بسم الله الرحمن الرحیم

PRIMARY & SECONDARY PREVENTION IN STROKE

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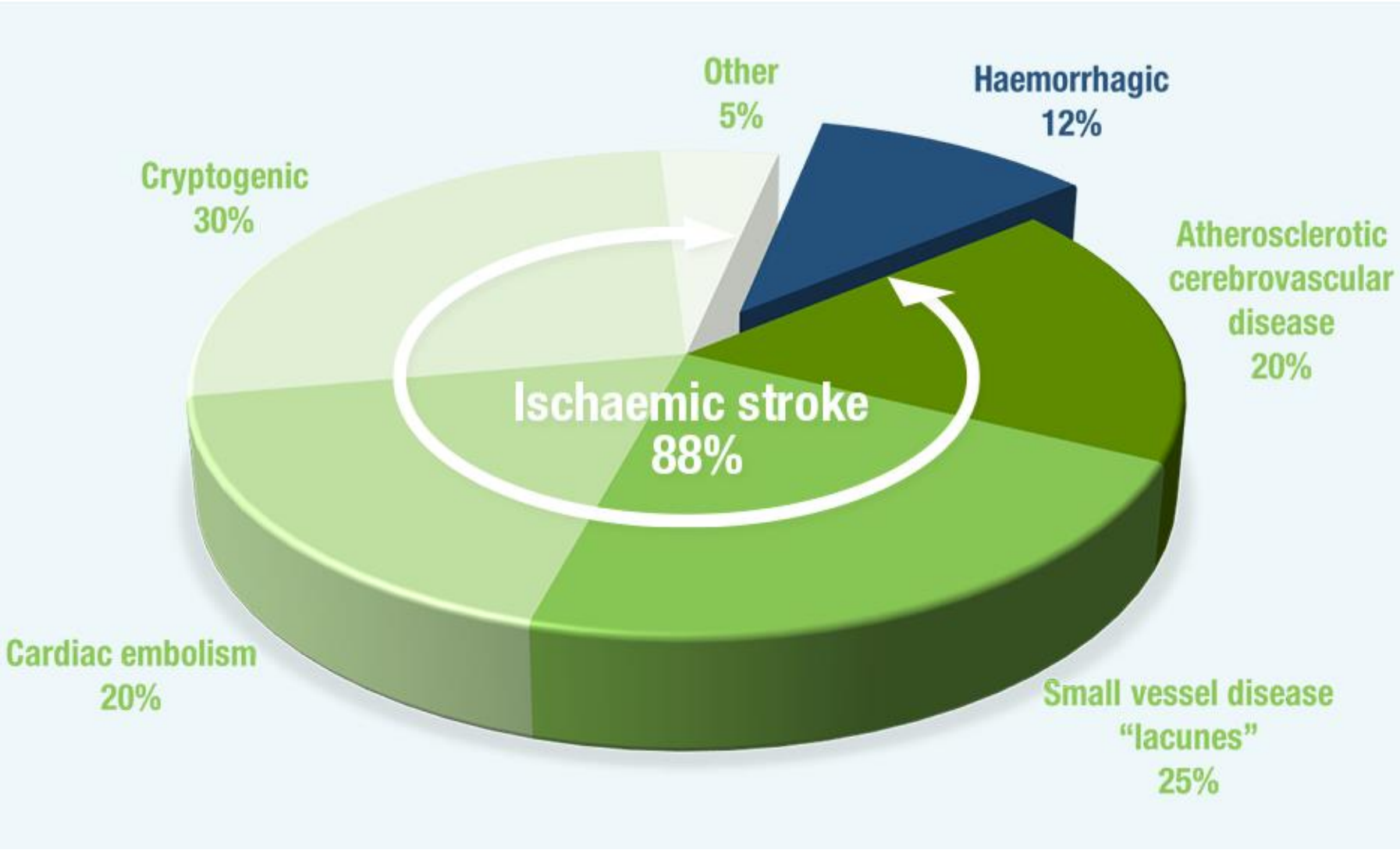
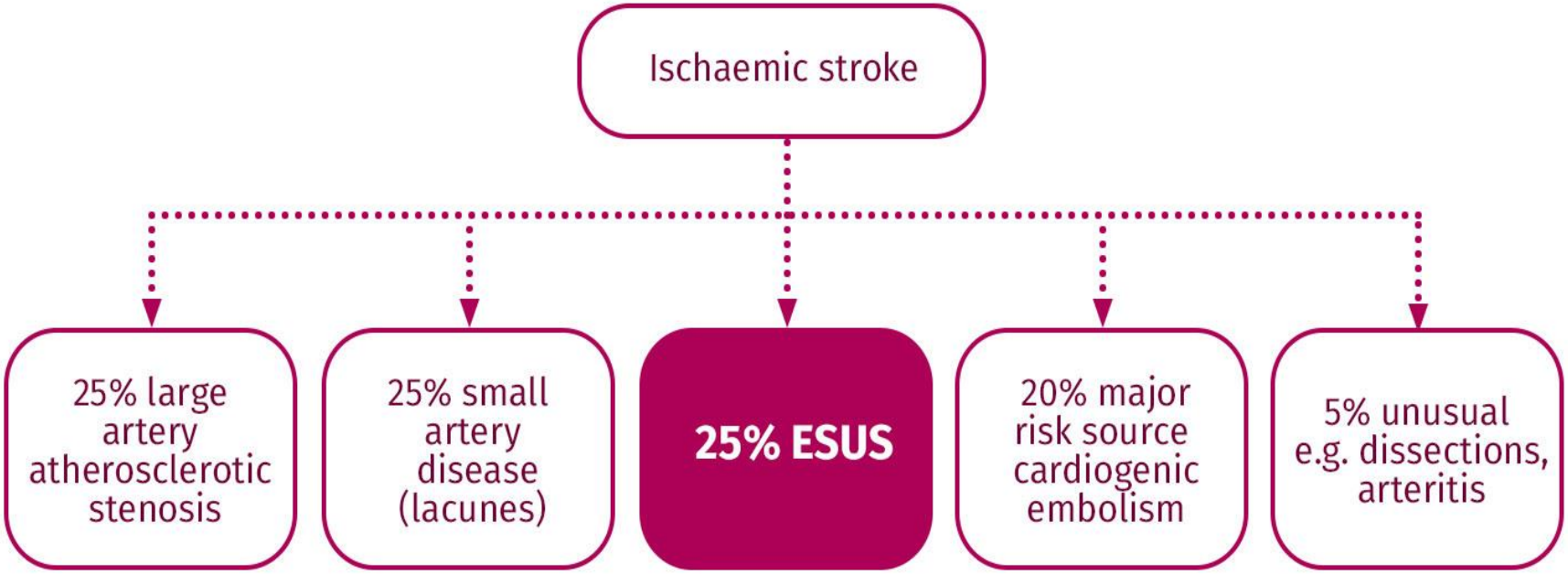

