LE DIABÈTE ET HTA

Nicolas Rousseau-Saine R2

Jason Gallant R3

13 Novembre 2013

CAS CLINIQUE

- Homme
- 80 ans
- Antécédants d'hypertension et diabète
- Colectomie

PLAN PRÉSENTATION

- Rappel des facteurs de risques cardiovasculaires
- Estimation du risque cardiovasculaire
- Diabète
- Hypertension
- Colectomie
- Retour sur le cas
- Réponses aux questions #43 et #48

FACTEURS DE RISQUES CARDIOVASCULAIRES

- Non **modifiables**
  - Antécédents familiaux (40-60%)
  - **Hypertension**
  - Dyslipidémie
  - **Âge**
  - **Sexe**
  - Autres
    - Marqueurs inflammatoires (CRP, IL-6)
    - VIH
    - Microalbuminurie
    - Irradiation médiastinale
- **Modifiables**
  - Cigarettes (femmes 6x, hommes 3x)
  - Alimentation
  - Exercice
  - Alcool
  - Obésité
  - Stress

•Équivalents: MVAS, **diabète**, IRC

Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study

*Salim Yusuf, Steven Hawken, Stephanie Ôunpuu, Tony Dans, Alvaro Avezum, Fernando Lanas, Matthew McQueen, Andrzej Budaj, Prem Pais, John Varigos, Liu Lisheng, on behalf of the INTERHEART Study Investigators**

Risk factor	Sex	Control (%)	Case (%)	Odds ratio (99% CI)	PAR (99% CI)
Current smoking	F	9·3	20·1	2·86 (2·36–3·48)	15·8% (12·9–19·3)
	M	33·0	53·1	3·05 (2·78–3·33)	44·0% (40·9–47·2)
Diabetes	F	7·9	25·5	4·26 (3·51–5·18)	19·1% (16·8–21·7)
	M	7·4	16·2	2·67 (2·36–3·02)	10·1% (8·9–11·4)
Hypertension	F	28·3	53·0	2·95 (2·57–3·39)	35·8% (32·1–39·6)
	M	19·7	34·6	2·32 (2·12–2·53)	19·5% (17·7–21·5)
Abdominal obesity	F	33·3	45·6	2·26 (1·90–2·68)	35·9% (28·9–43·6)
	M	33·3	46·5	2·24 (2·03–2·47)	32·1% (28·0–36·5)
Psychosocial index	F	–	–	3·49 (2·41–5·04)	40·0% (28·6–52·6)
	M	–	–	2·58 (2·11–3·14)	25·3% (18·2–34·0)
Fruits/veg	F	50·3	39·4	0·58 (0·48–0·71)	17·8% (12·9–24·1)
	M	39·6	34·7	0·74 (0·66–0·83)	10·3% (6·9–15·2)
Exercise	F	16·5	9·3	0·48 (0·39–0·59)	37·3% (26·1–50·0)
	M	20·3	15·8	0·77 (0·69–0·85)	22·9% (16·9–30·2)
Alcohol	F	11·2	6·3	0·41 (0·32–0·53)	46·9% (34·3–60·0)
	M	29·1	29·6	0·88 (0·81–0·96)	10·5% (6·1–17·5)
ApoB/ApoA1 ratio	F	14·1	27·0	4·42 (3·43–5·70)	52·1% (44·0–60·2)
	M	21·9	35·5	3·76 (3·23–4·38)	53·8% (48·3–59·2)

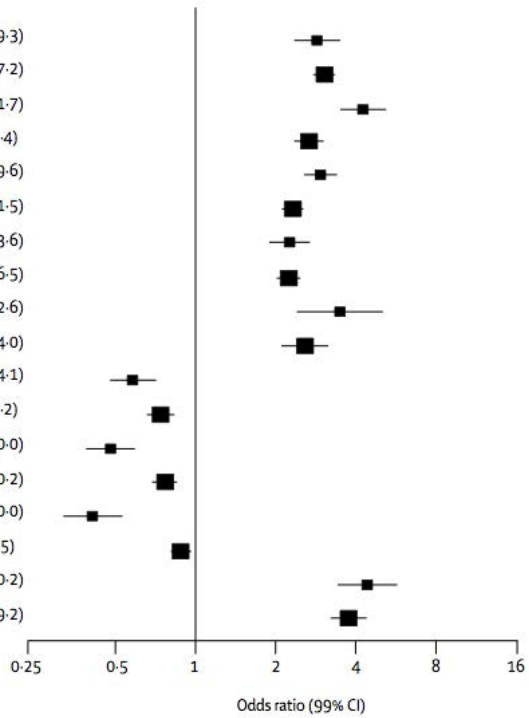


Figure 4: **Association of risk factors with acute myocardial infarction in men and women after adjustment for age, sex, and geographic region**
For this and subsequent figures, the odds ratios are plotted on a doubling scale. Prevalence cannot be calculated for psychosocial factors because it is derived from a model.

Lancet 2004; 364: 937–52

ESTIMATION DU RISQUE

- Framingham risk score
- Framingham/ATP III
- SCORE (Systematic Cerebrovascular and cOronary Risk Evaluation)
- QRISK / QRISK2
- Reynolds risk score

FRAMINGHAM RISK SCORE

FRAMINGHAM RISK SCORE: What is this patient's risk of cardiovascular disease (CVD)?

Patient Name: _____ Date: ____/____/____ **Curent Lipid Values:** LDL-C _____ TC _____ HDL-C _____ Apo B _____

FRAMINGHAM TABLE

Risk Factor	Risk Points (MEN)		Risk Points (WOMEN)		Points
Age 30-34 Years	0		0		
35-39	2		2		
40-44	5		4		
45-49	7		5		
50-54	8		7		
55-59	10		8		
60-64	11		9		
65-69	13		10		
70-74	14		11		
75+	15		12		
HDL-C Level (mmol/L)					
>1.6	-2		-2		
1.3-1.6	-1		-1		
1.2-1.3	0		0		
0.9-1.2	1		1		
<0.9	2		2		
Total Cholesterol Level (mmol/L)					
<4.1	0		0		
4.1-5.2	1		1		
5.2-6.2	2		3		
6.2-7.2	3		4		
>7.2	4		5		
Systolic Blood Pressure (mmHg)	**Untreated**	**Treated**	**Untreated**	**Treated**	
<120	-2	0	-3	-1	
120-129	0	2	0	2	
130-139	1	3	1	3	
140-149	2	4	2	5	
150-159	2	4	4	6	
>160	3	5	5	7	
Smoker					
No	0		0		
Yes	4		3		
Diabetes					
No	0		0		
Yes	3		4		
				Total Points	

TOTAL RISK POINTS	MEN	WOMEN
-3 or less	<1	<1
-2	1.1	<1
-1	1.4	1.0
0	1.6	1.2
1	1.9	1.5
2	2.3	1.7
3	2.8	2.0
4	3.3	2.4
5	3.9	2.8
6	4.7	3.3
7	5.6	3.9
8	6.7	4.5
9	7.9	5.3
10	9.4	6.3
11	11.2	7.3
12	13.3	8.6
13	15.6	10.0
14	18.4	11.7
15	21.6	13.7
16	25.3	15.9
17	29.4	18.51
18	>30	21.5
19	>30	24.8
20	>30	27.5
21+	>30	>30

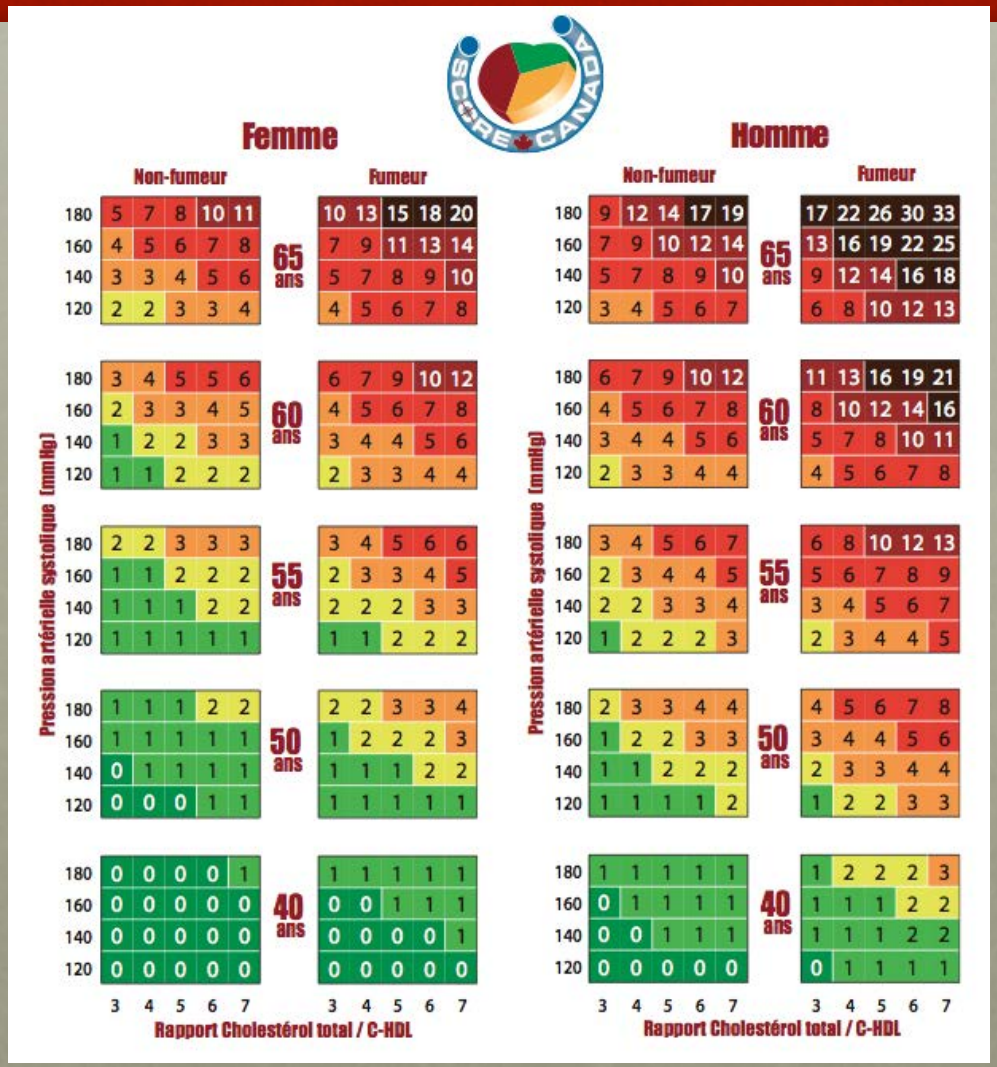
10-Year CVD Risk: _____%

Is there a positive family history of CVD in a first degree relative before age 60?

☐ **YES** (if so, multiply above 10-year CVD risk (%) by 2)
Calculation: 10-year CVD risk ____% X 2 = ____%

☐ **NO**

SCORE CANADA



Femme

Pression artérielle systolique (mmHg)	Non-fumeur 3	4	5	6	7	Fumeur 3	4	5	6	7
65 ans										
180	5	7	8	10	11	10	13	15	18	20
160	4	5	6	7	8	7	9	11	13	14
140	3	3	4	5	6	5	7	8	9	10
120	2	2	3	3	4	4	5	6	7	8
60 ans										
180	3	4	5	5	6	6	7	9	10	12
160	2	3	3	4	5	4	5	6	7	8
140	1	2	2	3	3	3	4	4	5	6
120	1	1	2	2	2	2	3	3	4	4
55 ans										
180	2	2	3	3	3	3	4	5	6	6
160	1	1	2	2	2	2	3	3	4	5
140	1	1	1	2	2	2	2	2	3	3
120	1	1	1	1	1	1	1	2	2	2
50 ans										
180	1	1	1	2	2	2	2	3	3	4
160	1	1	1	1	1	1	2	2	2	3
140	0	1	1	1	1	1	1	1	2	2
120	0	0	0	1	1	1	1	1	1	1
40 ans										
180	0	0	0	0	1	1	1	1	1	1
160	0	0	0	0	0	0	0	1	1	1
140	0	0	0	0	0	0	0	0	0	1
120	0	0	0	0	0	0	0	0	0	0

Rapport Cholestérol total / C-HDL

Homme

Pression artérielle systolique (mmHg)	Non-fumeur 3	4	5	6	7	Fumeur 3	4	5	6	7
65 ans										
180	9	12	14	17	19	17	22	26	30	33
160	7	9	10	12	14	13	16	19	22	25
140	5	7	8	9	10	9	12	14	16	18
120	3	4	5	6	7	6	8	10	12	13
60 ans										
180	6	7	9	10	12	11	13	16	19	21
160	4	5	6	7	8	8	10	12	14	16
140	3	4	4	5	6	5	7	8	10	11
120	2	3	3	4	4	4	5	6	7	8
55 ans										
180	3	4	5	6	7	6	8	10	12	13
160	2	3	4	4	5	5	6	7	8	9
140	2	2	3	3	4	3	4	5	6	7
120	1	2	2	2	3	2	3	4	4	5
50 ans										
180	2	3	3	4	4	4	5	6	7	8
160	1	2	2	3	3	3	4	4	5	6
140	1	1	2	2	2	2	3	3	4	4
120	1	1	1	1	2	1	2	2	3	3
40 ans										
180	1	1	1	1	1	1	2	2	2	3
160	0	1	1	1	1	1	1	1	2	2
140	0	0	1	1	1	1	1	1	2	2
120	0	0	0	0	0	0	1	1	1	1

