뇌졸중의 일차예방과 이차예방의 개괄적 이해

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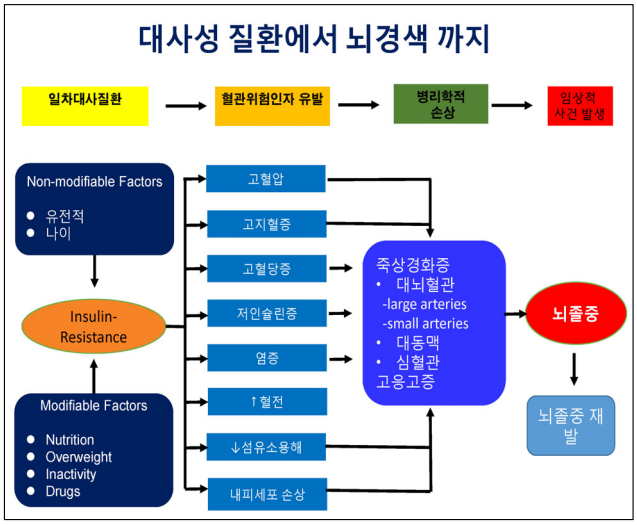


Definition : Primary Prevention

Here the goal is to protect healthy people from developing a disease or experiencing an injury in the first place. For example:

- education about good nutrition, the importance of regular exercise, and the dangers of tobacco, alcohol and other drugs
- education and legislation about proper seatbelt and helmet use
- regular exams and screening tests to monitor risk factors for illness
- immunization against infectious disease
- controlling potential hazards at home and in the workplace

Definition : Secondary Prevention

These interventions happen after an illness or serious risk factors have already been diagnosed. The goal is to halt or slow the progress of disease (if possible) in its earliest stages; in the case of injury, goals include limiting long-term disability and preventing re-injury. For example:

- telling people to take daily, low-dose aspirin to prevent a first or second heart attack or stroke
- recommending regular exams and screening tests in people with known risk factors for illness
- providing suitably modified work for injured workers

Definition : Tertiary Prevention

This focuses on helping people manage complicated, long-term health problems such as diabetes, heart disease, cancer and chronic musculoskeletal pain. The goals include preventing further physical deterioration and maximizing quality of life. For example:

- cardiac or stroke rehabilitation programs
- chronic pain management programs
- patient support groups

Vascular Risk factors of Cerebrovascular Disease

Nonmodifiable RF	Modifiable RF	
	Well-Documented	Less Well Documented
• Age • Sex • Low Birth Weight • Race/Ethnicity • Genetic Factors	• Physical inactivity • Dyslipidemia • Diet and nutrition • Hypertension • Obesity and body fat distribution • Diabetes • Cigarette smoking • Atrial fibrillation • Other heart disease • (Aortic atherosclerosis, MI, Cardiomyopathy, VHD, PFO, ASD,) • Asymptomatic carotid artery stenosis	• Migraine • Metabolic syndrome • Alcohol Consumption • Drug Abuse • Sleep-Disordered Breathing • Hyperhomocyteinemia • Elevatated Lp(a) • Hypercoagulability • Inflammation and infection

Primary Prevention of Ischemic Stroke

- >76% of stroke are first events
- 10 potential modifiable risk factors explained 90% of the risk of stroke
- Public Health Campaign
- Assessing the risk of First Stroke

www.mw.go.kr
www.cdc.go.kr

뇌졸중 예방법

심뇌혈관질환의 정의

허혈성 심장질환(심근경색증, 협심증), 심부전증 등 심장질환과
뇌졸중(뇌출혈, 뇌경색)등 뇌혈관질환,
고혈압, 당뇨병, 고지혈증, 동맥경화증 등 선행질환을 총칭

심뇌혈관질환
예방관리를 위한 9대 생활수칙

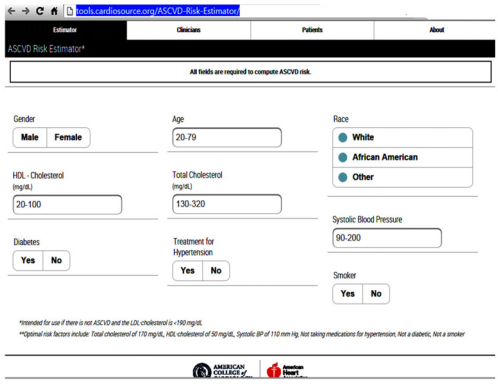
1 담배는 반드시 끊습니다.
2 술은 하루에 한두 잔 이하로 줄입니다.
3 음식은 싱겁게 골고루 먹고, 채소와 생선을 충분히 섭취합니다.
4 가능한 한 매일 30분 이상 적절한 운동을 합니다.
5 적정 체중과 허리둘레를 유지합니다.
6 스트레스를 줄이고, 즐거운 마음으로 생활합니다.
7 정기적으로 혈압, 혈당, 콜레스테롤을 측정합니다.
8 고혈압, 당뇨병, 고지혈증을 꾸준히 치료합니다.
9 뇌졸중, 심근경색증의 응급 증상을 숙지하고 발생 즉시 병원에 갑니다.