Other
5%
Haemorrhagic
12%
Cryptogenic
30%
Atherosclerotic
cerebrovascular
disease
20%
Ischaemic stroke
88%
Cardiac embolism
20%
Small vessel disease
"lacunes"
25%



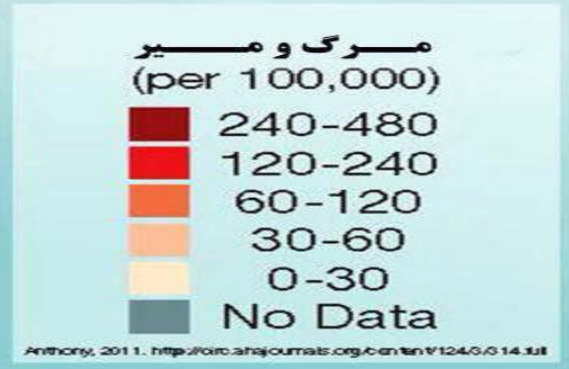
۷ آبان
#روز جهانی سکته‌ی مغزی

از هر ۶ نفر **یک نفر** در طول عمر خود دچار سکته ی مغزی خواهد شد.

سالانه در کل جهان ۱۵ میلیون نفر دچار سکته ی مغزی می شوند که ۶ میلیون نفر آن ها زنده نمی مانند.

در کل جهان هر ۶ ثانیه یک نفر به خاطر سکته ی مغزی زندگی خود را از دست می دهد.