Rapport Cholestérol total / C-HDL

www.score-canada.ca

ÂGE ET SYSTÈME CV

- Réponse diminuée stimulation des recepteurs bêta
- Rigidification du myocarde, artères et veines
- Système nerveux autonome
  - Augmentation sympathique (repos et réponses exagérées)
  - Dimimution parasympathique
- Changement système conduction
- Préconditionnement ischémique défectueux

ÉPIDÉMIOLOGIE

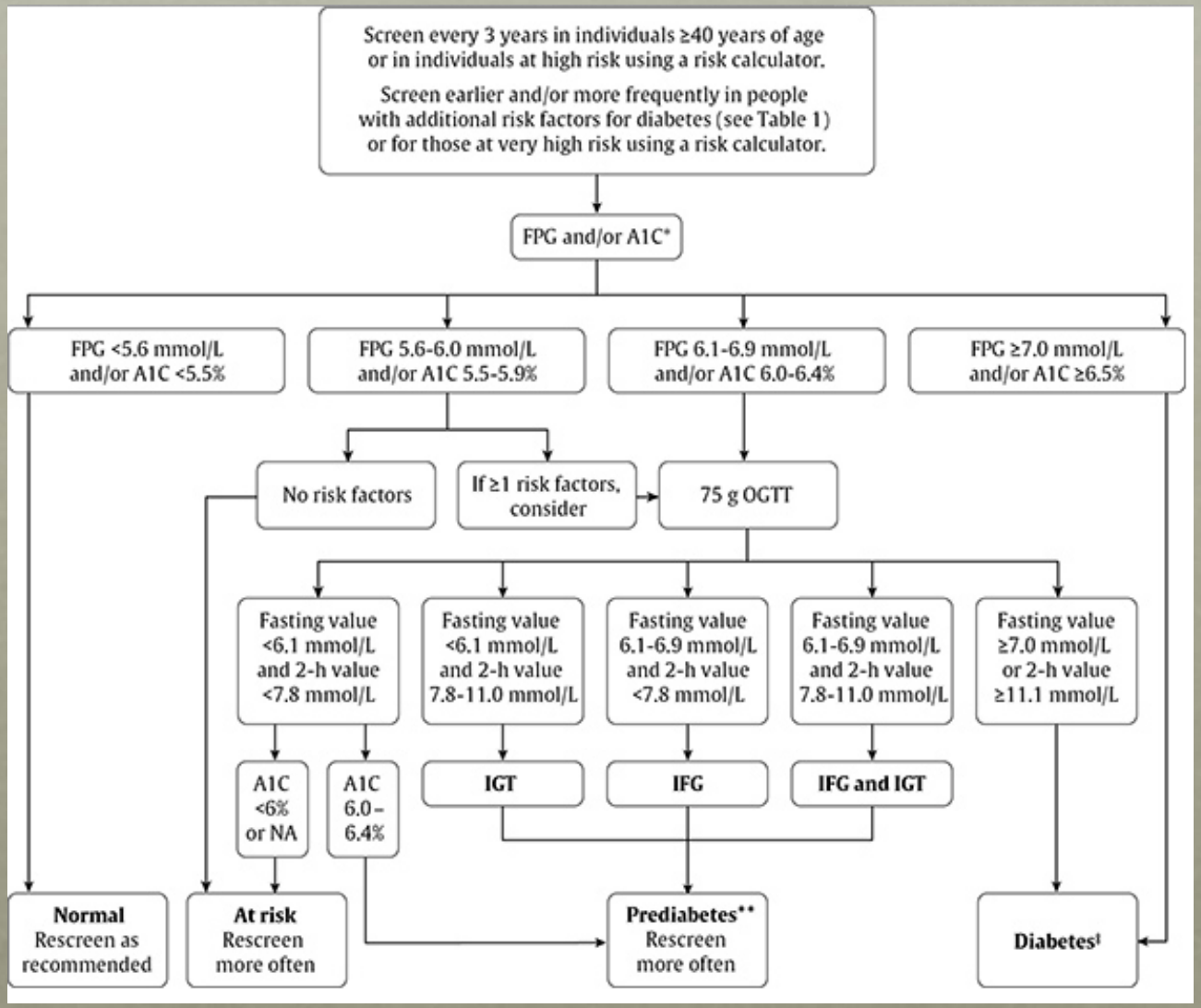
- Au Québec:
  - 760 000 personnes diabétiques (90% type II)
    - Prévalence 6,4% chez >20 ans
    - Prévalence 20% chez les >65 ans
  - 70% mourront de maladie CV (35% population générale)
  - Le diabète est la cause de:
    - 25% des chirurgies cardiaques
    - 40% des insuffisances rénales
    - 50% des amputations non traumatiques
    - Première cause de cécité chez les >65 ans
  - Coût annuel de 3 milliards de dollars

Diabète Québec

PATHOPHYSIOLOGIE ET CLINIQUE

- Type I
  - Destruction autoimmune des cellules bêta du pancréas
  - Acidocétose = Présentation fréquente
  - Avant 40 ans
  - Pas obésité
  - Évolution rapide en dépendance à l'insuline (<2 ans)
- Type II
  - Résistance à l'insuline
  - Déficience relative en insuline
  - Évolution asymptomatique sur 4-7 ans avant dx
  - Obésité
  - Hx familiale
  - Complications au dx dans 50% des cas

DIAGNOSTIC



Canadian Diabetes Association

TRAITEMENTS PHARMACOLOGIQUES

Table 3

Overview of Oral Agents and Glucagon-like Peptide-1 Analogs for Diabetes by Drug Class

Drug Class	Mechanism of Action	Agent (Brand Name)	Duration of Action	Dosing	Adverse Effects and Precautions
Biguanides	Reduce hepatic insulin resistance and glucose production	Metformin (Glucophage [Bristol-Myers Squibb, Lisle, IL], Glumetza [Biovail Pharmaceuticals, Mississauga, ON, Canada], Fortamet [First Horizon Pharmaceutical, Alpharetta, GA])	12-18 h	500 mg with meals, increasing by 500 mg every 1-3 wk up to twice or three times a day. Optimally effective dose, 2,000 mg/d; maximum, 2,550 mg/d.	GI side effects: nausea, vomiting, fullness, flatulence, diarrhea. Rare life-threatening lactic acidosis. Contraindicated in renal insufficiency (serum creatinine level >1.4 in males and >1.2 in females).
		Extended-release metformin (Glucophage XR [Bristol-Myers Squibb])	24 h	500 mg once per day; maximum dose, 2,000 mg once per day	Same as above
Sulfonylureas	Increase insulin secretion from the pancreas	Glyburide (Micronase [Pfizer, New York, NY], DiaBeta [Aventis Pharmaceuticals, Bridgewater, NJ], Glynase [Pfizer])	12-24 h	Glyburide: 1.25-5.0 mg once or twice a day; maximum, 20.0 mg/d Glynase: 0.75-12.0 mg/d; maximum, 12.0 mg/d	Hypoglycemia, weight gain. Severe hypoglycemia is a function of advanced age and renal insufficiency.
		Glipizide (Glucotrol [Pfizer], Glucotrol XL [Pfizer])	12-24 h	2.5-20.0 mg once or twice a day; maximum, 40 mg/d XL: 2.5-10.0 mg once or twice a day; maximum, 20 mg/d	Same as above
		Glimepiride (Amaryl [Aventis])	24 h	1-8 mg/d; maximum, 8 mg/d	Same as above
Short-acting secretagogues	Enhance rapid-phase insulin release, reduce postprandial glucose	Repaglinide (Prandin [Novo Nordisk Pharmaceuticals, Princeton, NJ])	4-6 h	0.5-2.0 mg, 15-30 min before each meal; increase weekly if necessary; maximum, 16.0 mg/d	Headache, dizziness, diarrhea. 3 times a day dosing and high cost may lead to compliance issues.
		Nateglinide (Starlix [Novartis Pharmaceuticals, Basel, Switzerland])	4-6 h	60-120 mg before each meal	Same as above

J Am Acad Orthop Surg. 2010 Jul;18(7):426-35.

TRAITEMENTS PHARMACOLOGIQUES

Thiazolidinediones	Enhance insulin sensitivity in muscle, liver, and fat	Rosiglitazone (Avandia [GlaxoSmithKline, Philadelphia, PA])	Days to weeks	Start with 4 mg/d once or twice a day; maximum, 8 mg/d	Weight gain, fluid retention, edema, anemia, heart failure, possible increased cardiovascular risk with rosiglitazone. Contraindicated with high-dose insulin and in New York Heart Association class 3 and 4 heart failure.
		Pioglitazone (Actos [Takeda Pharmaceuticals, Deerfield, IL])	Days to weeks	15, 30, or 45 mg once a day; start with smaller dose and titrate up	Same as above
α-glucosidase inhibitors	Inhibit carbohydrate digestion and delay glucose absorption	Acarbose (Precose [Bayer, Pittsburgh, PA])	2-3 h	25 mg/d; increase by 25 mg/d every 4 wk to three times a day (with first bite of food)	Modest glucose-lowering action. Frequent GI side effects and expense may limit compliance and utility.
		Miglitol (Glyset [Bayer])	2-3 h	300 mg/d (150 mg/d when weight <60 kg)	Same as above
DPP-IV inhibitors	Suppress the enzyme that breaks down the incretin hormone GLP-1	Sitagliptin (Januvia [Merck, Whitehouse Station, NJ])	24 h	50-100 mg once a day	Abdominal pain, fatigue, headache
		Saxagliptin (Onglyza [Bristol-Myers Squibb])	24 h	2.5-5.0 mg once a day	Same as above
GLP-1 analogs	Mimic the actions of the incretin hormone GLP-1	Exenatide (Byetta [Amylin Pharmaceuticals, San Diego, CA, and Eli Lilly, Indianapolis, IN])	6-8 h	Start with 5 μg subcutaneously 30 min before breakfast and dinner; increase to 10 μg after 2-3 wk if necessary	Injection site pain and bruising, nausea, vomiting. Postmarketing reports of association with acute pancreatitis.
		Liraglutide (Victoza [Novo Nordisk])	24 h	Start with 0.6 μg subcutaneously, increase to 1.2 μg after 1 week and to a maximum dose 1.8 μg if necessary; inject without regard to meals	Injection site pain and bruising, nausea, vomiting, diarrhea, and headache. Slightly increased incidence of acute pancreatitis in human studies and medullary thyroid cancer in rats.

DPP = dipeptidyl-peptidase, GI = gastrointestinal, GLP = glucose-like polypeptide

J Am Acad Orthop Surg. 2010 Jul;18(7):426-35.

TRAITEMENTS PHARMACOLOGIQUES

Table 4

Combination Oral Pills for Diabetes

Drug Class	Agent	Ratios of Oral Agents and Dosing	Adverse Effects and Precautions
Sulfonylureas and biguanide	Glucovance (Bristol-Myers Squibb, Lisle, IL) (glyburide and metformin)	Ratios of glyburide and metformin: 1.25:250 mg, 2.5:500 mg, 5.0:500 mg. Start with 1.25:250 mg once or twice a day, increasing every 2 wk, to an average dose of 7.5:1,500 mg. Maximum dose should not exceed 20 mg glyburide:2,000 mg metformin daily.	As for individual agents (see Table 3) Side effects of more than one medication Hypoglycemia risk with sulfonylurea-based combinations
	Metaglip (Bristol Myers-Squibb) (glipizide and metformin)	Ratios of glipizide and metformin: 2.5:250 mg, 2.5:500 mg, 5.0:500 mg. Start with 2.5:250 mg once or twice a day, increasing every 2 wk. Maximum dose should not exceed 20 mg glipizide:2,000 mg metformin daily.	Same as above
Thiazolidinedione and biguanide	Avandamet (GlaxoSmithKline, Philadelphia, PA) (rosiglitazone and metformin)	Ratios of rosiglitazone and metformin: 1.0:500 mg, 2.0:500 mg, 4.0:500 mg, 2.0:1,000 mg, 4:1,000 mg twice a day. Dosage individualized based on current therapy. Maximum, 8:2,000 mg/d.	Same as above
	ACTOplus Met (Takeda Pharmaceuticals, Deerfield, IL) (pioglitazone and metformin)	Ratios of pioglitazone and metformin: 15:500 mg, 15:850 mg	Same as above
Thiazolidinedione and sulfonylurea	Avandaryl (GlaxoSmithKline) (rosiglitazone and glimepiride)	Ratios of rosiglitazone and glimepiride: 4 mg:1 mg, 4 mg:2 mg	Same as above
	Duetact (Takeda Pharmaceuticals) (pioglitazone and glimepiride)	Ratios of pioglitazone and glimepiride: 30 mg:2 mg, 30 mg:4 mg	Same as above
DPP-IV inhibitor and biguanide	Janumet (Merck, Whitehouse Station, NJ) (sitagliptin and metformin)	Ratios of sitagliptin and metformin: 50 mg:500 mg, 50 mg:1,000 mg	Same as above

DPP = dipeptidyl-peptidase

J Am Acad Orthop Surg. 2010 Jul;18(7):426-35.

