia. The frequent coexistence of more than one and sometimes multiple potential risk factors for stroke is an important factor. All patients who have evidence of potential risk factors for stroke deserve control and modification of these factors when possible. The importance of control of hypertension has to be stressed to the treating physicians. An overview of 14 treatment trials concluded that a long-term (mean five years) 5 to 6 mmHg decrease in the usual diastolic blood pressure was associated with 35-40% reduction in stroke incidence.<sup>27</sup> Treating hyperlipidemia with HMGCoA reductase inhibitor has been described by Bucher to reduce the incidence of stroke.<sup>28</sup> Several studies have reported that physical inactivity increases the risk of stroke and those who participate in leisure-time physical activity have a lower risk.<sup>29-32</sup>

## CONCLUSION

This study reveals that the pattern of stroke and its risk factor profile at KAUH, in the western province of Saudi Arabia, is similar to that reported from other regions of Saudi Arabia and other parts of the world.

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