۱ دقیقه =

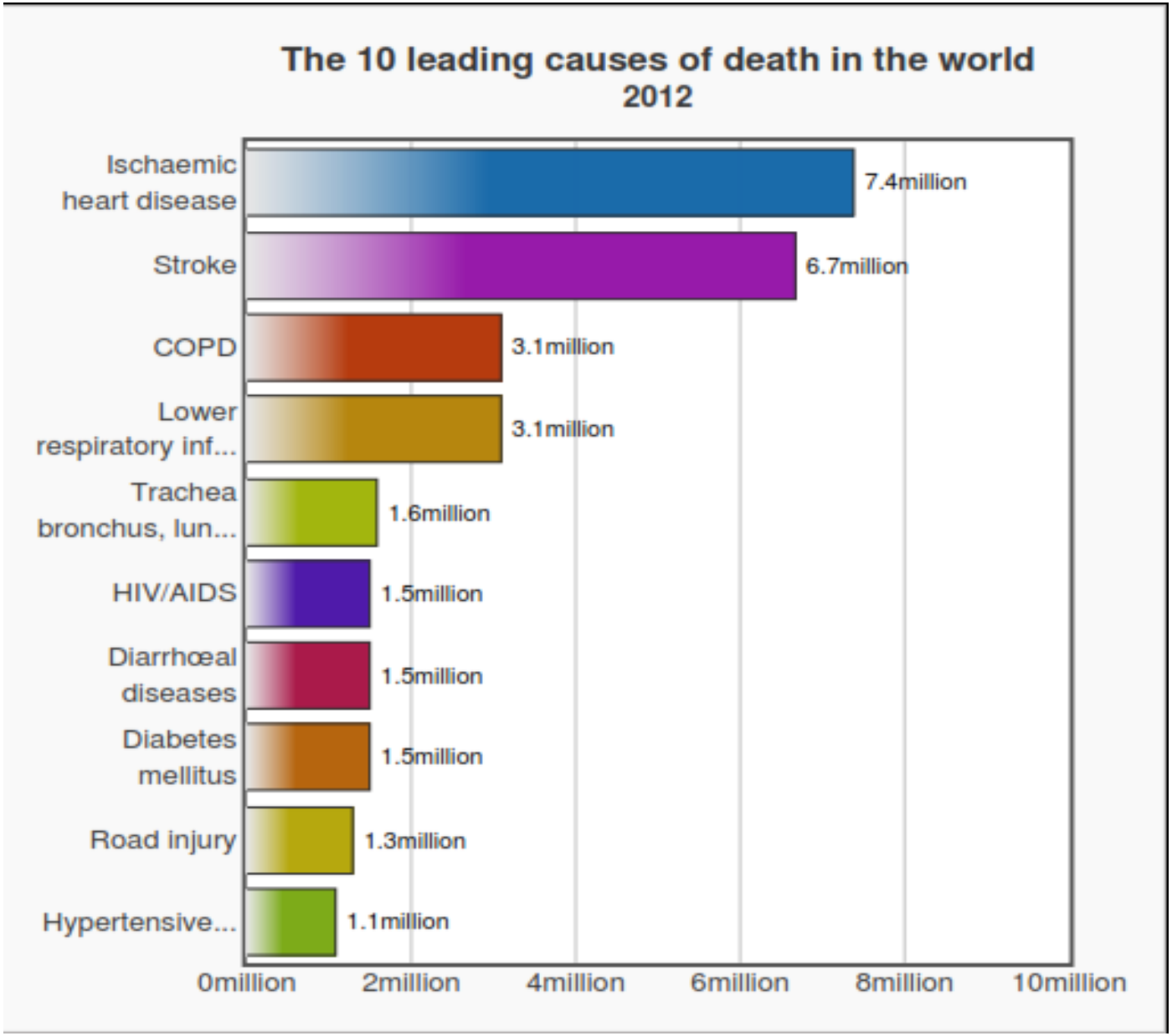


سکته ی مغزی عمدتا قابل پیشگیری و درمان است

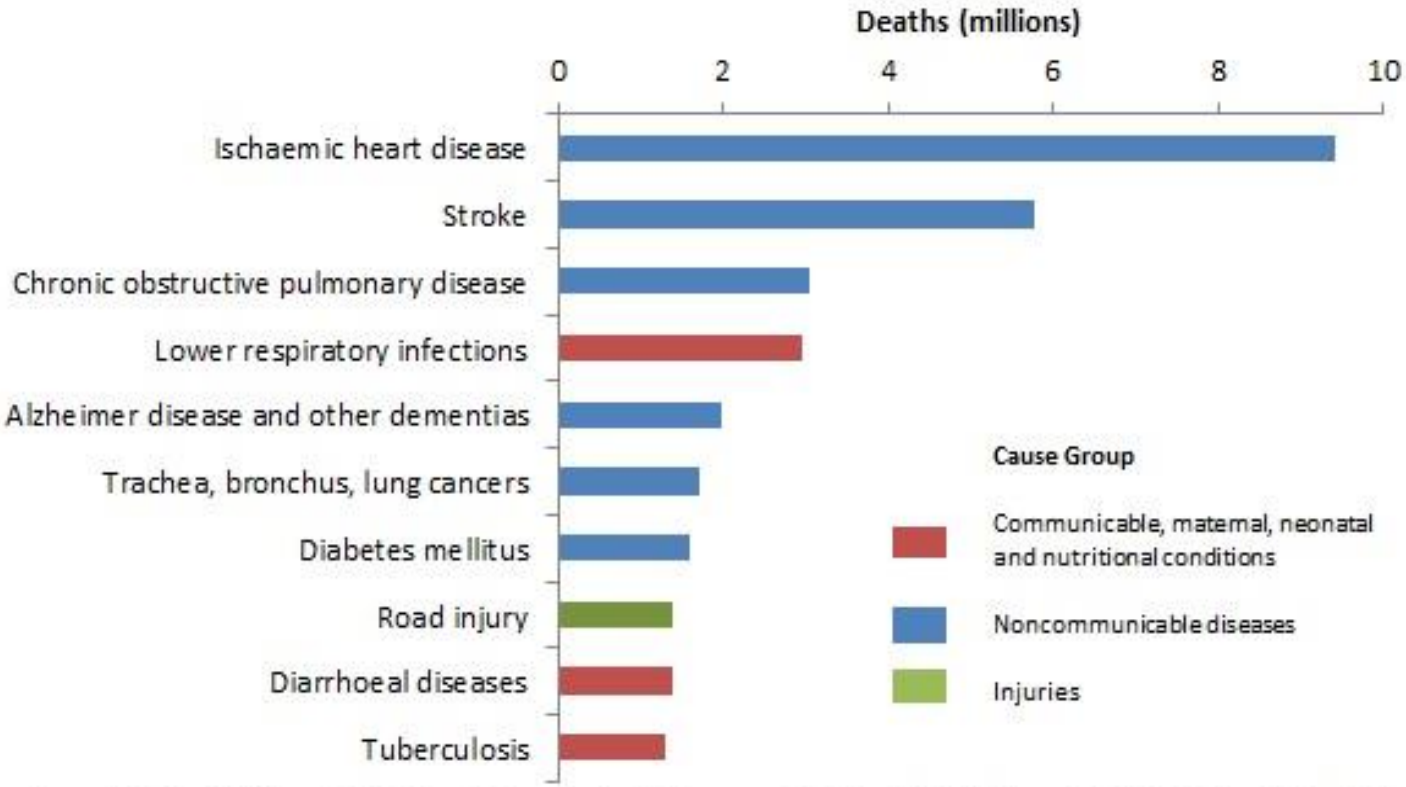
همه باهم به سوی دنیایی بدون سکته ی مغزی

Iranian Stroke Association, 2006

انجمن استروک ایران، ۱۳۸۵

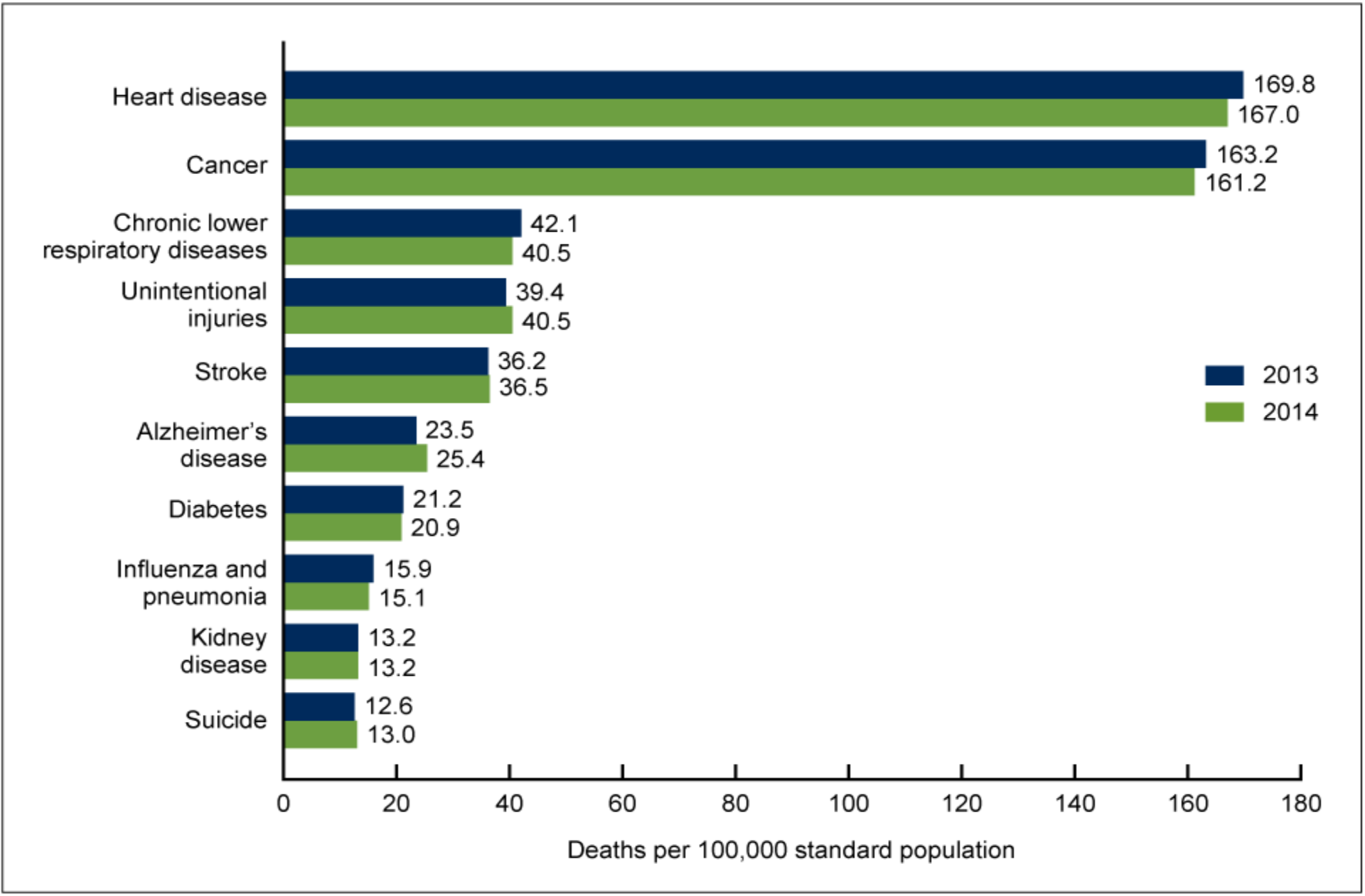

The 10 leading causes of death in the world
2012
Ischaemic heart disease
7.4million
Stroke
6.7million
COPD
3.1million
Lower respiratory inf...
3.1million
Trachea bronchus, lun...
1.6million
HIV/AIDS
1.5million
Diarrhœal diseases
1.5million
Diabetes mellitus
1.5million
Road injury
1.3million
Hypertensive...
1.1million
0million
2million
4million
6million
8million
10million

Top 10 global causes of deaths, 2016



Source: Global Health Estimates 2016: Deaths by Cause, Age, Sex, by Country and by Region, 2000-2016. Geneva, World Health Organization; 2018.

Figure 3. Age-adjusted death rates for the 10 leading causes of death: United States, 2013 and 2014



NOTES: A total of 2,626,418 resident deaths were registered in the United States in 2014. The 10 leading causes accounted for 73.8% of all deaths in the United States in 2014. Access data table for Figure 3 at: http://www.cdc.gov/nchs/data/databriefs/db229_table.pdf#1. Causes of death are ranked according to number of deaths.

بررسی های انجام شده در **ایران** نشان داده شده *سن سکته حاد مغزی نسبت به میانگین سن در سایر نقاط جهان پایین تر می باشد* و با مورتالیته بیشتری در مقایسه با کشورهای پیشرفته همراه است.

اگر میزان تقریبی بروز سکته حاد مغزی در ایران را حدود ۱۵۰ در یکصد هزار نفر در نظر بگیریم بدین معنی است که در ایران در هر سال بیش از یک صد هزار نفر (بطور تقریبی در هر روز نزدیک به ۳۰۰ نفر) دچار سکته حاد مغزی می شوند.