TRAITEMENTS PHARMACOLOGIQUES

Insulin Type (trade name)	Onset	Peak	Duration
Bolus (prandial) Insulins			
Rapid-acting insulin analogues (clear): • Insulin aspart (NovoRapid®) • Insulin glulisine (Apidra™) • Insulin lispro (Humalog®)	 10 - 15 min 10 - 15 min 10 - 15 min	 1 - 1.5 h 1 - 1.5 h 1 - 2 h	 3 - 5 h 3 - 5 h 3.5 - 4.75 h
Short-acting insulins (clear): • Insulin regular (Humulin®-R) • Insulin regular (Novolin®geToronto)	30 min	2 - 3 h	6.5 h
Basal Insulins			
Intermediate-acting insulins (cloudy): • Insulin NPH (Humulin®-N) • Insulin NPH (Novolin®ge NPH)	1 - 3 h	5 - 8 h	Up to 18 h
Long-acting basal insulin analogues (clear) • Insulin detemir (Levemir®) • Insulin glargine (Lantus®)	90 min	Not applicable	Up to 24 h (glargine 24 h, detemir 16 - 24 h)

Canadian Diabetes Association

TRAITEMENTS PHARMACOLOGIQUES

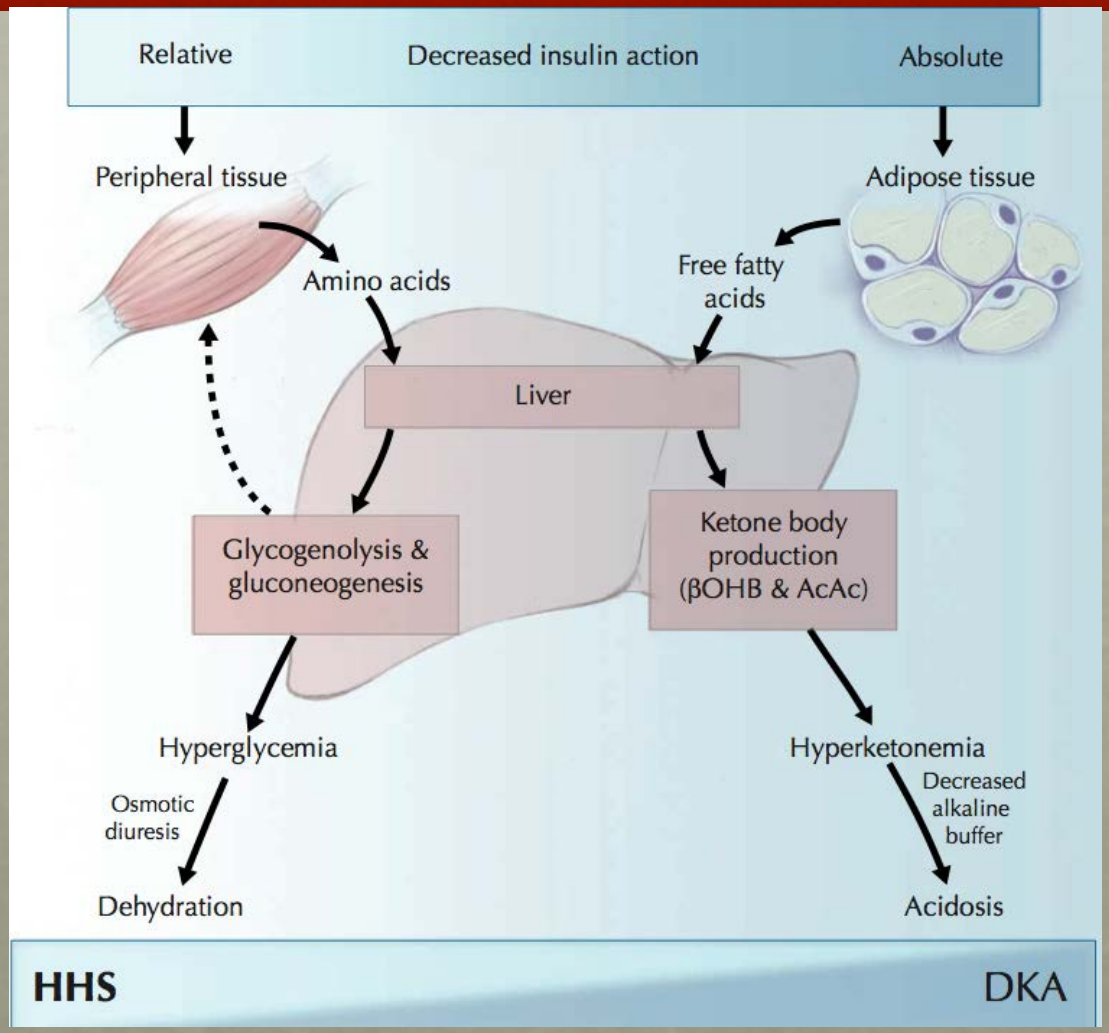
Insulin Type (trade name)	Time action profile
Premixed Insulins	
Premixed regular insulin – NPH (cloudy): • 30% insulin regular/ 70% insulin NPH (Humulin® 30/70) • 30% insulin regular/ 70% insulin NPH (Novolin®ge 30/70) • 40% insulin regular/ 60% insulin NPH (Novolin®ge 40/60) • 50% insulin regular/ 50% insulin NPH (Novolin®ge 50/50)	A single vial or cartridge contains a fixed ratio of insulin (% of rapid-acting or short-acting insulin to % of intermediate-acting insulin)
Premixed insulin analogues (cloudy): • 30% Insulin aspart/70% insulin aspart protamine crystals (NovoMix® 30) • 25% insulin lispro / 75% insulin lispro protamine (Humalog® Mix25®) • 50% insulin lispro / 50% insulin lispro protamine (Humalog® Mix50®)	

Canadian Diabetes Association

COMPLICATIONS

- Aigues:
  - Acidocétose diabétique
  - Coma hyperosmolaire
  - Hypoglycémie
- Chroniques
  - Macrovasculaires: MCAS, ACV, MVAS
  - Microvasculaires: rétinopathie, néphropathie, neuropathie
  - Cardiaques:
    - MCAS
    - Neuropathie autonome cardiaque
    - Cardiomyopathie diabétique

ACIDOCÉTOSE VS COMA HYPEROSMOLAIRE



CMAJ 2003;168(7):859-66

DKA et HHS investigations

- Analyses de laboratoire
  - FSC
  - Glycémie
  - Créat/urée
  - Électrolytes
  - Osmolalité
  - Cétones plasmatiques et urinaires
  - Gaz artériel
  - Analyse urine

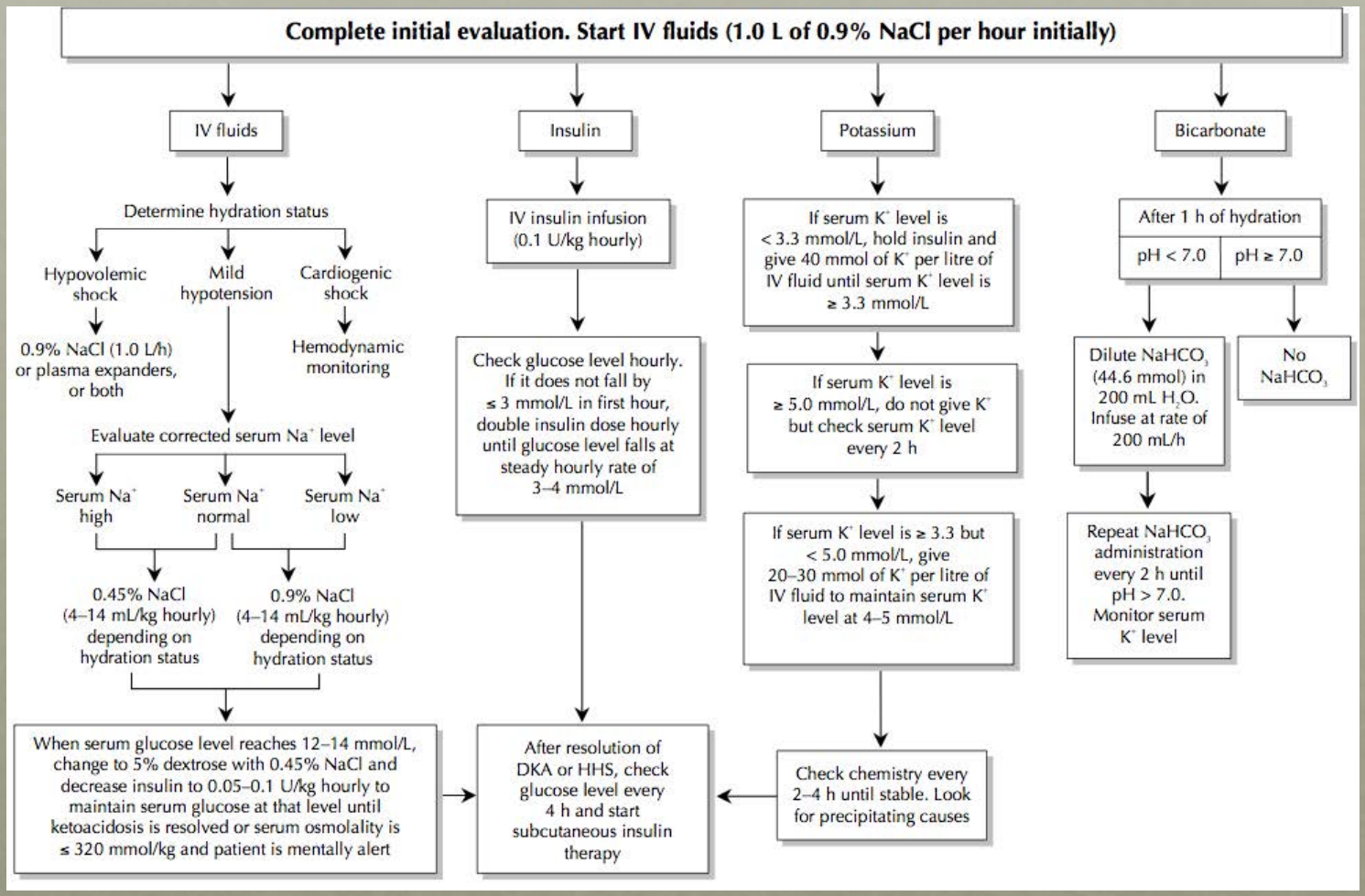
ACIDOCÉTOSE VS COMA HYPEROSMOLAIRE

Table 2: Laboratory diagnostic criteria for DKA and HHS[17,18]

Parameter	Normal range	DKA	HHS
Plasma glucose level, mmol/L	4.2–6.4	≥ 14	≥ 34
Arterial pH*	7.35–7.45	≤ 7.30	> 7.30
Serum bicarbonate level, mmol/L	22–28	≤ 15	> 15
Effective serum osmolality, mmol/kg	275–295	≤ 320	> 320
Anion gap,† mmol/L	< 12	> 12	Variable
Serum ketones	Negative	Moderate to high	None or trace
Urine ketones	Negative	Moderate to high	None or trace

CMAJ 2003;168(7):859-66

DKA ET HHS TRAITEMENT



CMAJ 2003;168(7):859-66

COMPLICATIONS

- Aigues:
  - Acidocétose diabétique
  - Coma hyperosmolaire
  - Hypoglycémie
- Chroniques
  - Macrovasculaires: MCAS, ACV, MVAS
  - Microvasculaires: rétinopathie, néphropathie, neuropathie
  - Cardiaques:
    - MCAS
    - Neuropathie autonome cardiaque
    - Cardiomyopathie diabétique

Neuropathie diabétique

- Polyneuropathie en gants et chaussettes
  - Atteinte axonale: sensitive > motrice
- Automone
  - Hypotension orthostatique
  - Gastroparésie
  - Impotence
  - Anhydrose
  - Dysfonction vessie/intestins
- Mononeuropathie multiplex
- Neuropathie nerf craniens: III>IV>VI

CARDIOMYOPATHIE DIABÉTIQUE

- Définition:
  - Dysfonction myocardique chez un patient diabétique en l'absence de MCAS, HTA ou maladie valvulaire

- Épidémiologie
  - Prévalence de 30-60% chez Db2 selon les études
  - Prévalence 15% d'insuffisance cardiaque chez les diabétique de longue date
  - 85% insuffisance cardiaque diastolique parmis les patients diabétiques avec IC

World J Diabetes 2013 October 15; 4(5): 177-189

CARDIOMYOPATHIE DIABÉTIQUE

- Mécanismes physiopathologiques
  - Hyperglycémie chronique
  - Stéatose cardiaque
  - Hyperinsulinémie
  - Ischémie microvasculaire
  - Système rénine-angiotensine

→ Contractilité diminuée
Fibrose
Anomalie relaxation
Rigidité myocardique
Hypertrophie ventriculaire

↓

Dysfonction diastolique

↓

Remodelage

↓

Insuffisance cardiaque

World J Diabetes 2013 October 15; 4(5): 177-189

Cardiomyopathie diabétique

- Évolution de la maladie:
  - Stade précoce:
    - Asymptômatique, changements moléculaires
    - Hypertrophie ventriculaire
    - Dysfonction diastolique
  - Stade intermédiaire:
    - Hypertrophie progressive et fibrose
    - Dysfonction diastolique avancée
    - Dysfonction systolique légère
  - Stade avancé
    - Dysfonction diastolique et systolique symptômatique
    - Associé à neuropathie autonome, MCAS, HTA

World J Diabetes 2013 October 15; 4(5): 177-189

Cardiomyopathie diabétique

- Investigations diagnostiques
  - Échographie + doppler transmitral
  - Doppler tissulaire
  - IRM-gadolinium cardiaque
  - BNP
  - Metalloprotéinase de la matrix (MMP9)
  - PIIINP
- Traitements
  - Sensiblement les mêmes que diabètes

World J Diabetes 2013 October 15; 4(5): 177-189

Considération anesthésiques

- MCAS chez majorité de >65ans
- Ischémie silencieuse
- Plus à risque de maladie vasculaire cérébrale, rénale, périférique
- Atteinte nerveuse/vasculaire périférique = blessure de positionnement
- Dysfonction autonomique = instabilité HD per-op
- Gastroparésie = risque accru d'aspiration
- Rigidité articulaire = airway difficile

Considérations anesthésiques

Table 1

Hemodynamic, Metabolic, and Neuroendocrine Changes During Surgery and Anesthesia in Patients With Diabetes

Release of counterregulatory hormones (ie, epinephrine, cortisol, growth hormone)
Tachycardia and tendency to cardiac arrhythmia
Vasoconstriction and labile blood pressure responses
Elevated peripheral insulin resistance
Reduced insulin secretion
Enhanced hepatic gluconeogenesis
Decreased peripheral glucose utilization
Accelerated adipose tissue and protein catabolism
Electrolyte abnormalities

J Am Acad Orthop Surg. 2010 Jul;18(7):426-35.

