How to Calculate a Patient's Cardiovascular Risk to Determine Therapeutic Management

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Highlights - Hoogtepunte

- How to calculate the lifetime risk of developing coronary heart disease.
- How low should cholesterol levels be for different risk categories?
- The ABCDE for secondary prevention of coronary heart disease.
- Hoe om die leeftydsrisiko vir koronêre vatsiekte te bereken.
- Hoe laag moet cholesterolvlakke wees vir sekere risikogroepe?
- Die ABCDE vir sekondêre voorkoming van koronêre vatsiekte.

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INTRODUCTION:

The lifetime risk is a useful concept to estimate an individual's cumulative risk of developing a disease during that individual's remaining lifespan. Although mortality from coronary heart disease remains the single leading cause of death for adults worldwide, it was only recently that the lifetime risk for coronary heart disease was calculated from the Framingham Heart Study. Lifetime risk to develop coronary heart disease at the age of 40 years is One in Two for males and One in Three for females.

This knowledge may promote efforts to screen for and treat patients at high risk of developing coronary heart disease.

RISK MANAGEMENT

Risk Assessment:

An absolute risk estimate should be calculated for every individual. Absolute risk of an individual is the risk of developing coronary heart disease (CHD) over a given time frame (short-term = 10 years; long-term = 20 years).

The major independent (causal) risk factors:

- Hypertension (any elevation or on antihypertensive therapy)
- Smoking (any amount)
- Elevated T Cholesterol; elevated LDL Cholesterol and low HDL Cholesterol.

Diabetes mellitus is not considered a major risk factor, but it is now regarded as CHD equivalent, implying that it contributes to the patient's risk profile, the same risk as if the patient had already had a cardiovascular event (MI etc.).

These major factors are currently being used in the calculation of absolute risk – for that we use a risk chart (e.g. Framingham, Sheffield, European).

Before the elevated cholesterol can be used as an indication for cholesterol-lowering therapy, secondary causes of elevated cholesterol should be excluded: diabetes, hypothyroidism, obstructive liver disease, chronic renal disease, nephrotic syndrome, drugs (e.g. anabolic steroids).

Risk categories of patients:

The use of the risk categories moves away from the old concept of primary and secondary prevention.

I. Highest risk

A. Patients with previous coronary heart disease events (CHD).

B. Patients with CHD equivalents:
   i. Other clinical forms of atherosclerosis (peripheral arterial disease, aorta aneurysm, symptomatic carotid artery disease).
   ii. Multiple cardiovascular risk factors (2 or more risk factors):
      a. Cigarette smoking.
      b. Hypertension or anti-hypertensive therapy.
      c. Low HDL.
      d. High LDL / total cholesterol.
      e. Family history of premature disease: father before 55 years age and mother before 65 years age.
   iii. Diabetes mellitus.

This highest risk category implies that patients have a higher than 20% risk of having a recurrent event in the next 10 years (20 out of every 100 people).

FRAMINGHAM RISK CHART:

Table 1: Estimate of 10-Year Risk for Men (Framingham Point Scores)

Age, y	*Points*
20-34	-9
35-39	-4
40-44	0
45-49	3
50-54	6
55-59	8
60-64	10
65-69	11
70-74	12
75-79	13

Total Cholesterol Mg/dL	Points				
	Age 20-39y	Age 40-49y	Age 50-59y	Age 60-69y	Age 70-79y
<160	0	0	0	0	0
160-199	4	3	2	1	0
200-239	7	5	3	1	0
240-279	9	6	4	2	1
≥ 280	11	8	5	3	1

	Points				
	Age 20-39y	Age 40-49y	Age 50-59y	Age 60-69y	Age 70-79y
Nonsmoker	0	0	0	0	0
Smoker	8	5	3	1	1

HDL,mg/dL	*Points*
≥60	-1
50-59	0
40-49	1
<40	2

Systolic BP, mmHg	If Untreated	If Treated
<120	0	0
120-129	0	1
130-139	1	2
140-159	1	2
≥160	2	3

Point Total	10-Year Risk,%
<0	<1
0	1
1	1
2	1
3	1
4	1
5	2
6	2
7	3
8	4
9	5
10	6
11	8
12	10
13	12
14	16
15	20
16	25
≥17	≥30

Table 2: Estimate of 10-Year Risk for Women (Framingham Point Scores)

Age, y	Points
20-34	-7
35-39	-3
40-44	0
45-49	3
50-54	6
55-59	8
60-64	10
65-69	12
70-74	14
75-79	16