- دومین عامل مرگ افراد در ایران
- ۱۰% مرگ و میر
- ۳۰% قادر به راه رفتن بدون کمک نیستند
- ۷۰% شغل خود را از دست میدهند

Table 13-1. Well-Documented Risk Factors for Stroke.

Nonmodifiable risk factors
Increased age
Male sex
Low birth weight
African American ethnicity
Family history of stroke
Modifiable risk factors
Vascular
Hypertension (BP >140 mm Hg systolic or 90 mm Hg diastolic)
Cigarette smoking
Asymptomatic carotid stenosis (>60% diameter)
Peripheral artery disease
Cardiac
Atrial fibrillation (with or without valvular disease)
Congestive heart failure
Coronary artery disease
Endocrine
Diabetes mellitus
Postmenopausal hormone therapy (estrogen ± progesterone)
Oral contraceptive use
Metabolic
Dyslipidemia
High total cholesterol (top 20%)
Low HDL cholesterol (<40 mg/dL)
Obesity (especially abdominal)
Hematologic
Sickle cell disease
Lifestyle
Physical inactivity

PRIMARY PREVENTION

- Lifestyle

Moderate to vigorous aerobic **activity** for 30 to 40 min per day, 3 to 4 times per week, is recommended. A **diet** low in sodium and saturated fats and rich in fruits, vegetables, low-fat dairy products, and nuts may also reduce stroke risk, as may **weight reduction in overweight or obese** patients, cessation of **smoking, and moderation of heavy alcohol use.**

- Statins Treatment with a statin is recommended for patients, with or without dyslipidemia, who are at increased (>10%) 10-year risk for cardiovascular events, including stroke. This approach reflects the finding that statins have vasoprotective (eg, anti-inflammatory) actions besides their lipid-lowering effects.

