



Epidemiology of Stroke Associate with Diabetes Mellitus

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ABSTRACT

Stroke also known as cerebrovascular accident or cerebrovascular insult is when poor blood flow to the brain result in brain death. The 1990 Global Burden of Disease (GBD) study provided the first global estimate on the burden of 135 diseases, and cerebrovascular diseases ranked as the second leading cause of death after ischemic heart disease. During the past decade the quantity of especially routine mortality data due to cerebrovascular disease has been increased, and is now covering approximately one-third of the world's population. Data on causes of death from the 1990s have shown that cerebrovascular diseases remain a leading cause of death. In 2001 it was estimated that cerebrovascular diseases (stroke) accounted for 5.5 million deaths world-wide, equivalent to 9.6 % of all deaths. Two-thirds of these deaths occurred in people living in developing countries and 40% of the subjects were aged less than 70 years.

KEYWORDS: Cerebrovascular accident, blood flow, mortality rate, age.

INTRODUCTION

The World Health Organisation (WHO) 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⁽¹⁾. The epidemiological studies have indicated that hypertension and type 2 diabetes are commonly associated conditions, and their concordance is increased in populations⁽²⁾. While diabetes is a well known risk factor for stroke, the magnitude of risk varies, and the impact of diabetes on stroke incidence rates is not known⁽³⁾. The prevalence of diabetes increases with age in all race/ethnicity groups⁽⁴⁾. Specific

and nonspecific risk factors of stroke in the diabetic population include previous cerebrovascular disorders, arterial hypertension, central obesity, smoking, dyslipidemia, hyperglycaemia, diabetes duration, diabetic complications, and insulin resistance/hyperinsulinemia^(5,6).

TYPES

On the basis of pathogenesis it may be either ischemic or haemorrhagic disturbances in cerebral blood flow.

ISCHEMIC STROKE

It may be due to thrombotic cerebral infarction (atherosclerotic obstruction) embolic cerebral

infarction (embolism of a clot) and lacunar cerebral infarction (small deep infarcts).several other causes of cerebral infarction are also present.

HEMORRHAGIC STROKE

Spontaneous intra-cerebral hemorrhages are mainly due to arteriolar hypertensive disease. Cortical amyloid angiopathy (a consequence of hypertension) is a cause of cortical haemorrhages especially occurring in elderly people.

SUBARACHNOID HAEMORRHAGE

This group of strokes is mainly due to the rupture of aneurysms at the bifurcations of large arteries at the inferior surface of the brain⁽⁷⁾.

DISTRIBUTION OF STROKE

In Caucasian population study the incidence rate ratios for different main types of stroke, for ischemic stroke; the ratio was 1.55, for intra-cerebral haemorrhage 1.60, for SAH 0.84 and for stroke of undetermined cause 1.08⁽⁸⁾.

RISK FACTORS

Several studies have demonstrated that high blood pressure is an independent risk factor for stroke in diabetic patients^(9,10). In some studies concerning the joint prognostic effect of hypertension and type 2 diabetes on stroke risk in the general population, it is not well known whether the increasing risk of stroke comes from the effect of hypertension or type 2 diabetes alone or from the combined effect of both hypertension and type 2 diabetes^(11,12). It is suggested that one of the risk factors for stroke in patients with T2DM is high activity of cells with histamine receptors and prostaglandin-synthesising cells. These cells suppress cell-mediated immunity to insulin and may have a role in promoting the development of insulin resistance⁽¹³⁾. Modifiable risk factors includes Hypertension, Cardiac diseases, Atrial fibrillation, Coronary heart disease, Left ventricular hypertrophy, Cigarette smoking, Diabetes mellitus, Asymptomatic carotid stenosis, Dyslipidemias, Total cholesterol, HDL chole-

sterol, LDL cholesterol, Triglycerides, Alcohol consumption, Physical inactivity, Obesity, Hematocrit level, Fibrinogen⁽¹⁴⁾. Non modifiable risk factors include age, sex, family history and race⁽¹⁵⁾.

PREVENTION

Stroke prevention in patients with diabetes involves multi-factorial interventions. The most effective strategies include strict blood pressure control, anti platelet therapy, and lipid altering therapy. Although glucose-lowering therapy has been shown to reduce micro-vascular disease, its effect on macro vascular disease is unclear, and there are no conclusive data showing a benefit in stroke patients⁽¹⁶⁾; however, there are data showing a reduction in macro vascular disease in patients with type 1 diabetes managed with a glucose-lowering strategy⁽¹⁷⁾.

TABLE 1:-

MODIFIABLE RISK FACTORS	MANAGEMENT
Hypertension	Regular screening for hypertension (at least every 2 years in adults) and appropriate management. ⁽¹⁸⁾
Smoking	Strongly encourage patient and family to stop smoking. Provide counselling, nicotine replacement, and formal programs as available. ⁽¹⁹⁾
Diabetes	Careful control of hypertension in both type 1 and type 2 diabetics ^(19,20)
Carotid stenosis	Endarterectomy may be considered ⁽²¹⁾
Atrial fibrillation	Antithrombotic therapy (warfarin or aspirin) ⁽²²⁾
Hyperlipidemia	Treatment with a statin ⁽²³⁾
Obesity	Weight reduction ⁽²¹⁾
Physical inactivity	Regular exercise ⁽²⁴⁾
Poor diet	A healthy diet containing at least 5 daily servings of fruits and vegetables ⁽²¹⁾
Alcohol abuse	No more than 2 drinks per day for men and 1 drink per day for non pregnant women ⁽¹⁹⁾

TREATMENT

Tissue plasminogen activator (tPA) was approved for the treatment of acute ischemic stroke in the United States in 1996 and in Canada in February 1999. The barriers to using tPA for acute ischemic stroke are dominated by

the short time window: the drug must be administered within 3 hours of stroke onset. Patients must fulfill strict inclusion criteria because of the risk of symptomatic intracerebral haemorrhage. Another major impediment is the lack of public understanding of what the symptoms of stroke are⁽²⁵⁾. Stroke thrombolytic therapy with intravenous alteplase may be ineffective for patients with severe ischemic stroke due to large vessel occlusion. Angiographically controlled studies using alteplase (double-chain, recombinant tissue-type plasminogen activator) found that recanalization of large vessel occlusions were uncommon after a 60-minute infusion⁽²⁶⁾.

CONCLUSION

The mortality rate and the incidence of stroke are in concordance with the results of many studies, and they indicate that T2DM is a strong risk factor for stroke. In patients with disturbances of carbohydrate metabolism the course of stroke is worse, the period of rehabilitation is longer and the mortality rate is higher⁽²⁷⁾. Some systematic overview shows that in patients with no history of diabetes who have an ischemic stroke, even moderately elevated glucose levels are associated with both a 3-fold higher risk of short-term mortality and an increased risk of poor functional recovery compared with lower glucose levels. This finding is supported by studies showing higher mean admission glucose level in non survivors of stroke compared with survivors⁽²⁸⁾. Thus, this review article conclude that management of diabetes is important to reduce the risk of ischemic stroke in patients, since it plays one of the major cause of stroke.

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