PRÉ-OP

- CIEPC
- Consultation endocrino/med interne
- Histoire + examen physique
- Investigations nécessaires
  - Glycémie
  - HbA1c
  - E+
  - Créatinine
  - ECG
  - Analyse urine
- Reporter la chirurgie si:
  - HbA1c > 8%
  - E+ anormaux
  - Cétonurie
- Considérer de débuter b-bloqueur en peri-op (controversé)

PER-OP

- Planifier le patient comme 1er cas
- Si hypoglycémie pré-op: glucose po ou jus clair
- Type 1:
  - Demi-dose longue action + protocole IV
  - Poursuivre pompe insuline si chx courte
- Type 2:
  - Cesser HCO le jour de la chx (48-72h pour les HGO longue action)
  - Échelle insuline rapide IV
  - Reprendre lorsque s'alimente
- Glycémie capillaire q 1-2h
- Insuline IV via pompe sur side-port D5NS KCl20

CONTRÔLE GLYCÉMIE PER-OP

Table 2

Relationship Between Improved Glycemic Control and Health Outcomes

Surgery or Event	Outcome
Perioperative	
Open heart	Decreased rates of death, deep sternal wound infections, length of stay, cost
Surgical ICU	Decreased mortality, bloodstream and nosocomial infections, acute renal failure, ventilatory support, blood transfusions, critical illness polyneuropathy, and duration of ICU stay
Other	
Acute coronary event	Enhanced survival after myocardial infarction
Medical ICU	Significant reduction in hospital mortality, transfusion requirements, new cases of renal insufficiency, and length of stay
Acute stroke	Better neurologic outcome and enhanced functional recovery
Labor and delivery	Prevention of adverse effects of neonatal hypoglycemia

ICU = intensive care unit

J Am Acad Orthop Surg. 2010 Jul;18(7):426-35.

GESTION DE L'INSULINE EN PÉRI-OPÉRATOIRE

Table 1 Maintenance insulin management for surgical outpatients: day of surgery dosing[a]

Insulin regimen	Dosing for early case	Dose adjustments for later case	During case in OR	Dosing in PACU	Instructions for home
Insulin pump (basal–bolus)	Maintain basal rate	Maintain basal rate	Maintain basal rate if possible	Maintain basal rate if possible; bolus without food	Resume usual rate + boluses without food
(Basal–bolus) Peakless basal dosing plus rapid acting without food (e.g. glargine, detemir)	No change in basal doses	No change	No change	No need	Back to usual dosing with rapid-acting boluses with meals
Intermediate-acting: single or multiple dose (e.g. NPH)	Hold morning dose until after case, or give percentage of dose[b]	Give percentage of dose based on time to first meal and next dose (Fig. 2)	No change	Give calculated percentage of insulin if necessary	Resume schedule if eating, careful with overlapping times
Peakless single or multiple dosing as sole insulin (e.g. glargine, detemir)	Same as intermediate-acting above	Same as above	No change	Give calculated percentage of insulin if necessary	Resume schedule if eating, careful with overlapping times
Fixed combination long and short acting (e.g. 70/30)	Hold morning dose or give percentage[b] [calculate amount of long-acting insulin (70%) as dose for multiple dose above]	Calculate amount of long-acting insulin (70%) as dose for multiple dose above and adjust	No change	Give calculated percentage of insulin if necessary	Resume schedule if eating, careful with overlapping times

OR, operating room; PACU, postanesthesia care unit.
[a] Correction of elevated glucose may be done with a subcutaneous dose of ultra-rapid-acting insulin as needed at any point in care.
[b] Calculated percentage insulin refers to dosing formula in Fig. 2.

Current Opinion in Anaesthesiology 2009, 22:718 – 724

POST-OP

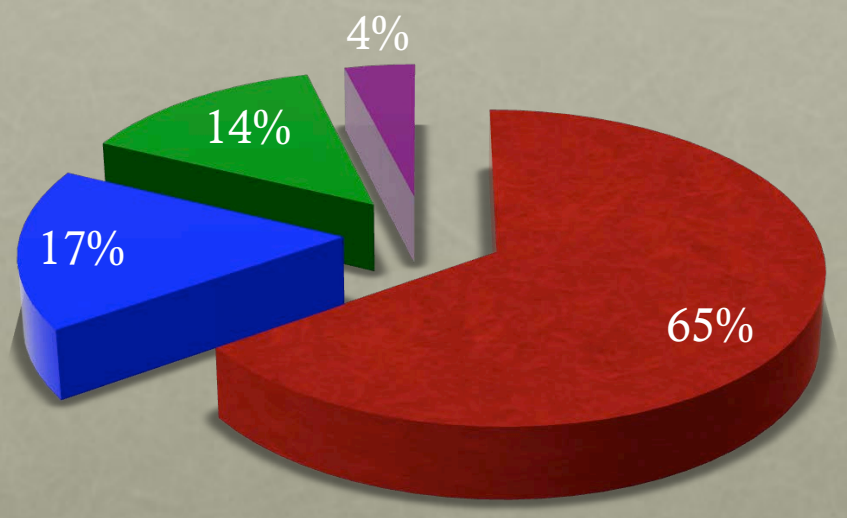
- Traitement aggressif de No/Vo
  - Éviter décadron
- Encourager alimentation précoce
- Retour au régime de tx pré-op

HYPERTENSION ARTÉRIELLE

- Prévalence mondiale de 1 milliard de personnes
- Prévalence canadienne de 20% chez 20-79 ans
  - 18% entre 40-59 ans
  - 53% entre 60-79 ans
- Le plus grand facteur de risque de mortalité à l'échelle mondiale
- 7.5 millions de morts/année (13%)
- Diminution des cas non diagnostiqués et meilleur contrôle de la maladie

Statistics Canada, Catalogue no. 82-003-XPE • Health Reports, Vol. 21, no. 1, March 2010
Blood pressure in Canadian adults • Research article

HYPERTENSION ARTÉRIELLE



- Traité et contrôlé
- Pas de diagnostic
- Traité et non-contrôlé
- Diagnostic et non-traité (4%)

Statistics Canada, Catalogue no. 82-003-XPE • Health Reports, Vol. 21, no. 1, March 2010
Blood pressure in Canadian adults • Research article

HYPERTENSION ARTÉRIELLE

- Types:
  - Essentielle (90%)
  - Secondaire (10%)
    - Néphropathie diabétique
    - Reins polykystiques
    - Glomérulonéphrites
    - Maladie rénovasculaire
    - Hyperaldostéronisme
    - Maladie de Cushing
    - Hyperthyroïdie/Hyperparathyroïdie
    - Phéochromocytome
    - Coarctaction de l'aorte, Apnée du sommeil, Rx…

HYPERTENSION ARTÉRIELLE

Classification de l'hypertension artérielle selon l'Organisation Mondiale de la Santé

CATÉGORIE	SYSTOLIQUE (mm Hg)		DIASTOLIQUE (mm Hg)
Optimale	< 120	et/ou	< 80
Normale	< 130	et/ou	< 85
Normale élevée	130-139	et/ou	85-89
Grade 1	140-159	et/ou	90-99
Grade 2	160-179	et/ou	100-109
Grade 3	≥ 180	et/ou	≥ 110
Hypertension systolique isolée	≥ 140	et	< 90

HYPERTENSION ARTÉRIELLE

Stratification des niveaux de risque cardiovasculaire, selon le nombre de facteurs de risque associés (hypercholestérolémie, diabète, surpoids, tabagisme, sédentarité...)

	PA 140-159 / 90-99	PA 160-179/100-109	PA > 180/110
0 FdR	Risque faible	Risque moyen	Risque élevé
1 à 2 FdR associés	Risque moyen	Risque moyen	Risque élevé
> 3 FdR et ou AVC et/ou diabète	Risque élevé	Risque élevé	Risque élevé
Maladie cardiovasculaire/rénale	Risque élevé	Risque élevé	Risque élevé

(FdR = facteur de risque)

Interprétation (niveau de risque)

<1 % | 1 % | 2 % | 3 à 4 % | 5 à 9 % | 10 à 14 % | ≥15 %

Faible (≤ 1 %) — **Élevé (≥ 5 %)**

- Chaque augmentation de 20 mm Hg de systolique ou 10 mm Hg de diastole en haut de 115/75 doublerait le risque de maladie cardiovasculaire chez 40-70 ans

Miller's Anesthesia 7th Edition, Chap 34

www.score-canada.ca

HYPERTENSION ARTÉRIELLE

TRAITEMENT NON-PHARMACOLOGIQUE

Intervention	Cible
↓ aliments avec sodium ajouté	< 2300 mg/jour
Perte de poids	IMC < 25 kg/m^2
Restriction cons. d'alcool	≤ 2 cons./jour
Activité physique	30-60 minutes, 4-7 jours/sem.
Régime alimentaire	Régime DASH
Désaccoutumance au tabac	Environnement exempt de fumée
Tour de taille	Hommes < 102 cm; femmes < 88 cm

http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/new_dash.pdf)

Hypertension CANADA

HYPERTENSION ARTÉRIELLE

- Indications d'instaurer thérapie Rx:

	Systolique	Diastolique
Risque élevé (LON ou Fx de risques MCV)	140	90
Faible risque (pas de LON ou Fx de risque MCV)	160	100
Diabète	130	80

Hypertension CANADA

HYPERTENSION ARTÉRIELLE

- Cibles thérapeutiques

Population	Systolique	Diastolique
Diabétiques	<130	<80
Personnes de > 80 ans	<150	<90
Tous les autres patients (y compris les néphropathies non-diabétiques)	<140	<90

Hypertension CANADA

ANTI-HYPERTENSEURS

Table 92. Side-Effects and Contraindications of Common Antihypertensive Agents

Classes of Antihypertensive Agents	Side-Effects	Contraindications
Diuretics		
Thiazides and loop diuretics	ECF volume depletion Increase in cholesterol (less with indapamide) Increase in glucose Increase in uric acid Increase in calcium (not with loop diuretics) Increase in lithium Decrease in potassium Decrease in sodium Decrease in magnesium Rarely causes blood dyscrasias, photosensitivity, pancreatitis, hyponatremia, erectile dysfunction	Avoid with gout
Potassium-sparing diuretics	Hyperkalemia, Metabolic acidosis Folate deficiency (triamterene) Kidney stones (triamterene)	Use with caution in CKD Stages 3-4 and in patients at increased risk for hyperkalemia
Beta adrenergic blockers		
Non-selective beta-blockers (and high-dose selective beta-blockers)	Bronchospasm Impairment of peripheral circulation Hyperkalemia	Avoid with asthma Avoid with chronic obstructive pulmonary disease Avoid with severe peripheral vascular disease
Lipid-soluble (metabolized in the liver) beta-blockers	Impotence Fatigue and decreased exercise tolerance Insomnia	Avoid with depression Avoid with liver disease (labetalol only)
All beta-blockers	Bradycardia Can mask and prolong insulin-induced hypoglycemia Hyperkalemia (less with selective beta-blockers)	Avoid with bradycardia Avoid with second or third degree heart block Avoid with heart failure (except carvedilol, extended release metaprolol, and bisoprolol)
Combined alpha and beta-blockers	Postural hypotension Bronchospasm	
Renin-angiotensin system		
ACE inhibitors	Cough Angioedema (very rare) Hyperkalemia Rash Loss of taste Leukopenia Increase lithium levels	Avoid in pregnancy Avoid with history of angioedema Caution with hyperkalemia
Angiotensin receptor blockers	Cough (lower incidence than ACE-I) Angioedema (very rare) Hyperkalemia (lower incidence than ACE-I) Increase lithium levels	Avoid in pregnancy Avoid with history of angioedema Caution with hyperkalemia
Calcium-channel blockers (CCBs)		
Dihydropyridine CCBs	Edema of the ankle (especially nifedipine) Flushing Headache Increase in cyclosporine levels (nicardipine only) Gingival hypertrophy "Dose dumping" (nifedipine, nisoldipine, felodipine)	

Table 92. Side-Effects and Contraindications of Common Antihypertensive Agents (cont'd)

Classes of Antihypertensive Agents	Side-Effects	Contraindications
Non-dihydropyridines CCBs (e.g., diltiazem, mibefradil, verapamil)	Nausea, headache (diltiazem) Constipation (verapamil) Conduction defects Worsening of systolic dysfunction Increase levels of other drugs metabolized by the same hepatic enzyme system Decrease serum lithium levels (verapamil only) Increase in cyclosporine levels Gingival hyperplasia, constipation	Avoid with second and third degree heart block Avoid with congestive heart failure due to systolic dysfunction
Alpha-adrenergic system		
Peripheral alpha-adrenergic blockers	Postural hypotension Diarrhea Decreases clearance of verapamil (prazosin only) Nasal congestion (reserpine only) Sedation (reserpine only, incontinence priapism)	Avoid with depression (reserpine only) Avoid with peptic ulcer disease (reserpine only)
Central alpha-adrenergic agonists	Sedation Dry mouth Bradycardia Withdrawal hypertension (more with clonidine, less with guanfacine, exacerbated by concomitant beta-blocker therapy) Increase serum lithium levels (methyldopa only) Hepatic and autoimmune disorders (methyldopa)	Avoid with depression Avoid with liver disease (methyldopa only)
Directly acting vasodilators	Headaches Fluid retention Tachycardia Lupus-like syndrome (hydralazine) Hirsutism and pericardial effusion (minoxidil only)	Avoid in lupus (hydralazine only)
Aldosterone antagonists		
Non-selective (spironolactone)	Hyperkalemia, metabolic acidosis Gynecomastia, impotence, hypermenorrhea	Use with caution in CKD Stages 3-4 and in patients at increased risk for hyperkalemia
Selective (eplerenone)	Hyperkalemia Metabolic acidosis Hypertriglyceridemia	Use with caution in CKD Stages 3-4 and in patients with increased risk of hyperkalemia

The listing of side-effects and contraindications is not all-inclusive, and side-effects are for the class of drugs except where noted for individual drugs (in parentheses); clinicians are urged to refer to the package insert for a more detailed listing.