- Blood Pressure Control

Blood pressure should be reduced by lifestyle modification, antihypertensive drugs, or both for patients with hypertension (>140 mm Hg systolic or >90 mm Hg diastolic pressure).

- Glycemic Control

Diabetes increases the risk of stroke and should be treated, although the relationship between intensity of glycemic control and stroke incidence is unclear.

Remember:

- *Prevention* of risk is better than treating it.
- Exercise a lot.
- Stop smoking even before you start it.
- Lipid and BP leads to harmful consequences treat them first.

Control Risk Factors

1- BLOOD PRESSURE CONTROL

- Hypertension is the single most important modifiable stroke risk factor.

- The risk of cardiovascular disease, beginning at BP 115/75 mmHg, doubles with each increment of 20/10 mmHg.

- Recent meta-analysis seems to support the superiority of diuretics.

- The most important point is blood-pressure reduction, not the specific drug. SBP ≥ 140 or DBP ≥ 90.

2. LIPID CONTROL

- American College of Cardiology (ACC) and American Heart Association (AHA) guidelines recommend initiation of high-dose statins (atorvastatin 40 or 80 mg or rosuvastatin 20 or 40 mg) for ASCVD regardless of the patient's *age* (in the past, this recommendation was only for patients < 75 years old).

- The target of LDL < 70 mg/dL was influenced by the SPARCL trial.

3. HYPERGLYCEMIA

A large randomized study recently showed that more aggressive glucose lowering (to 80–130 mg/dL) did not result in better 3-month outcome than more relaxed treatment (to 140–180 mg/dL).

4. LIFESTYLE MODIFICATION

important part of the control of blood pressure, lipids, and glucose.

. Stop smoking.

. The Mediterranean-style diet and the diabetic diet or a low-sodium diet if indicated.

. More exercise. Forty minutes, five times per week, is optimal.

. Estrogen in the form of hormonal contraceptives or hormone replacement therapy should be avoided in most cases.

. Drugs of abuse and alcohol should be avoided, especially vasoactive drugs such as cocaine and amphetamines.

Aspirin for primary prevention?

• The use of aspirin for cardiovascular (including but not specific to stroke) prophylaxis is reasonable for people whose risk is sufficiently high (10-y risk >10%) for the benefits to outweigh the risks associated with treatment. (Class IIa; Level of Evidence A).

• Aspirin is not useful for preventing a first stroke in low-risk individuals (*Class III; Level of Evidence A).*

• Aspirin is not useful for preventing a first stroke in people with diabetes mellitus in the absence of other high-risk conditions (*Class III; Level of Evidence A).*

http://www.cvriskcalculator.com

ANTIPLATELETS

- Long-term aspirin therapy results in a ~20% relative risk reduction (RRR) of secondary stroke/other vascular events.

- Clopidogrel (Plavix) – May be slightly better than aspirin in preventing vascular events, particularly in patients with peripheral vascular disease, and better tolerated.

- Aspirin/dipyridamole ER (Aggrenox, Asasantin) – Two trials showed this combination to be 30% better than aspirin alone. In another, aspirin/dipyridamole was comparable to clopidogrel but caused a slightly higher risk of bleeding. Headache is a frequent side effect.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Ticagrelor versus Aspirin in Acute Stroke or Transient Ischemic Attack

This article was published on May 10, 2016, at NEJM.org.

CONCLUSIONS:

In our trial involving patients with acute ischemic stroke or TIA, ticagrelor was not found to be superior to aspirin in reducing the rate of stroke, myocardial infarction, or death at 90 days.

Dual Antiplatelet Therapy **(DAPT)**

(CHANCE, POINT and SAMMPRIS trials)

In patients with TIA and mild strokes, we initiate DAPT with aspirin 81 mg plus clopidogrel (300 mg load followed by 75 mg) for 21 days,

And continue aspirin 325 mg and clopidogrel 75 mg for 3 months in patients with severe intracranial atherosclerosis.

Antiplatelet therapy in the elderly: Primary prevention

The current knowledge for the primary prevention of cerebro- and cardiovascular disorders (CVDs) with aspirin is based on multiple randomized clinical trials (RCTs) and meta-analyses.

Study; Year: Primary prevention RCTS: Aspirin vs. placebo	Study; Year: Primary prevention RCTS: Aspirin vs. placebo
BMD, UK-1988(1)	***WHS***, US, 2005) (8)
PHS, US-1989 (2)	***AAAT, Scotland- 2010 (9)***
ETDRS, US-1992 (3)	***JPPP***, Japan-2014 (10)
TPT, UK- 1998 (4)	***JPAD 2***, Japan- 2017 (11)
HOT, 26 countries in Europe, Asia, Americas-1998 (5)	***ASCEND***, UK-2018(15)
PPP, Italy 2001(6)	***ASPREE***, Australia and the United States- 2018(16)
POPADAD, Scotland-2008 (7)	***ARRIVE,*** 7 countries (Germany, Italy, Ireland, Poland,Spain, UK, and USA- 2018(17)

Meta-analysis by Abdelaziz et al. including ASCEND, ASPREE and ARRIVE (2019; 15 trials, n= 165,000)

- The possible preventive benefit of aspirin in the risk reduction of nonfatal ischemic events;
- At the same time a significant increase in the risk of major bleeding.

- Abdelaziz H, et al. J Am Coll Cardiol. 2019 Jun 1;73(23).

Knowledge Until 2018

Aspirin can reduce the risk of:

a. Ischemic events nonfatal myocardial infarction (MI);
b. With no (or a very small reduction) in nonfatal stroke over 10 years;
c. But had little or no benefit for all-causes or CVDs mortality.

2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease

- Low-dose aspirin should not be administered on a routine basis for CVDs prevention among:

1- Adults aged 70 and more

2- Adults (at any age) who are at increased risk of bleeding

Comorbidities

- In addition to bleeding hazards, clinicians should always take into consideration patients' comorbidities and life expectancy.