Assessing the Risk of First Stroke

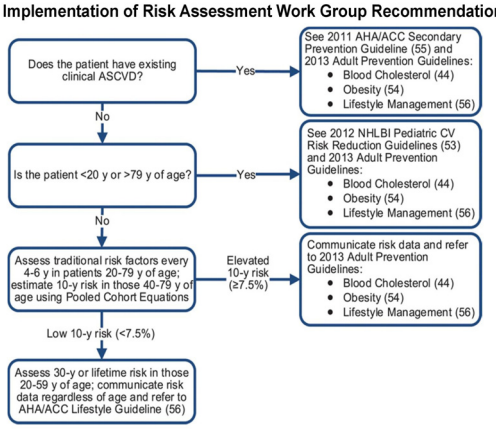
- Global risk assessment tool
  - Stroke screening program in community
  - to select certain treatments of primary stroke prevention
  - To identify people at elevated risk who might be unaware of their risk
  - To assess risk in the presence of > 1 condition,
  - To measure an individual's risk that can be tracked and lowered by appropriate modification
  - To estimate risk for selecting treatments or stratification in clinical trials
  - To guide appropriate use of further diagnostic testing

ASCVD risk calculator

- http://my.americanheart.org/cvriskcalculator



Implementation of Risk Assessment Work Group Recommendations.



David C. Goff, Jr et al. Circulation. 2014;129:S49-S73

For patient with non valvualar AF, CHA_2DS_2-VASc score

(a) Risk factors for stroke and thrombo-embolism in non-valvular AF	
'Major' risk factors	**'Clinically relevant non-major' risk factors**
Previous stroke, TIA, or systemic embolism Age ≥75 years	Heart failure or moderate to severe LV systolic dysfunction (e.g. LV EF ≤40%) Hypertension - Diabetes mellitus Female sex - Age 65–74 years Vascular disease[a]

(b) Risk factor-based approach expressed as a point based scoring system, with the acronym CHA_2DS_2-VASc (Note: maximum score is 9 since age may contribute 0, 1, or 2 points)	
Risk factor	**Score**
Congestive heart failure/LV dysfunction	1
Hypertension	1
Age ≥75	2
Diabetes mellitus	1
Stroke/TIA/thrombo-embolism	2
Vascular disease[a]	1
Age 65–74	1
Sex category (i.e. female sex)	1
Maximum score	**9**

AHA management recommendation for Lifestyle Risk factors

Factors	Goal
Cigarette smoking	Cessation
Physical inactivity	Moderate to intense aerobic physical activity at least 40min/d 3 to 4d/wk
Obesity	BMI <25 kg/m3
Diet/nutrition	Reduced intake of sodium and increased intake of potassium. Rich in fruits and vegetables, low –fat dairy products and reduced in saturated and total fat. A Mediterranean diet supplemented with nuts may be considered.
Alcohol	Moderation
Drug abuse	Cessation

Antiplatelet Agents and Aspirin in Primary Prevention

- People whose risk is sufficiently high (10-y risk >10%)
- Prevention of a first stroke in people with chronic kidney disease (eGFR 30-45 m
- Cilostazol may be reasonable for the prevention of a first stroke in people with PAD
- Antiplatelet regimens other than aspirin and cilostazol are not recommend for the prevention of a first stroke

4 primary groups of patients be considered for statin therapy

(1) having clinical ASCVD;

(2) with elevation of LDL-C ≥190 mg/dL;

(3) people ages 40 to 75 years who have an LDL-C 70 to 189 mg/dL with a history of diabetes mellitus regardless of the presence of ASCVD; and

(4) otherwise having an estimated 10-year ASCVD risk ≥7.5%.3

Secondary Prevention of Stroke

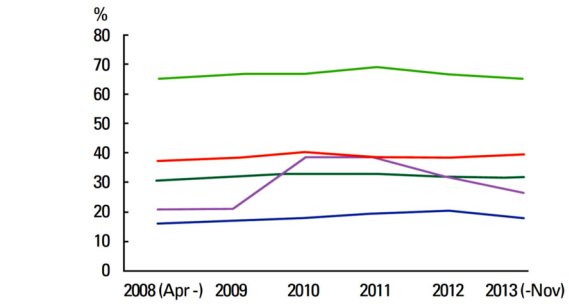
- The annual risk for future IS after an initial IS or TIA: 3-4%
- The estimated risk of an individual patient :
  - age,
  - event type,
  - comorbid illness,
    - sleep apnea, carotid atherosclerosis, preDM
  - adherence to preventive therapy.