TRAITEMENT PHARMACOLOGIQUE

Table 8: Considerations in the Individualization of Antihypertensive Therapy*†
ACE angiotensin converting enzyme; TIA transient ischemic attack; ARB angiotensin receptor blocker

	Initial therapy	***Second-line therapy***	***Notes and/or Cautions***
HYPERTENSION WITHOUT OTHER COMPELLING INDICATIONS			
Diastolic hypertension with or without systolic hypertension (target <140/90 mmHg)	Thiazide diuretics, beta-blockers, ACE inhibitors, ARBs, or long acting calcium channel blockers (consider ASA and statins in selected patients). Consider initiating therapy with a combination of first-line drugs if the blood pressure is ≥20 mmHg systolic or ≥10 mmHg diastolic above target.	Combinations of first-line drugs	Not recommended for monotherapy: Alpha blockers, Beta-blockers in those ≥60 years of age, ACE inhibitors in Blacks. Hypokalemia should be avoided in those prescribed diuretics monotherapy. ACE inhibitors and direct rennin inhibitors are potential teratogens, and caution is required if prescribing to women of child bearing potential. Combination of an ACE inhibitor with an ARB is not recommended.
Isolated systolic hypertension without other compelling indications (target BP for age <80 is <140/90 mmHg; for age ≥ 80 the target systolic BP is <150 mmHg.	Thiazide diuretics, ARBs or long acting dihydropyridine calcium channel blockers.	Combinations of first-line drugs	Same as diastolic hypertension with or without systolic hypertension

Hypertension CANADA

TRAITEMENT PHARMACOLOGIQUE

DIABETES MELLITUS	TARGET BLOOD PRESSURE < 130/80 mmHg		
Diabetes mellitus with microalbuminuria*, renal disease, cardiovascular disease or additional cardiovascular risk factors	ACE inhibitors or ARBs	Addition of dihydropyridine CCB is preferred over thiazide.	A loop diuretic could be considered in hypertensive CDK patients with extracellular fluid overload.
Diabetes mellitus not included in the above category	ACE inhibitors, ARBs, dihydropyridine CCBs or thiazide diuretics	Combination of first-line drugs. If combination with ACE-inhibitor is being considered a dihydropyridine CCB is preferable to thiazide diuretic	Normal albumin to creatinine ratio [ACR] < 2.0 mg/mmol in men and < 2.8 mg/mmol in women

CARDIOVASCULAR DISEASE	TARGET BLOOD PRESSURE < 140/90 mmHg		
Coronary artery disease	ACE inhibitors or ARBs (except in low-risk patients); beta-blockers for patients with stable angina	Long-acting CCBs. When combination therapy is being used for high risk patients, an ACE inhibitor/ dihydropyridine CCB is preferred	Avoid short-acting nifedipine. Combination of an ACE-inhibitor with an ARB is specifically not recommended.

Hypertension CANADA

TRAITEMENT PHARMACOLOGIQUE

Recent myocardial infarction	Beta-blockers and ACE inhibitors (ARBs if ACE inhibitor intolerant)	Long-acting CCBs if beta blocker contraindicated or not effective	Non-dihydropyridine CCBs should not be used with concomitant-heart failure.
Heart failure	ACE inhibitors (ARBs if ACE inhibitor intolerant) and beta blockers. Aldosterone antagonists (mineral corticoid receptor antagonists) may be added for patients with a recent cardiovascular hospitalization, acute myocardial infarction, elevated BNP or NT-proBNP level or NYHA Class II to IV symptoms.	ACE inhibitor and ARB combined. Hydralazine/isosorbide dinitrate combination if ACE inhibitor and ARB contraindicated or not tolerated. Thiazide or loop diuretics are recommended as additive therapy. Dihydropyridine CCB	Titrate doses of ACE inhibitors and ARBs to those used in clinical trials. Carefully monitor potassium and renal function if combining an of ACE inhibitor, ARB and/or aldosterone antagonist.
Left ventricular hypertrophy	ACE inhibitor, ARB, long acting CCB or thiazide diuretics	Combination of additional agents	Hydralazine and minoxidil can increase left ventricular hypertrophy
Past stroke or TIA	ACE inhibitor/diuretic combinations	Combination of additional agents	Treatment of hypertension should not be routinely undertaken in acute stroke unless extreme BP elevation. Combination of an ACE inhibitor with an ARB is not recommended.

Hypertension CANADA

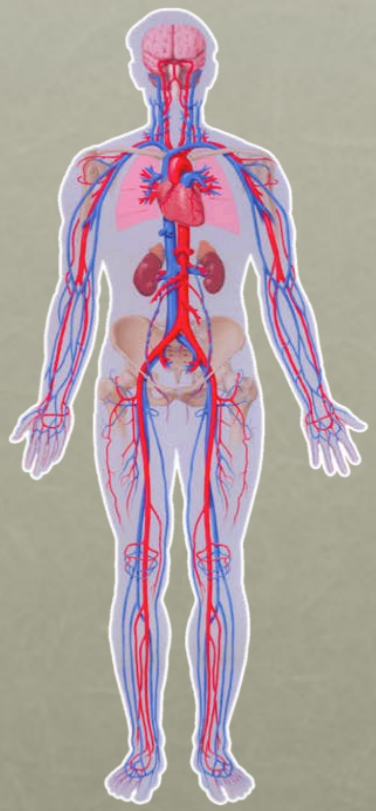
TRAITEMENT PHARMACOLOGIQUE

NON-DIABETIC CHRONIC KIDNEY DISEASE	TARGET BLOOD PRESSURE < 140/90 mmHg		
Nondiabetic chronic kidney disease with proteinuria†	ACE inhibitors (ARBs if ACE inhibitor intolerant) if there is proteinuria. Diuretics as additive therapy	Combinations of additional agents	Carefully monitor renal function and potassium for those on an ACE inhibitor or ARB. Combinations of an ACE-inhibitor and ARB are not recommended in patients without proteinuria.
Renovascular disease	Does not affect initial treatment recommendations	Combinations of additional agents	Avoid ACE inhibitors or ARBs if bilateral renal artery stenosis or unilateral disease with solitary kidney

OTHER CONDITIONS	TARGET BLOOD PRESSURE < 140/90 mmHg		
Peripheral arterial disease	Does not affect initial treatment recommendations	Combinations of additional agents	Avoid beta-blockers with severe disease
Dyslipidemia	Does not affect initial treatment recommendations	Combinations of additional agents	
Overall vascular protection	Statin therapy for patients with 3 or more		Caution should be exercised with the ASA
	cardiovascular risk factors or atherosclerotic disease Low dose ASA in patients with controlled blood pressure		recommendation if blood pressure is not controlled.

Hypertension CANADA

HYPERTENSION ARTÉRIELLE



- **Affection vasculaire cérébrale**
  - Accident ischémique transitoire (AIT)
  - Accident vasculaire cérébral (AVC) ischémique ou hémorragique
  - Démence vasculaire
- **Rétinopathie hypertensive**
- **Dysfonctionnement ventriculaire gauche**
- **Hypertrophie ventriculaire gauche**
- **Coronaropathie**
  - Infarctus du myocarde
  - Angine de poitrine
  - Insuffisance cardiaque congestive
- **Néphropathie chronique**
  - Néphropathie hypertensive (DFG : < 60 ml/min/1,73 m^2)
  - Albuminurie
- **Artériopathie périphérique**
  - Claudication intermittente
  - Indice tibio-brachial < 0,9

Hypertension CANADA

HYPERTENSION ARTÉRIELLE

- **Atteintes cardiaques**
  - Hypertrophie ventriculaire gauche (15-20%)
    - Fx de risque de MCAS, ACV, arythmies ventriculaires et mort subite
  - Dysfonction diastolique
  - Dysfonction systolique
  - HAG
  - Valvulopathies possibles (IA, ScA et IM)
  - Arythmies (FA)

PHYSIOPATHOLOGIE

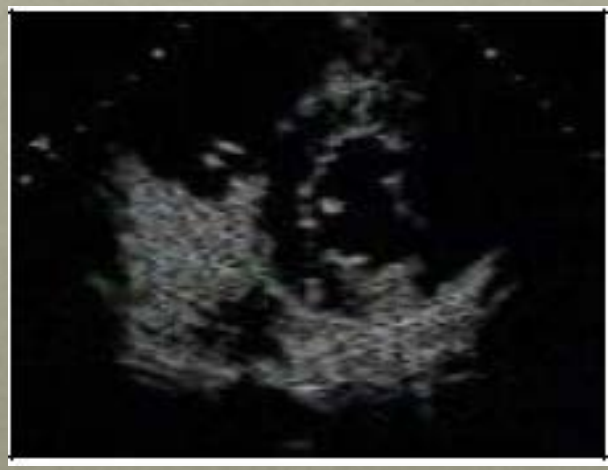
- HTA
  - Mécanismes complexes
  - Dysfonction endothéliale
    - Diminution production NO (vasodilatateur)
    - Augmentation de vasoconstricteurs
    - Augmentation de résistance vasculaire périphérique
  - Hyperactivité adrénergique / rénine-angiotensine
  - Dysfonction de la microcirculation
  - Atteinte du DC et hypoperfusion des organes possible

Circulation 2011; 123: 327-334

PHYSIOPATHOLOGIE

- HVG
  - Augmentation de la masse ventriculaire
    - Cardiomyocytes
    - Matrice extra-cellulaire
    - Accumulation de fibrose
    - Anomalies de la vascularisation intra-myocardique