Recommendations: harms

Aging is the most important predictor of CVDs risk and at the same time the most consistent risk factor for bleeding (with a 1.5- to 2-fold rise in the risk of bleeding in each subsequent decade after age 50, followed by male sex)

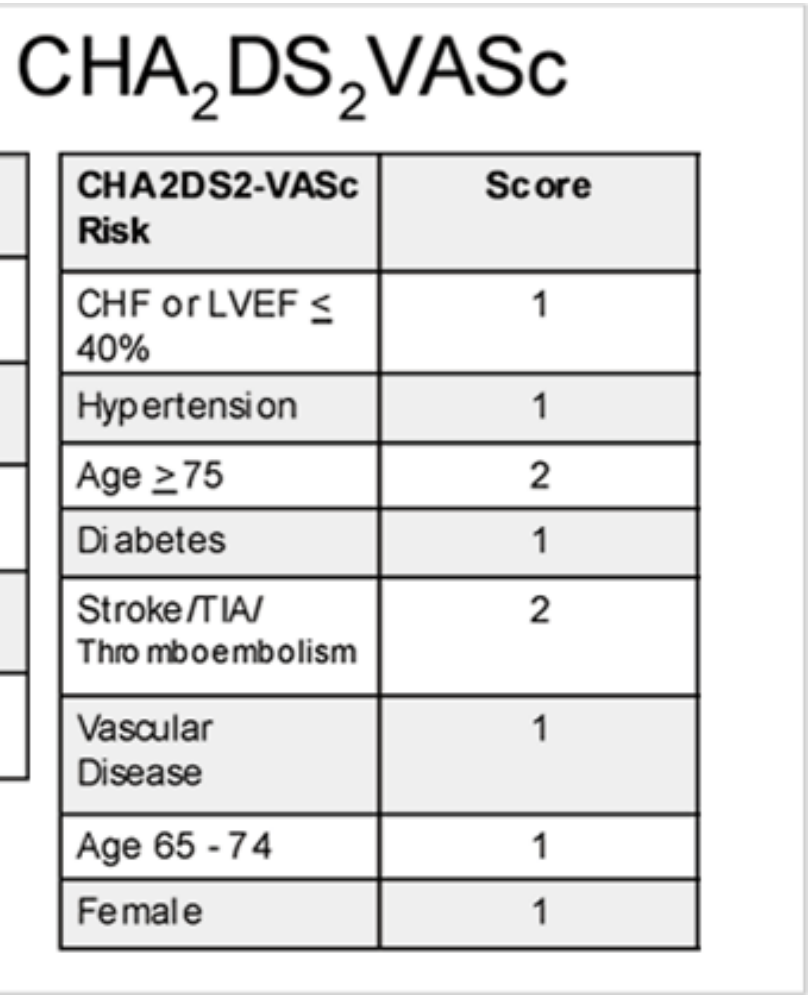
-**Anticoagulation**

The **CHA2DS2-VASc score** can be used to assess stroke risk in atrial fibrillation.

- Patients with **valvular atrial fibrillation and CHA2DS2-VASc score ≥2 should receive** long-term warfarin treatment targeted to an international normalized ratio (INR) of 2.5—0.5. Either warfarin or aspirin may be given if the CHA2DS2-VASc score is 1; no treatment is indicated for a CHA2DS2-VASc score of 0.

- In patients with **nonvalvular atrial fibrillation** and CHA2DS2-VASc score ≥2, dabigatran, rivaroxaban or apixaban can be substituted for warfarin.

The CHA2DS2-VASc score can be used to assess stroke risk in atrial fibrillation.



CHA2DS2-VASc Risk	Score
CHF or LVEF ≤ 40%	1
Hypertension	1
Age ≥75	2
Diabetes	1
Stroke/TIA/ Thromboembolism	2
Vascular Disease	1
Age 65 - 74	1
Female	1

Score	Annual stroke risk (%)
0	0.2
1	0.6
2	2.2
3	3.2
4	4.8
5	7.2
6	9.7
7	11.2
8	10.8

HAS-BLED Score:

Hypertension (uncontrolled or > 160 mmHg systolic)	Present (1 point) Absent (0 point)
Renal disease (dialysis, transplant, Cr > 2.26 mg/dL or > 200 μmol/L)	Present (1 point) Absent (0 point)
Liver disease (cirrhosis or bilirubin > 2× normal with AST/ALT/AP > 3× normal)	Present (1 point) Absent (0 point)
Stroke history	Present (1 point) Absent (0 point)
Prior major bleeding or predisposition to bleeding	Present (1 point) Absent (0 point)
Labile INR (unstable/high INRs, time in therapeutic range < 60%)	Present (1 point) Absent (0 point)
Age > 65	Present (1 point) Absent (0 point)
Medication usage predisposing to bleeding (aspirin, clopidogrel, NSAIDs)	Present (1 point) Absent (0 point)
Alcohol use (≥ 8 drinks/week)	Present (1 point) Absent (0 point)

Score	Risk (%)
0	0.9
1	3.4
2	4.1
3	5.8 (high risk)
4	8.9
5	9.1
≥ 6	Assumed at least 10%

ANTICOAGULANTS

- Atrial fibrillation.
- rheumatic valvular disease or mechanical valve
- low left ventricular ejection fraction (< 30%)
- akinesis or severe hypokinesis of left-ventricle segments (especially anterior wall or apex)
- stroke soon after myocardial infarction, especially if mural thrombus is identified on TTE
- aortic atheroma > 4 mm

- Critical extracranial carotid stenosis, string sign or total occlusion.
- Basilar thrombosis/stenosis.
-Arterial dissection.