Total Cholesterol Mg/dL	Points				
	Age 20-39y	Age 40-49y	Age 50-59y	Age 60-69y	Age 70-79y
<160	0	0	0	0	0
160-199	4	3	2	1	1
200-239	8	6	4	2	1
240-279	11	8	5	3	2
≥ 280	13	10	7	4	2

	Points				
	Age 20-39y	Age 40-49y	Age 50-59y	Age 60-69y	Age 70-79y
Nonsmoker	0	0	0	0	0
Smoker	9	7	4	2	1

HDL,mg/dL	*Points*
≥60	-1
50-59	0
40-49	1
<40	2

Systolic BP, mmHg	If Untreated	If Treated
<120	0	0
120-129	1	3
130-139	2	4
140-159	3	5
≥160	4	6

Point Total	10-Year Risk,%
<9	<1
9	1
10	1
11	1
12	1
13	2
14	2
15	3
16	4
17	5
18	6
19	8
20	11
21	14
22	17
23	22
24	27
≥25	≥30

Therapy should lower LDL-cholesterol to < 2.6 mmol/L as a goal.

II. High risk

This group has a less than 20% risk to develop a cardiovascular (CV) event over the next 10 years. They are the group without any prior problems but have 2 or more risk factors present on testing. The ultimate goal for LDL on therapy should be < 3.4 mmol/L.

Their absolute risk is less than 10% over the next 10 years to develop CHD. They are the people with 0 - 1 risk factor.

The LDL goal for therapy should be < 4.0 mmol/L.

Utility of risk categories:

These risk categories serve 3 purposes:

I. Define the selection of patients for aggressive therapy. The intensity of risk-reduction therapy is adjusted to a person's absolute risk.

II. Their goal levels for therapy of cholesterol are different. The higher the risk, the lower the LDL cholesterol to aim for.

III. These risk categories can be used to motivate the patient to participate in risk management and move to a lower risk if possible.

Problems with absolute risk estimate:

There are other risk factors for CHD:

A. Conditional risk factors:

They are associated with increased CHD risk, but their exact association, especially their quantitative contributions are not well documented. These are elevated TgS (triglycerides), elevated small dense LDL cholesterol, elevated homocysteine, elevated lipoprotein (a), elevated prothrombotic factors (e.g. fibrinogen, PAI-1) and elevated inflammatory markers (CRP).

B. Predisposing risk factors:

These factors, when present, worsen the independent major risk factors. They are: obesity, abdominal obesity (waist > 102 cm in women, waist >88 cm men), physical inactivity, family history of premature CAD, ethnic characteristics and psychosocial factors (e.g. depression).

C. The metabolic syndrome:

This syndrome is being increasingly recognised for its contribution to CV Risk.

There is a relative risk:

The relative risk is the ratio of the individual's absolute risk divided by the baseline risk of the population. Using this risk prediction is helpful in 2 groups: the young patient and the elderly. A high relative risk in a young adult will eventually translate into a high absolute risk in the long term.

No provision in official charts is given to relative risk calculations. We should also bear this in mind in clinical medicine when dealing with patients. Ethical issues will no doubt arise when only absolute risks are used to defend funding issues for treatment. There is still a need also for clinical judgment in some patients.

Presence of subclinical atherosclerosis:

Some patients may not qualify for aggressive management based on absolute risk or relative risk, but need then to be tested for the presence of subclinical atherosclerosis using exercise testing, ankle-brachial index, measurement of Carotid Intima-Media thickness and EBCT-derived (Electron Beam Computed) coronary calcium scores.

Once subclinical atherosclerosis is diagnosed, the presence of subclinical atherosclerosis predicts future CAD and these patients should be treated as CHD equivalents.

Cholesterol level risk categories:	
Total cholesterol:	
Desirable:	< 5.2 mmol/L
Borderline high:	5.2-6.2 mmol/L
High:	> 6.2 mmol/L
LDL cholesterol:	
Optimal:	< 2.6 mmol/L
Near or above optimal:	2.6-3.3 mmol/L
Borderline high:	3.4-4.1 mmol/L
High:	4.1-4.9 mmol/L
Very high:	> 4.9 mmol/L

SECONDARY PREVENTION OF CHD:

The simplistic but important advice for the highest risk category, CHD and CHD equivalent (previously known as secondary prevention), is a mnemonic which is constructed as: **ABCDE**

A: Aspirin; ACE-Inhibitors.

B: Beta Blockers: Blood pressure reduction.

C: Cholesterol reduction.

D: Diet and don't smoke.

E: Exercise.❐

Please refer to CPD Questionnaire on page 51.

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