  - Stress sur la paroi musculaire
  - Influence neuro-hormonale et cytokines



Circulation 2011; 123: 327-334

PHYSIOPATHOLOGIE

- HVG excentrique vs concentrique

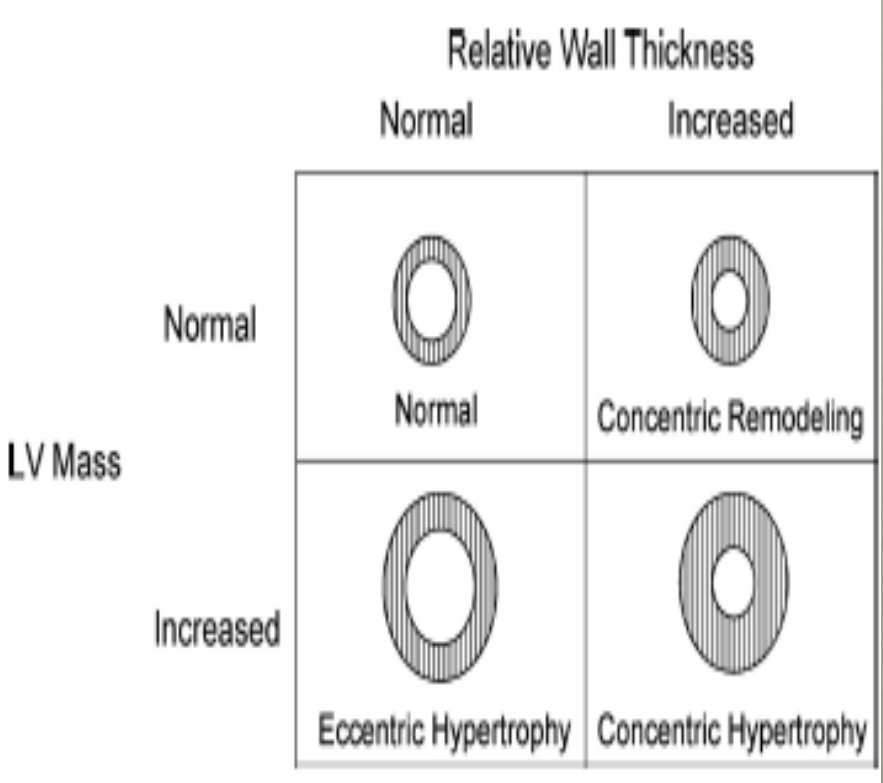


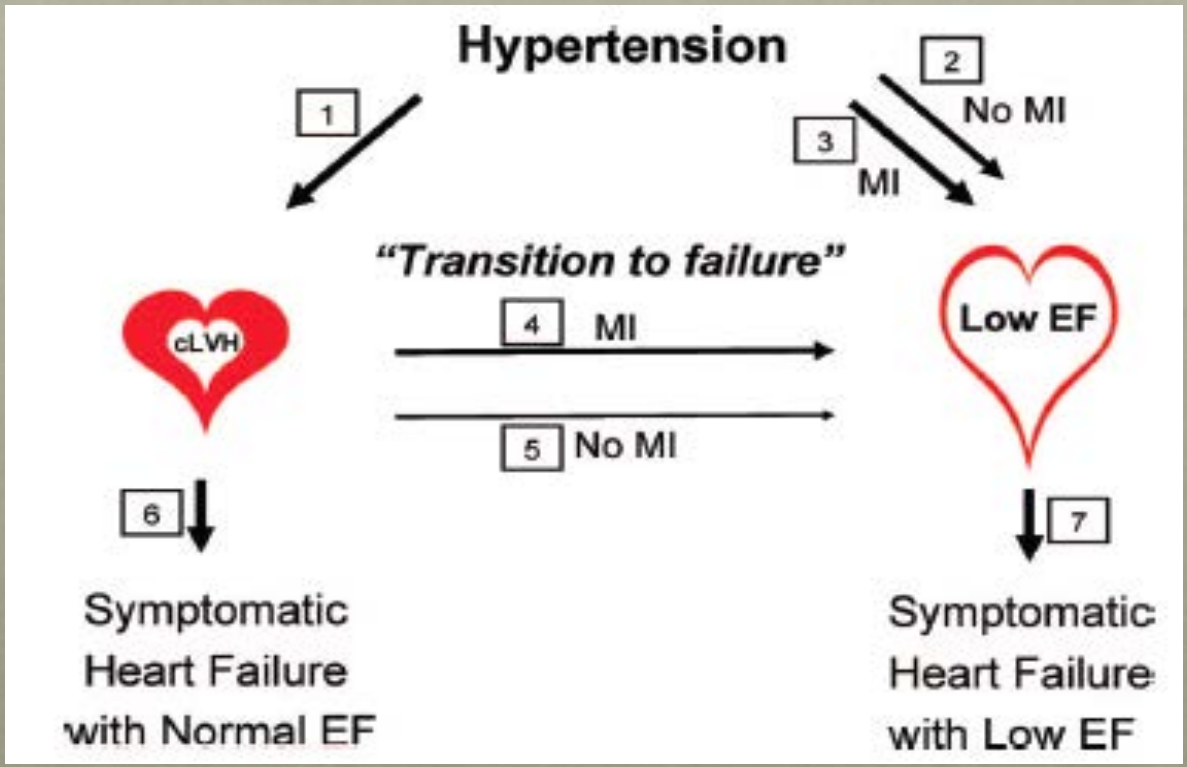
Table 1. Factors Influencing LV Geometry in Hypertensive Patients

Pressure load: severity, duration, rapidity of onset
Volume load
Demographic factors: age, race/ethnicity, gender
Concomitant medical conditions: coronary artery disease, diabetes mellitus, obesity, valvular heart disease
Neurohormonal milieu
Alterations of the extracellular matrix
Genetic factors

Circulation 2011; 123: 327-334

PHYSIOPATHOLOGIE

- Progression de HTA



Circulation 2011; 123: 327-334

HVG

- Diagnostic
  - ECG
    - Plusieurs critères disponibles

      Cornell (voltage), Sokolow-Lyon, produit de Cornell, score de Romhilt-Estes…
    - Haute spécificité, **faible sensibilité (environ 10%)**
    - Donne une aperçue du problème de conduction
    - Mauvais pour estimer la masse ventriculaire
  - Echographie et IRM

PERIOPÉRATOIRE

- Préopératoire
  - Anamnèse
  - E/P(valeur base TA)
  - Laboratoires, ECG
- Quels patients devraient être traités en aigu?
- Quelle circonstance doit mener à l'annulation d'une chirurgie élective?
- **Pas de ligne directrice acceptée avec unanimité**

Curr Hypertens Rep (2012) 14:432–441

PERIOPÉRATOIRE

- ERC, prospective, n=1000 (Weksler et al) Tad 110-130, pas d'atteinte organe noble
  - Pas de différence entre traitement immédiat et repousser chx pour contrôle TA
- ACC/AHA 2007
  - HTA grades 1 et 2 (<180/110 mm Hg) n'est pas fx de risque indépendant de complications cardiovasculaires
- Peu d'étude démontrant nécessité d'annuler la chirurgie avec TA>180/110 mm Hg

Curr Hypertens Rep (2012) 14:432–441

PERIOPÉRATOIRE

- ACC/AHA 2007
  - Pt avec TA>180/110 mm Hg **SANS** comorbidité CV significative peut subir sa chirurgie élective
    - Diminution de 20% (max) en aigu
  - Ceux avec comorbidités CV (MCAS, IC, IRC, MCV) ➔ Annuler la chirurgie pour contrôle de TA
    - Évaluer risques de repousser la chirurgie

Curr Hypertens Rep (2012) 14:432–441

PERIOPÉRATOIRE

- Les antihypertenseurs devraient être continués
  - Sauf IECA et ARA (Coriat et al., Brabant et al.)
  - Cesser au moins 10 heures avant SOP
  - Risque d'hypotension significative et prolongée
- Variation des TA dans les limites de 20% des valeurs de base ➔ probablement acceptable
- Certaines études ont démontrées plus d'effets délétères de l'hypotension pour les pt avec HTA chronique

Miller's Anesthesia 7th Edition, Chap 34

Curr Hypertens Rep (2012) 14:432–441

COLECTOMIE

- Plusieurs indications
  - Cancer du colon
  - Polypose adénomateuse familiale (FAP)
  - Maladie diverticulaire
  - MII (Crohn's et colite ulcéreuse)
  - Colite ischémique / Mégacôlon toxique
  - Perforation traumatique ….
- Plusieurs techniques
  - Hemicolectomie
  - Proctocolectomie totale avec iléostomie
  - Par laparotomie ou laparoscopie ..

COLECTOMIE

- Pré-op
  - Pt souvent hypovolémique
  - MII peut être associée à certaines conditions systémiques
    - Spondylite ankylosante (↓ ROM du cou)
    - Atteinte hépatique (métabolisme de certains Rx)
  - Risque significatif d'aspiration bronchique
    - Surtout en urgence
  - Respiratoire
    - Métastases pulmonaires possible (CA côlon)
    - ↓ CRF sur douleur/ distension abdominale

COLECTOMIE

- Cardiovasculaire
  - Hypovolémie
  - Instabilité HD possible si sepsis (obstruction et translocation)
- NM
  - Désordres E+/IRA
    - Alc. Métabollique avec Hypo K (Vomissements ou TNG)
    - Ac. Métabollique Hyper Cl (diarrhée)
- GI
  - Aspirer TNG avant induction

COLECTOMIE

- Intra-opératoire
  - Épidurale si laparotomie
    - Utiliser judicieusement durant chirurgie
  - Induction standard vs séquence rapide (urgence ou obstruction)
  - Risque de saignement modéré, en général
    - Code 50 et culots en réserve (selon le cas et le patient)
  - Instabilité HD possible
    - Hémorragie
    - Sepsis (manipulation de tissu nécrotique/translocation BGN)

RETOUR AU CAS

- Pt de 80 ans, HTA et DB doit subir colectomie
- Pré-op
  - Selon l'urgence de la situation
  - Électif = CIEPC
    - Stade HTA, type DB, le contrôle, les Rx, comorbidités
    - Classe fonctionnelle
    - Labo, code 50 (+/- culots en réserve)
    - Cesser HGO, IECA/ARA le matin de SOP
    - Poursuivre autres anti-HTA et ½ dose Insuline basale
    - 1er cas de la journée (éviter jeûne prolongé)
    - Pas de USI à prime abord

RETOUR AU CAS

- Intra-opératoire
  - Installation/monitoring
    - ASA standard (plus 5 dérivations)
    - Voies veineuses (18 G ou 16 G)
    - Canule artérielle (+/- avant induction)
    - +/- voie centrale
    - Couverture chauffante et réchauffe soluté
    - Sonde urinaire
    - Péridurale
    - Attention au positionnement (neuropathie périphérique)

RETOUR AU CAS

- Induction
  - Optimiser volémie
  - +/- séquence rapide selon clinique (gastroparésie, urgence…)
  - Standard avec attention aux doses (âge, comorbidités et péridurale)
  - Avoir médicaments d'urgence prêt
  - Cible TA : 20% de la base

RETOUR AU CAS

- Maintien
  - Halogénés
  - Péridurale (utiliser judicieusement)
  - +/- opioïde
  - Cible TA= 20% de base
  - Cible glycémie= 8-10 mmol, glycémies au 1-2 h
  - Cible ventilation= standard
  - Cible de volémie= Éviter recette, *Fluid directed therapy*
  - Cible transfusionnelle= selon état du pt (discutable)
- Émergence standard

QUESTION #43

- According to the AHA/ASA guidelines which patient requires further cardiac work up?

  a) Emergency pt
  b) Revascularization within 5 years
  c) No clinical predictors but low METs going for vascular surgery
  d) Stable angina for carotid surgery
  e) CHF Class 2 for cateract surgery

QUESTION #43

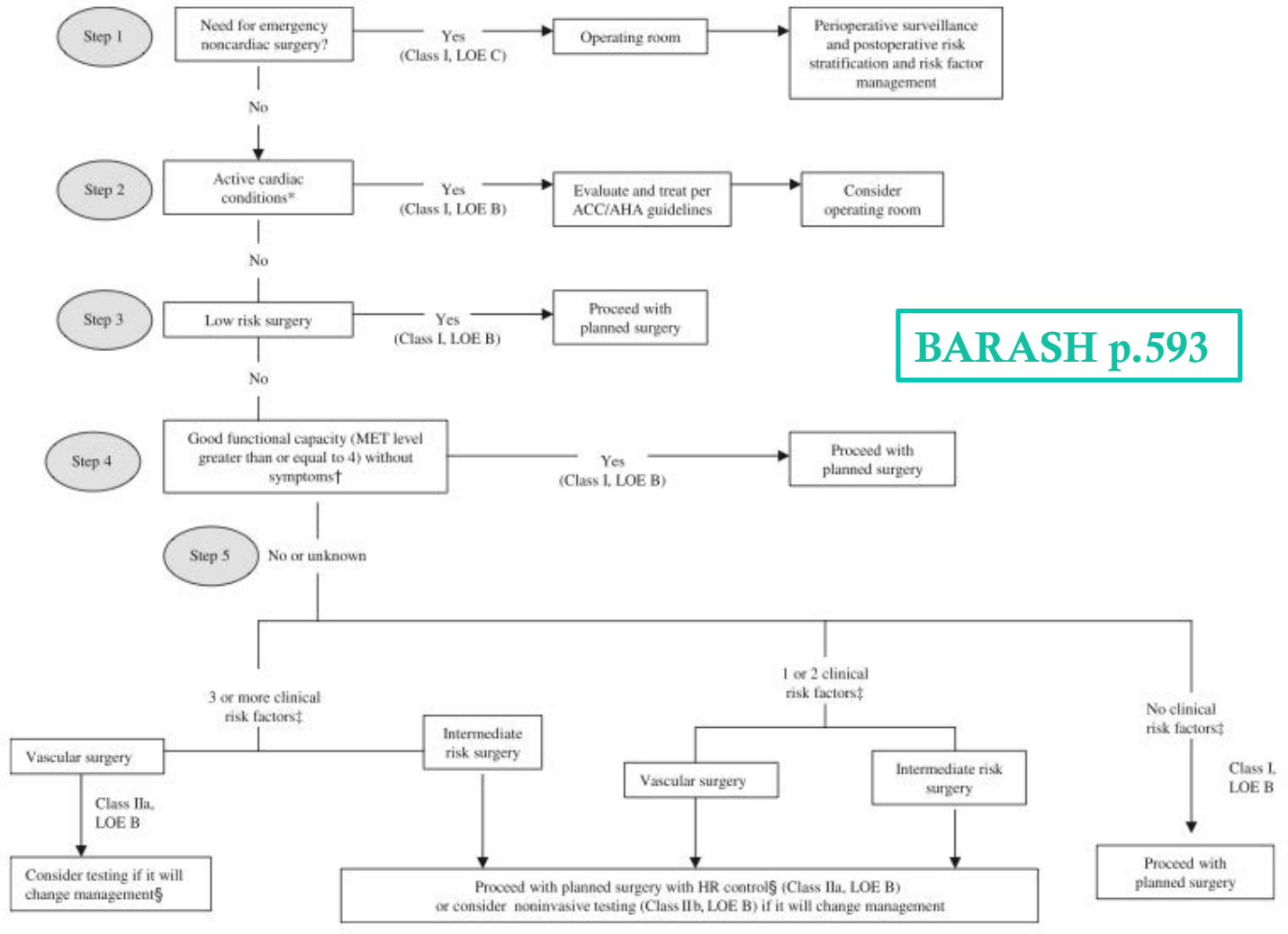
Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

ACC/AHA 2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery)

Lee A. Fleisher, Joshua A. Beckman, Kenneth A. Brown, Hugh Calkins, Elliot L. Chaikof, Kirsten E. Fleischmann, William K. Freeman, James B. Froehlich, Edward K. Kasper, Judy R. Kersten, Barbara Riegel and John F. Robb