- Coagulopathy, especially if history of venous thrombosis or PTE.
- Cerebral venous sinus thrombosis (CVT)

Circulation

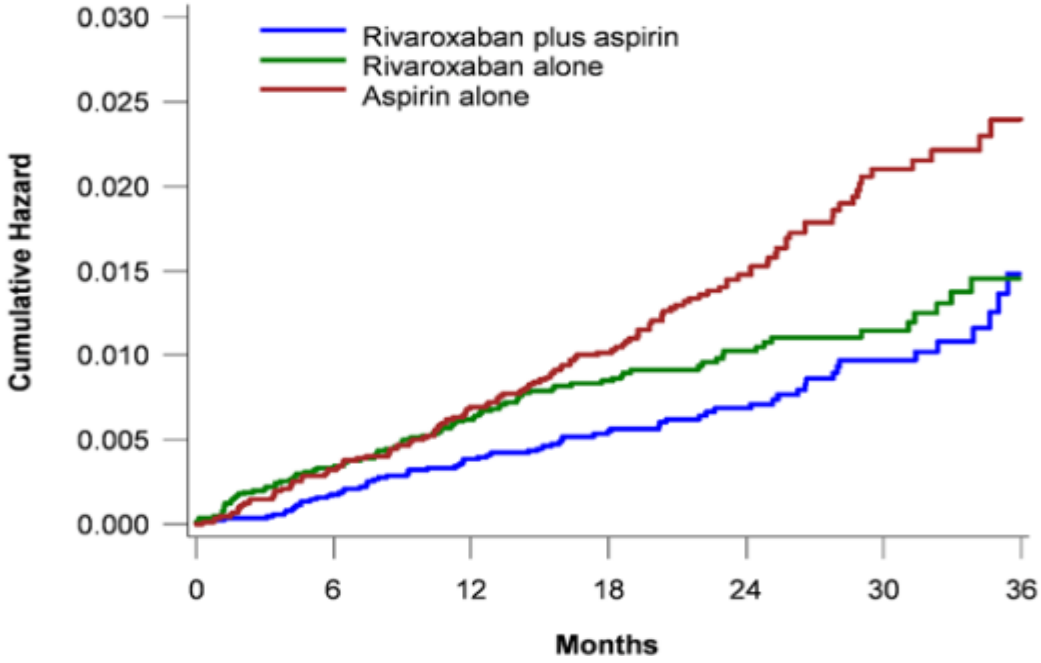
ORIGINAL RESEARCH ARTICLE

Stroke Outcomes in the COMPASS Trial

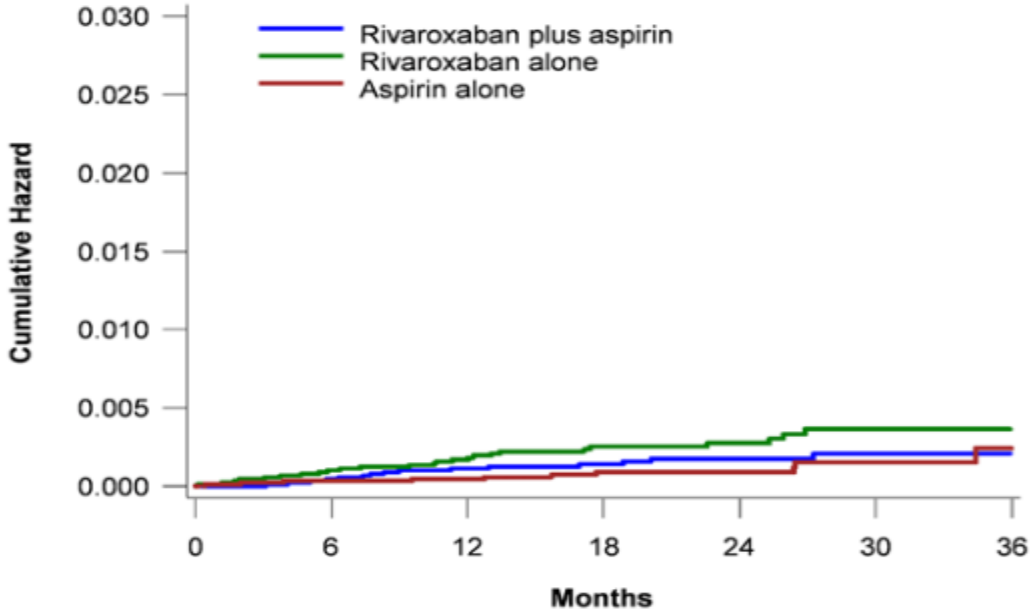
CONCLUSIONS: Low-dose rivaroxaban plus aspirin is an important new antithrombotic option for primary and secondary stroke prevention in patients with clinical atherosclerosis.

Circulation. 2019;139:1134–1145. DOI: 10.1161/CIRCULATIONAHA.118.035864

A **Ischemic or uncertain stroke**



B **Hemorrhagic stroke**



Clinical Perspective

What Is New?

- The combination of rivaroxaban 2.5 mg twice daily with aspirin 100 mg prevented stroke and disabling stroke better than aspirin in patients without atrial fibrillation with stable vascular disease without increasing the risk of hemorrhagic stroke.
- The effect was consistent across subgroups of baseline risk and particularly marked in those with a history of previous stroke.

What Are the Clinical Implications?

- Patients with coronary artery or peripheral artery disease and no recent events have a more efficacious treatment than aspirin to prevent stroke.
- This raises the hypothesis that combining anticoagulant and antiplatelet therapy may be better than either alone for stroke prevention.

JAMA Neurology | Original Investigation

Association Between Low-Dose Rivaroxaban With or Without Aspirin and Ischemic Stroke Subtypes

A Secondary Analysis of the COMPASS Trial

Low-dose rivaroxaban plus aspirin was associated with a reduced risk of all ischemic strokes and with large, significant reductions in cardioembolic strokes and ESUS among patients with systemic atherosclerotic disease.

JAMA Neurol. doi:10.1001/jamaneurol.2019.2984
Published online September 16, 2019.

