

# Cerebrovascular Diseases

## Part II

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# STROKE

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- The Definition Of Stroke ✓
- Classification of Strokes ✓
- **Stroke Incidence and Prevalence**
- **Risk Factors for Stroke**

# Stroke Incidence and Prevalence

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- **Stroke is a highly prevalent disease.** According to the WHO, around 15 million people, worldwide, suffer from stroke each year. Among those, 5 million die and another 5 million are permanently disabled.
- **Four out of five strokes occur in the low- and middle-income countries.** Stroke has been shown to be a major cause of death and disability in all societies irrespective of communities (industrial, agricultural, urban, or rural) which have been studied.
- **The incidence of stroke rapidly increases with age,** doubling for each decade after age 55. Among adults ages 35-44, the incidence of stroke is 30-120 of 100,000 per year, and for those ages 65-74, the incidence is 670-970 of 100,000 per year.
- **Approximately 800,000 first-ever or recurrent strokes occur each year** in the United States, with the majority being first-ever strokes (roughly 600,000). Of these strokes, approximately 87% are ischemic infarctions, 10% are primary hemorrhages, and 3% are subarachnoid hemorrhage.

# **Risk Factors for Stroke**

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# Risk Factors for Stroke

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## I. Non modifiable risk factors

- Age.
- Gender.
- Family History of Stroke (Genetic determinants).
- Racial-ethnic factors.

## II. Modifiable risk factors:

- Hypertension.
- Cardiac Disease (Particularly Atrial Fibrillation [AF]).
- Diabetes Mellitus.
- Cigarette Smoking.
- Alcohol Consumption.
- Migraine
- Combined Oral Contraceptives
- Hyperlipidemia.
- Carotid Artery Stenosis.
- Sedentary Lifestyle.

# I. Non Modifiable Stroke Risk Factors

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Although there is little that can be done to control these factors, they identify people who may be at increased risk for future strokes.

## ❖ Age

Stroke rates increase dramatically with age. Approximately two thirds of all strokes occur after age 65 years. In the Framingham study, the mean age of stroke patients was 65.4 years for men and 66.1 years for women. As the population ages, the burden of stroke becomes greater.

## ❖ Gender

The stroke incidence rate is greater in men than in women.

# I. Non Modifiable Stroke Risk Factors

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## ❖ **Family history of stroke (Genetic determinants).**

Family history of stroke is regarded as a very important one for the development of stroke. Obtaining information of family history could be useful in identifying people who might have high risk of stroke, which was recommended by the American Heart Association/American Stroke Association guidelines for primary prevention of stroke. Positive Family history of stroke could increase the risk of stroke by nearly 30%. Each type of family history of stroke (maternal, paternal, and sibling history) was associated with an increased stroke risk.

## ❖ **Racial-ethnic factors.**

e.g. Stroke is higher among blacks than among whites or Hispanics.

## II. Modifiable Stroke Risk Factors:

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### ❖ Hypertension

- Hypertension is the most significant modifiable risk factor for stroke, and stroke incidence is proportional to the level of the blood pressure. This is particularly true in blacks because of higher prevalence, earlier onset, greater severity, and poorer control of hypertension in this population.
- Decreasing systolic blood pressure by approximately 10 mmHg reduces the relative risk of stroke by 35% to 40%. Improved control of hypertension has resulted in a dramatic decline in stroke frequency, most notably in black women.
- Some large-scale trials have shown that certain antihypertensive regimens may confer benefit beyond the lowering of blood-pressure values.



## II. Modifiable Stroke Risk Factors:

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### ❖ Cardiac Disease

- Heart diseases are clearly associated with increased risk of ischemic stroke, particularly AF, valvular heart disease, MI, coronary artery disease, congestive heart failure, left ventricular hypertrophy on ECG, and mitral valve prolapse.
- AF, which alone carries a fivefold increased risk of stroke, is particularly important in the elderly and among those with coronary artery disease or heart failure or valvular heart disease.
- Ischemic stroke associated with AF is nearly twice as likely to be fatal as non-AF stroke.
- Recurrence is more frequent, and functional deficits are more likely to be severe among survivors.
- Because stroke is usually the initial manifestation of embolism in AF, prevention is critical to reducing disability and mortality.

## II. Modifiable Stroke Risk Factors:

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### ❖ Diabetes mellitus

- Diabetes mellitus is also a significant risk factor and is present in approximately 10% of stroke patients. It is common among blacks and particularly contributes to the development of intracranial atherosclerosis.

### ❖ Cigarette smoking

- Cigarette smoking is a very important preventable cause of stroke, and approximately 30% of stroke patients smoke. Heavy cigarette smoking (more than one pack per day) carries 11 times the ischemic stroke risk and 4 times the SAH risk of people who do not smoke. The combination of hypertension, diabetes, and cigarette smoking is particularly risky and requires aggressive interventions.
- Smoking has an especially toxic effect on women taking oral contraceptives, in whom it carries 22 times the risk of developing stroke than occurs in nonsmoking women who use other forms of birth control.
- With cessation of cigarette smoking, the risk of stroke declines after 2 to 5 years.

## II. Modifiable Stroke Risk Factors:

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### ❖ **Alcohol Consumption.**

On the whole, the relative risk for ischemic stroke increases significantly with heavy alcohol consumption of five or more units of alcohol per day.

### ❖ **Migraine**

Migraine particularly migraine with aura have been consistently linked with increased risk of ischaemic stroke. An increased risk has also been observed for haemorrhagic stroke and cardiovascular disease. The precise pathophysiological mechanisms for these associations remain unclear. However, migraine with aura is associated with circulating coagulation factors and systemic endothelial dysfunction that may increase the risk of arterial thrombosis and ischaemic stroke. Migraine also increases the stroke risk remarkably if a subject smokes and/or takes contraceptive pills.



## II. Modifiable Stroke Risk Factors:

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### ❖ Combined Oral Contraceptives

- The risk of myocardial infarction or ischemic stroke was 1.6-fold increased in women using combined oral contraceptives. The risk was highest for pills containing  $\geq 50 \mu\text{g}$  of estrogen.

### ❖ Hyperlipidemia.

Abnormal serum lipid levels are regarded as risk factors. High-density lipoprotein (HDL) is protective against stroke. Carotid atheroma is linked to increased LDL and may be inversely related to HDL. Lipid-lowering agents, e.g. statins, which lower LDL and triglyceride levels and increase HDL, reduced the risk for vascular events such as stroke and MI in at-risk populations with a history of coronary artery disease or MI in some trials. Patients taking lipid-lowering agents at the time of an ischemic stroke might have lower poststroke mortality and a lower risk of worsening during hospitalization.



## II. Modifiable Stroke Risk Factors:

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### ❖ Carotid Artery Stenosis.

Atherosclerotic stenosis of the carotid artery implicated in 20–25% of all strokes. Even when asymptomatic, stenosis of the carotid artery has been reported to place an individual at more than 3% increased risk of having a stroke in the next year.

### ❖ Sedentary lifestyle

Sedentary lifestyle is a well-known modifiable risk factor in primary and secondary stroke prevention. Also, in recent years, exercise has been described as a neuroprotective and neuroreparative factor.

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# Thank You