Circulation. 2007;116:e418-e500

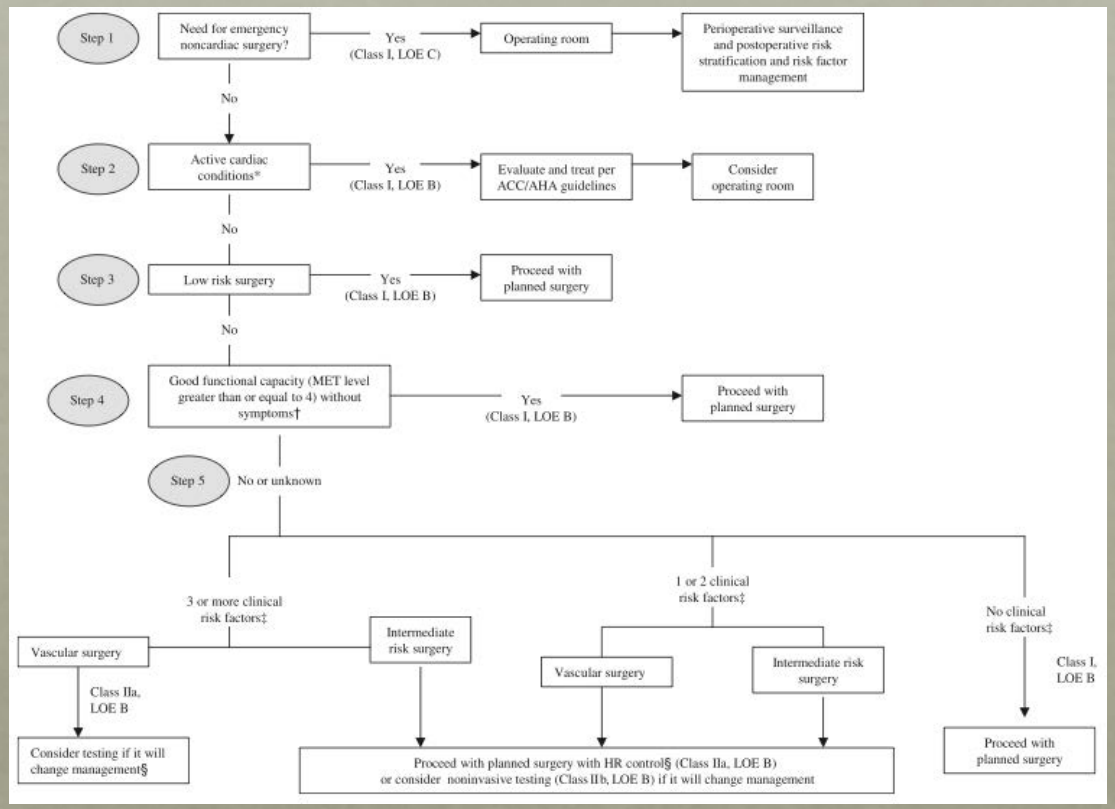
QUESTION #43



BARASH p.593

Circulation. 2007;116:e418-e500

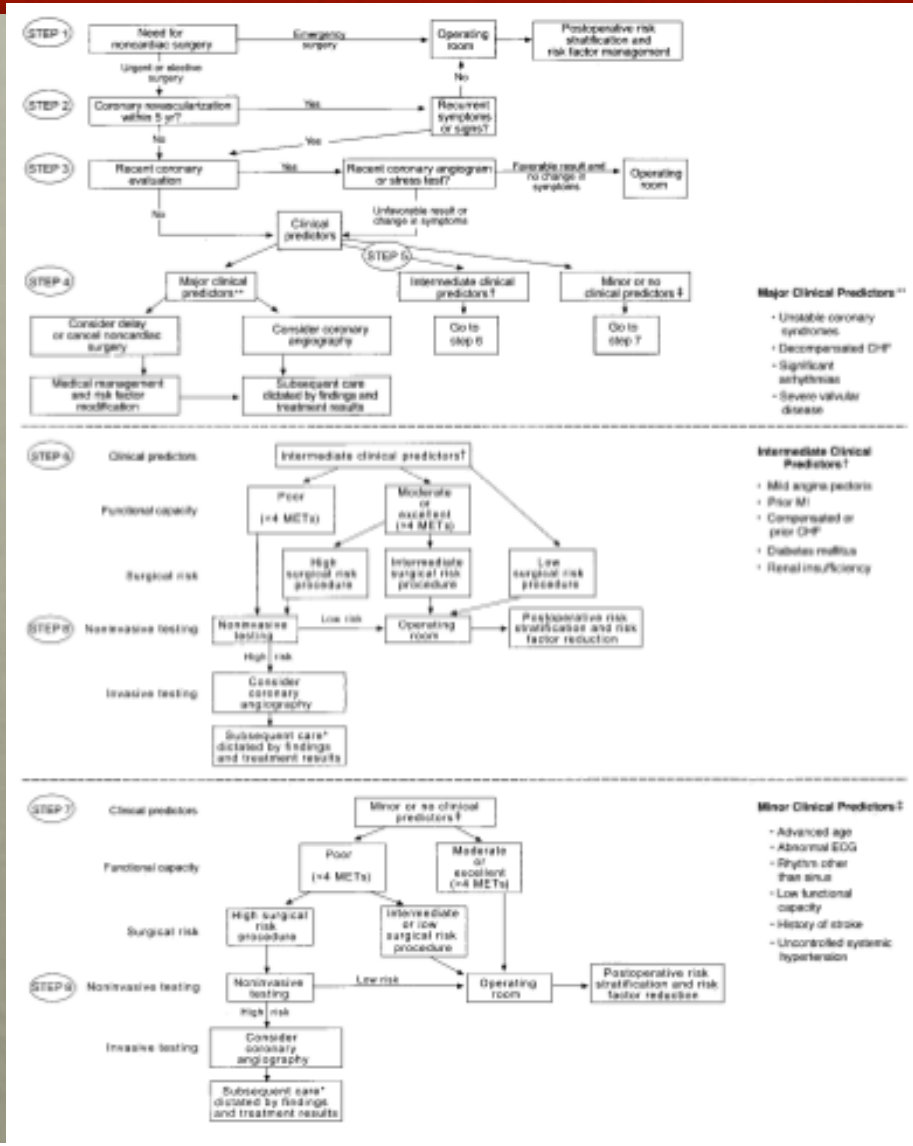
QUESTION #43



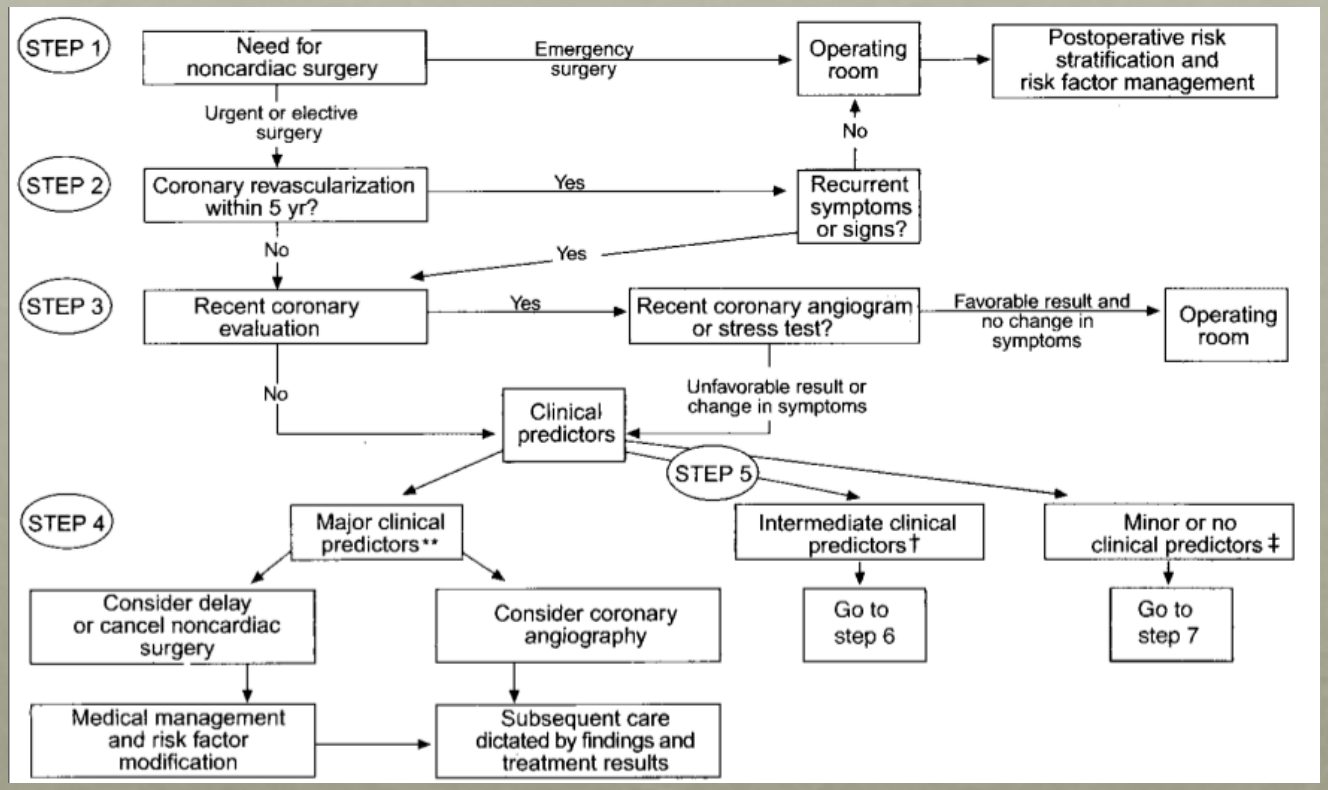
a) Emergency pt
b) Revascularization within 5 years
c) No clinical predictors but low METs going for vascular surgery
d) Stable angina for carotid surgery
e) CHF Class 2 for cateract surgery

Circulation. 2007;116:e418-e500

QUESTION #43


STEP 1
Need for noncardiac surgery
Emergency surgery
Operating room
Postoperative risk stratification and risk factor management
Urgent or elective surgery
No
STEP 2
Coronary revascularization within 5 yr?
Yes
Recurrent symptoms or signs?
No
Yes
STEP 3
Recent coronary evaluation
Yes
Recent coronary angiogram or stress test?
Favorable result and no change in symptoms
Operating room
No
Unfavorable result or change in symptoms
Clinical predictors
STEP 5
STEP 4
Major clinical predictors**
Intermediate clinical predictors†
Minor or no clinical predictors ‡
Consider delay or cancel noncardiac surgery
Consider coronary angiography
Go to step 6
Go to step 7
Medical management and risk factor modification
Subsequent care dictated by findings and treatment results
Major Clinical Predictors**
• Unstable coronary syndromes
• Decompensated CHF*
• Significant arrhythmias
• Severe valvular disease
STEP 6
Clinical predictors
Intermediate clinical predictors†
Functional capacity
Poor (<4 METs)
Moderate or excellent (>4 METs)
Surgical risk
High surgical risk procedure
Intermediate surgical risk procedure
Low surgical risk procedure
STEP 8
Noninvasive testing
Noninvasive testing
Low risk
Operating room
Postoperative risk stratification and risk factor reduction
High risk
Invasive testing
Consider coronary angiography
Subsequent care* dictated by findings and treatment results
Intermediate Clinical Predictors†
• Mild angina pectoris
• Prior MI
• Compensated or prior CHF*
• Diabetes mellitus
• Renal insufficiency
STEP 7
Clinical predictors
Minor or no clinical predictors ‡
Functional capacity
Poor (<4 METs)
Moderate or excellent (>4 METs)
Surgical risk
High surgical risk procedure
Intermediate or low surgical risk procedure
STEP 9
Noninvasive testing
Noninvasive testing
Low risk
Operating room
Postoperative risk stratification and risk factor reduction
High risk
Invasive testing
Consider coronary angiography
Subsequent care* dictated by findings and treatment results
Minor Clinical Predictors‡
• Advanced age
• Abnormal EKG
• Rhythm other than sinus
• Low functional capacity
• History of stroke
• Uncontrolled systemic hypertension