Event Outcome Rates after Stroke (N=19,186)

	7 days	30 days	90 days	365 days
Recurrent stroke	225 (1.2%)	428 (2.2%)	621 (3.2%)	854 (4.5%)
Myocardial infarction	12 (0.06%)	19 (0.1%)	41 (0.2%)	65 (0.3%)
Vascular death	267 (1.4%)	411 (2.1%)	491 (2.6%)	576 (3.0%)
Composite events	448 (2.3%)	771 (4.0%)	1008 (5.3%)	1304 (6.8%)

Kim BJ et al J Stroke 2015; 17:38-53

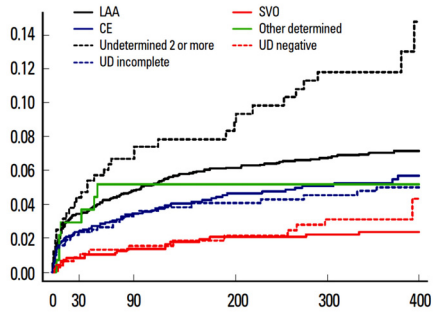
Temporal Trend of Vascular risk factors in Korean Stroke Patients



	2008 (Apr -)	2009	2010	2011	2012	2013 (-Nov)
Hypertension	65	67	67	69	67	65
Diabetes	31	32	33	33	32	32
Dyslipidemia	21	21	39	39	32	27
Habitual smoking	37	38	40	39	38	39
Atrial fibrillation	16	17	18	20	20	18

Kim BJ et al J Stroke 2015; 17:38-53

Kaplan Meier survival curves comparing risk of recurrent stroke according to stroke subtypes



Ko YC et al Journal of Stroke 2014; 16(3): 161-172

Classification of Ischemic Stroke

- TOAST classification : Stroke *1993; 24: 35-41*

1) large-artery atherosclerosis
2) cardioembolism
3) small-vessel occlusion
4) stroke of other determined etiology
5) stroke of undetermined etiology

- Modified TOAST Classification: *Stroke 2001:32:1091-1097*

Possible and probable, complete and incomplete

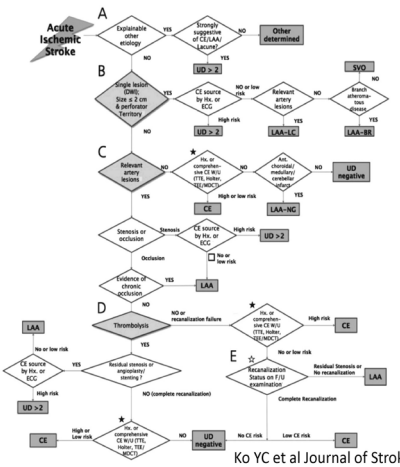
• SSS-TOAST classification : .

: CT, MRI, CTA, MRA, Ultrasonography, EKG, TTE

1) large-artery atherosclerosis : Evident, Probable, Possible
2) cardioembolism :
3) small-vessel occlusion
4) stroke of other determined etiology
5) stroke of undetermined etiology
   : Unknown, Unclassified,

Ann Neurol 2005;58:688–697

MRI-Based algorithm for acute stroke classification



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New revised recommendation in 2014 guideline in 2nd stroke prevention

- BP target : SBP <140 mmHg DBP <90mmHg
  Recent lacunar stroke <130mmHg
- Hyperlipidemia : statin therapy with intensive lipid lowering effects in atherosclerotic stroke patient
- DM : Screened for DM with testing of FBS, HbA1c & OGTT
- Obesity : measurement of BMI
- Physical inactivity : to initiate increased physical activity
- Nutrition : nutrition assessment, nutritional counselling for undernutrition patients. Do not give routine supplementation with vitamin. Sodium restriction. Mediterranean type diet instate of low-fat diet. Limit intake of sweets and red meats.
- Sleep apnea : sleep study might be considered
- Homocyteinemeia ; Routine screening is not indicated

Stroke. 2014; 45: 2160-2236

Reference

1. Guidelines for the Primary Prevention of Stroke. Stroke. 2014;45:3754-3832.
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