Carotid Stenosis

SYMPTOMATIC INTERNAL CAROTID STENOSIS

(70–99% BY NASCET CRITERIA OF ANGIOGRAPHIC STENOSIS)

ASYMPTOMATIC STENOSIS: stenosis > 70% and the lowest risk of complications (younger age, fewer comorbidities, favorable anatomy)

CAROTID STENTING VERSUS ENDARTERECTOMY

In summary, *CAS* can be considered as an alternative to CEA in younger patients, and in symptomatic patients where the stenosis is hard to reach surgically, where there are medical comorbidities that increase the risk of surgery, or in cases of post-radiation or postoperative stenoses.

SECONDARY PREVENTION

Secondary prevention (ie, prevention of a subsequent cerebrovascular event in patients with prior TIA or ischemic stroke) involves measures **similar** to those employed in primary prevention, with the following exceptions:

- **Statins:** Treatment with a statin is recommended for all patients with prior TIA or ischemic stroke.

- **Antiplatelet Drugs:** All patients with prior non-cardioembolic TIA or ischemic stroke should receive aspirin (81-325 mg/d); aspirin/ dipyridamole (25/200 mg twice daily) or clopidogrel (75 mg/d) alone are alternative options

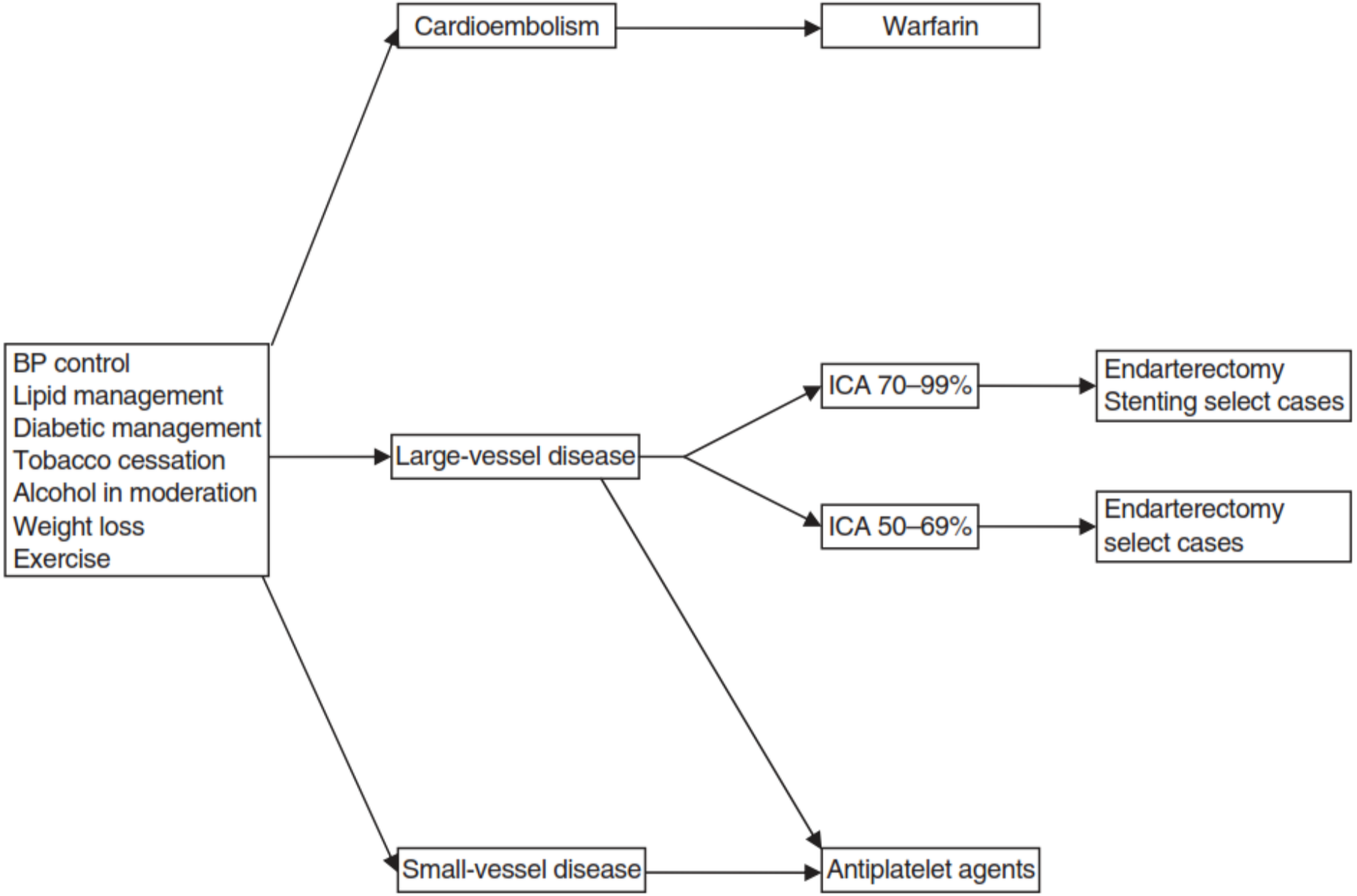
- **Anticoagulation**

Patients with prior TIA or ischemic stroke and **valvular atrial fibrillation or mechanical aortic or mitral valve replacement** should be given long-term warfarin treatment targeted to an INR of 2.5—0.5.

Nonvalvular atrial fibrillation should be treated with warfarin (INR 2.5—0.5), apixaban, dabigatran or rivaroxaban.

- **Surgical Treatment**

Surgical treatment for secondary prevention of TIA or stroke (**carotid endarterectomy or stenting)**.


BP control
Lipid management
Diabetic management
Tobacco cessation
Alcohol in moderation
Weight loss
Exercise
Cardioembolism
Warfarin
Large-vessel disease
ICA 70–99%
Endarterectomy
Stenting select cases
ICA 50–69%
Endarterectomy
select cases
Small-vessel disease
Antiplatelet agents

Thanks for your attention!