QUESTION #43

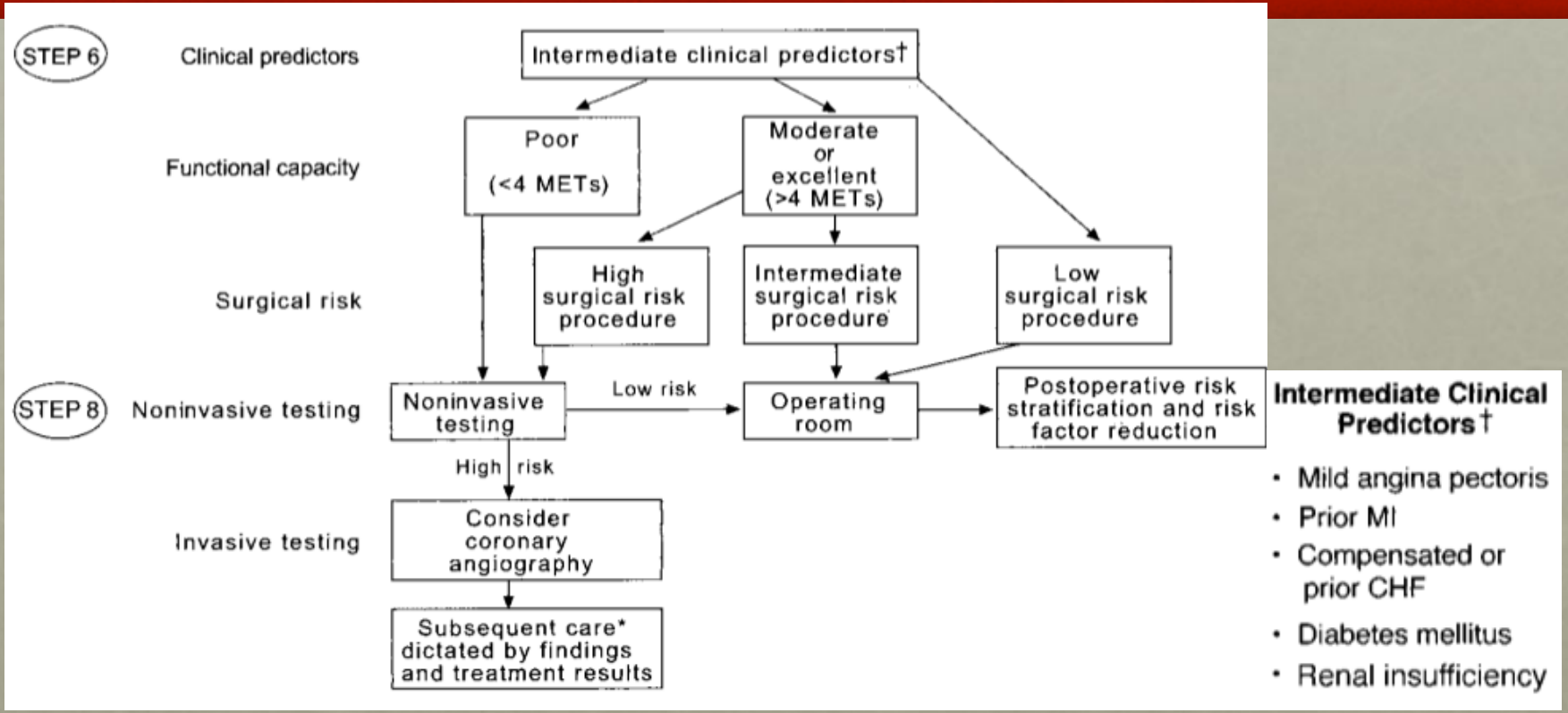


a) Emergency pt
b) Revascularization within 5 years
c) No clinical predictors but low METs going for vascular surgery
d) Stable angina for carotid surgery
e) CHF Class 2 for cateract surgery

Major Clinical Predictors **

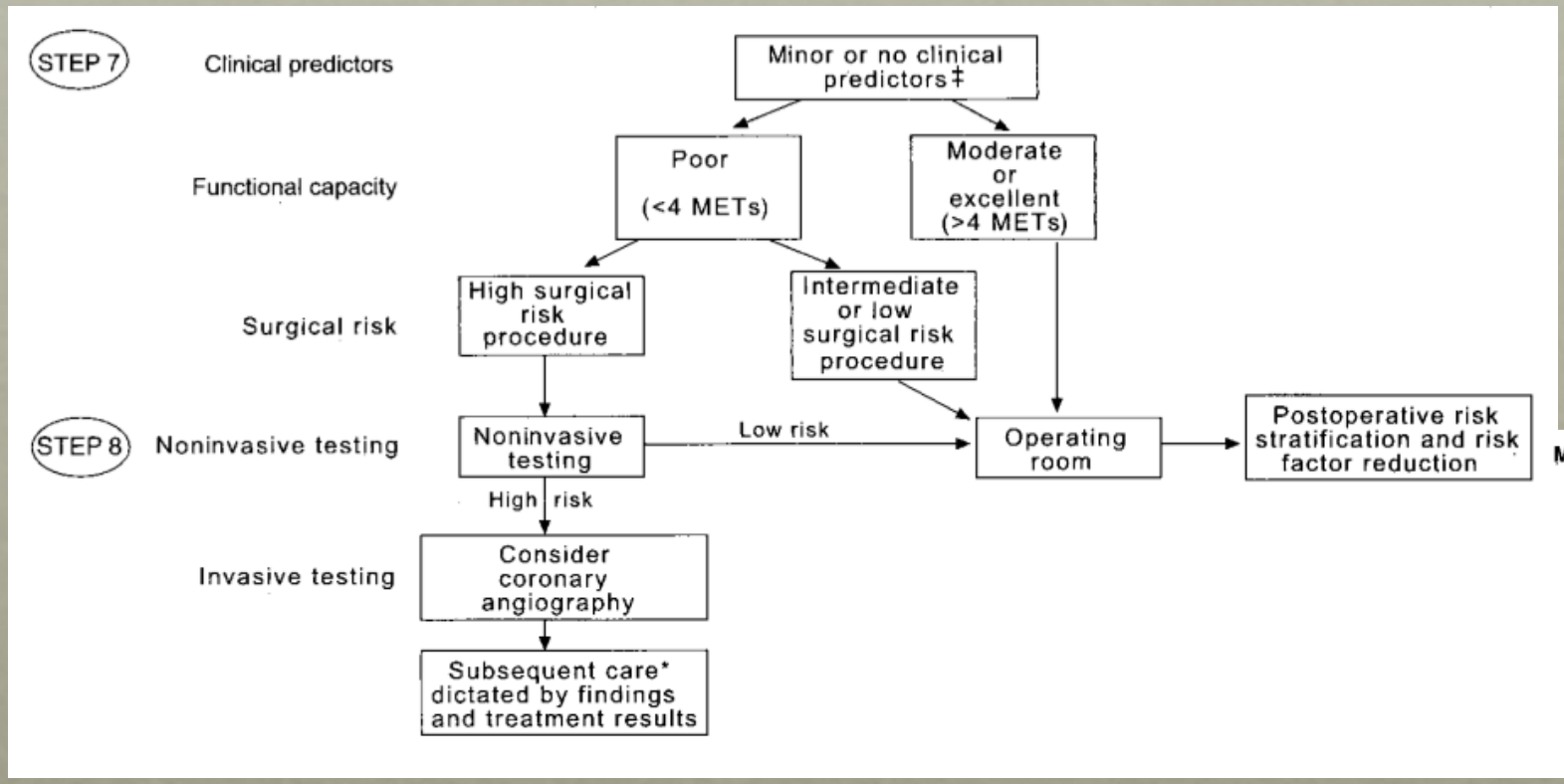
- Unstable coronary syndromes
- Decompensated CHF
- Significant arrhythmias
- Severe valvular disease

QUESTION #43



a) Emergency pt
b) Revascularization within 5 years
c) No clinical predictors but low METs going for vascular surgery
d) Stable angina for carotid surgery
e) CHF Class 2 for cateract surgery

QUESTION #43



Minor Clinical Predictors‡

- Advanced age
- Abnormal ECG
- Rhythm other than sinus
- Low functional capacity
- History of stroke
- Uncontrolled systemic hypertension

a) Emergency pt
b) Revascularization within 5 years
c) No clinical predictors but low METs going for vascular surgery
d) Stable angina for carotid surgery
e) CHF Class 2 for cateract surgery

QUESTION #43

- According to the AHA/ASA guidelines which patient requires further cardiac work up?

  a) Emergency pt
  b) Revascularization within 5 years
  c) No clinical predictors but low METs going for vascular surgery
  d) Stable angina for carotid surgery
  e) CHF Class 2 for cateract surgery

QCM #48

48) What procedure is described as high risk with regard to perioperative myocardial infarction?

a) Radical prostatectomy

b) Pneumonectomy

c) Femoral-popliteal artery bypass

d) Carotid endarterectomy

QCM #48

Table 4. Cardiac Risk* Stratification for Noncardiac Surgical Procedures

Risk Stratification	Procedure Examples
Vascular (reported cardiac risk often more than 5%)	Aortic and other major vascular surgery Peripheral vascular surgery
Intermediate (reported cardiac risk generally 1% to 5%)	Intraperitoneal and intrathoracic surgery Carotid endarterectomy Head and neck surgery Orthopedic surgery Prostate surgery
Low† (reported cardiac risk generally less than 1%)	Endoscopic procedures Superficial procedure Cataract surgery Breast surgery Ambulatory surgery

*Combined incidence of cardiac death and nonfatal myocardial infarction.
†These procedures do not generally require further preoperative cardiac testing.

ACCF/AHA 2007 Perioperative Guidelines, Circulation 2009

QCM #48

Table 4 Surgical risk[a] estimate (modified from Boersma *et al.*[6])

Low-risk <1%	Intermediate-risk 1–5%	High-risk >5%
▪ Breast ▪ Dental ▪ Endocrine ▪ Eye ▪ Gynaecology ▪ Reconstructive ▪ Orthopaedic—minor (knee surgery) ▪ Urologic—minor	▪ Abdominal ▪ Carotid ▪ Peripheral arterial angioplasty ▪ Endovascular aneurysm repair ▪ Head and neck surgery ▪ Neurological/ orthopaedic—major (hip and spine surgery) ▪ Pulmonary renal/ liver transplant ▪ Urologic—major	▪ Aortic and major vascular surgery ▪ Peripheral vascular surgery

[a]Risk of MI and cardiac death within 30 days after surgery.

European Heart Journal (2009), ESC Guidelines

EUROPEAN SOCIETY OF CARDIOLOGY®

QCM #48

48) What procedure is described as high risk with regard to perioperative myocardial infarction?

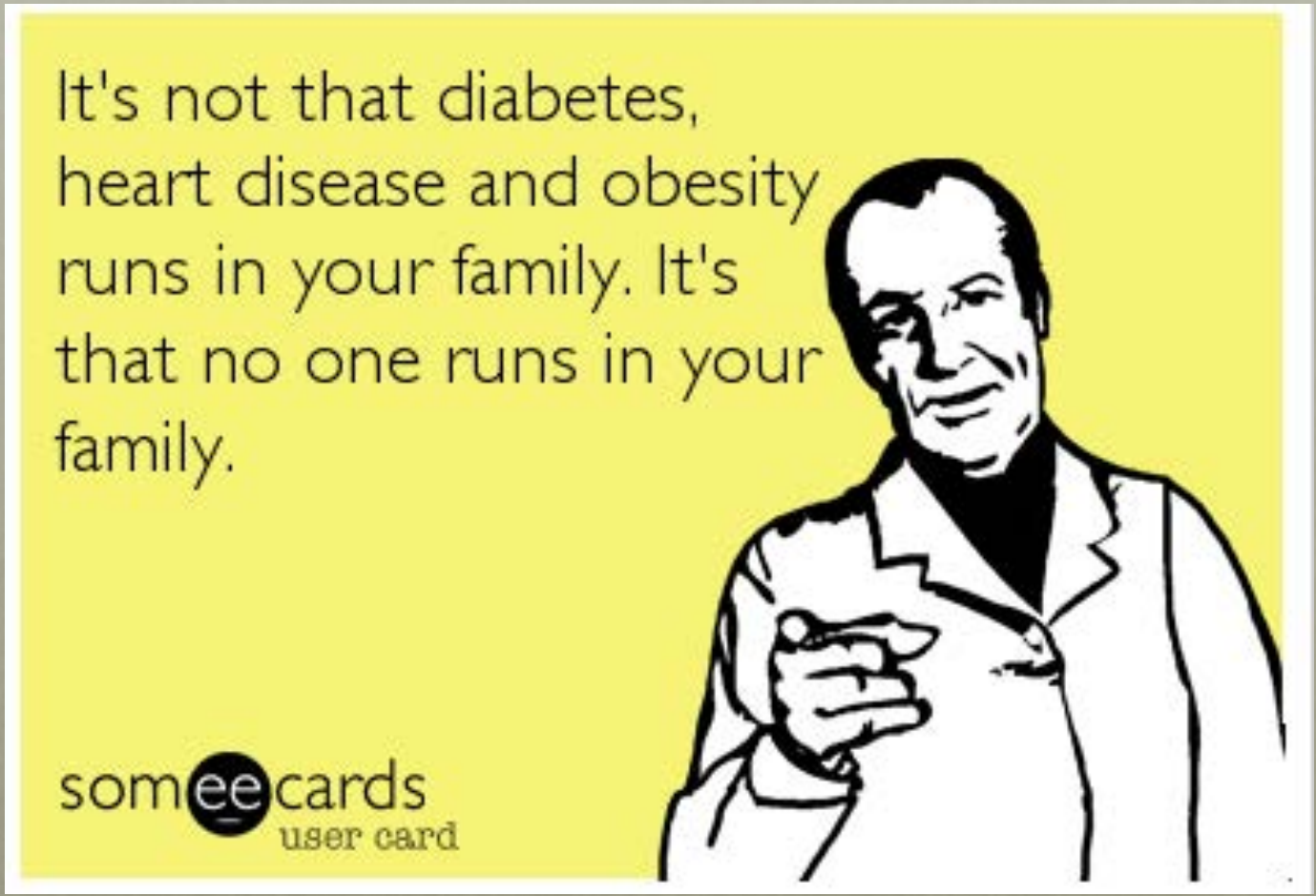
a) Radical prostatectomy

b) Pneumonectomy

c) Femoral-popliteal artery bypass

d) Carotid endarterectomy

QUESTIONS?


It's not that diabetes, heart disease and obesity runs in your family. It's that no one runs in your family.
someecards
user card