



# Cardiogeriatrics

Prof. M. de Saint-Hubert, geriatrician

Prof. AC. Pouleur, cardiologist

Prof. B. Boland, geriatrician



# Agenda

	Topic	Speaker
13:30 – 14:30	Heart failure with preserved LVF: myth of reality?	Prof. AC. Pouleur
14:30 – 15:30	TAVI & preoperative assessment	Prof. M. de Saint-Hubert/ AC. Pouleur
15:30 – 15:45	Coffee break	
15:45 – 16:30	Anticoagulation in older patients with AF	Prof. B. Boland

# **TAVI & PREOPERATIVE ASSESSMENT**

# What is known...

- TAVI > medical treatment
  - Selected patients
  - Survival :
    - 1-y : 15-19%
    - 2-y : 33-43%
- Survival post-TAVI  $\geq$  Surgery
- Still.. high morbidity :
  - 28% delirium (daily assessment) (gen anesth)
  - Frailty assessment may help to identify at-risk patients

*Assman et al, Openheart 2017*

*Sepehri et al, J Thorac Cardiovasc Surg 2014*

# Clinical situation

*Mrs X, 92 y*

- Admitted in cardiology for fall
- Pauci-symptomatic of severe aortic stenosis

# Clinical situation

*Mrs X, 92 y*

- Living at home, some help in IADL and ADL
- No cognitive impairment
- Low mobility for years (multifocal arthritis)

# Criteria for implantation (patient)

- Severe aortic stenosis
  - AND symptoms (NYHA  $\geq$ II)
  - AND expected QOL after procedure
  - BUT inoperability because of...
    - Porcelaine aorta
    - Severe chest deformation
    - Previous Rxtherapy
    - Previous sternotomies ( $\geq$ 2) and/or infection
    - .....
  - WITHOUT exclusion criteria

<http://www.inami.fgov.be/nl/professionals/individuele zorgverleners/verstrekkers-van-implantaten/akkoord/Paginas/klepstent-aortapositie.aspx#.WQwp0GdO6Uk>

# Exclusion criteria

- primaire hypertrofische cardiomyopathie +/- obstructie,
- ernstige ventriculaire dysfunctie LVEF < 20%,
- CVA of TIA < 6 maanden vóór de geplande ingreep,
- NI (chronisch of acuut) - creatininespiegel > 3 mg/dL / dialyse,
- Dementie of andere invaliderende neurologische ziekten,
- **levensverwachting** < één jaar
- een myocardinfarct binnen de 30 dagen
- klinisch significante coronaire met revascularisatie vereist is,
- hemodynamische instabiliteit (inotrope / mechanische)
- congenitale afwijking van de aortaklep: uni- of bicuspidale klep, anatomische afwijkingen, intracardiale massa, afmeting van de native annulus aortae
- gemengde aortaklepziekte (aortastenose en aortainsufficiëntie) met predominantie van de insufficiëntie > 3+,
- ernstige mitralisklepcalcificatie of -insufficiëntie
- acuut peptisch ulcus of hoge gastro-intestinale bloeding < 3 m.
- bloeddyscrasie gedefinieerd als volgt: leukopenie (WBC < 3000/mm<sup>3</sup>), acute anemie (Hb < 9 mg%), trombocytopenie (< 50.000 cellen/mm<sup>3</sup>), coagulopathie
- gekende overgevoeligheid of contra-indicatie voor acetylsalicylzuur, heparine, ticlopidine, clopidogrel of andere anti-aggregantia; gekende overgevoeligheid voor contraststoffen
- nood tot dringende heilkunde voor welke reden dan ook..
- Cardiomyopathie hypertrofische primaire met +/- obstructie
- Dysfunctie van de linker ventrikel (LVEF) < 20%
- AVC of AIT < 6 maanden
- IR (chronisch of acuut) - creatinine > 3mg/dL / dialyse
- Démence sénile grave ou autre maladie neurologique
- **Espérance de vie < 1 an**
- Infarctus du myocarde < 30 jours avant l'intervention planifiée
- Affection coronaire - revascularisation est exigée
- Instabilité hémodynamique (inotrope ou soutien mécanique)
- Anatomique : anomalie congénitale de la valve aortique : uni/bicuspidale ; dimension anneau, masse intracardiale
- Maladie de la valve aortique mixte (sténose + insuffisance)
- Calcification grave ou insuffisance grave de la valve mitrale
- Ulcère peptique aigu ou saignement gastro-duodénal < 3 mois
- Dyscrasie sanguine définie comme suit : leucopénie (WBC < 3000/mm<sup>3</sup>), anémie aiguë (Hb < 9mg%), thrombocytopénie (< 50.000 cellules / mm<sup>3</sup>), coagulopathie
- Hypersensibilité connue ou contre-indication à l'acide acétique salicylique, héparine, ticlopidine ou clopidogrel ou autre antiagrégant ; hypersensibilité aux substances de contraste
- Nécessité d'une chirurgie urgente pour quelque raison



# Criteria for implantation (hospital)

- Multidisciplinary team
  - Cardiologists, cardiac and vascular surgeons
  - Geriatrician
    - « Le gériatre vérifie l'état physique général, psychique et le fonctionnement social par rapport à l'espérance de vie existante »
    - “De geriater gaat binnen de bestaande levensverwachting het algemeen fysiek, psychisch en sociaal functioneren na.
- Life expectancy at least 1 year

<http://www.inami.fgov.be/nl/professionals/individuele zorgverleners/verstrekkers-van-implantaten/akkoord/Paginas/klepstent-aortapositie.aspx#.WQwp0GdO6Uk>

# OBSERVANT study

Observational study of effectiveness of AVR–TAVI procedures for severe aortic stenosis treatment

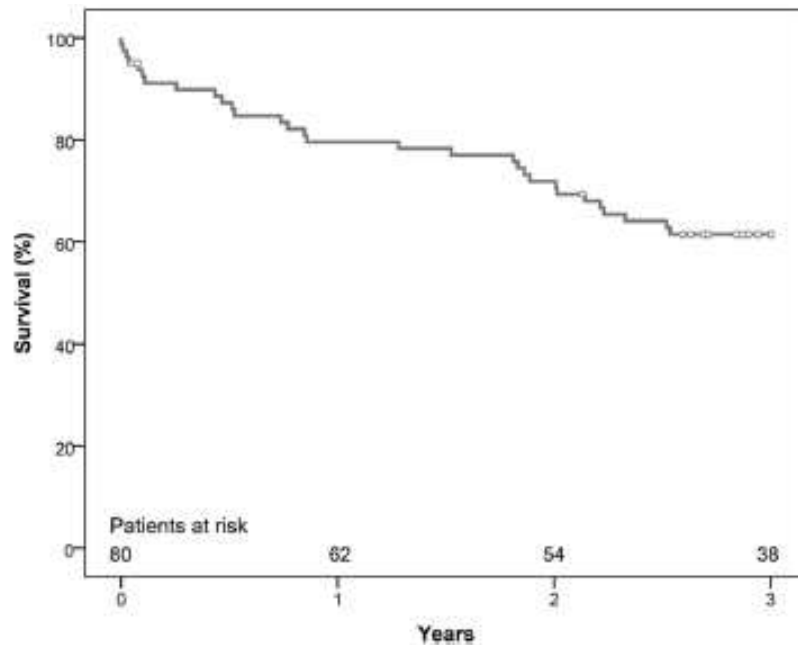
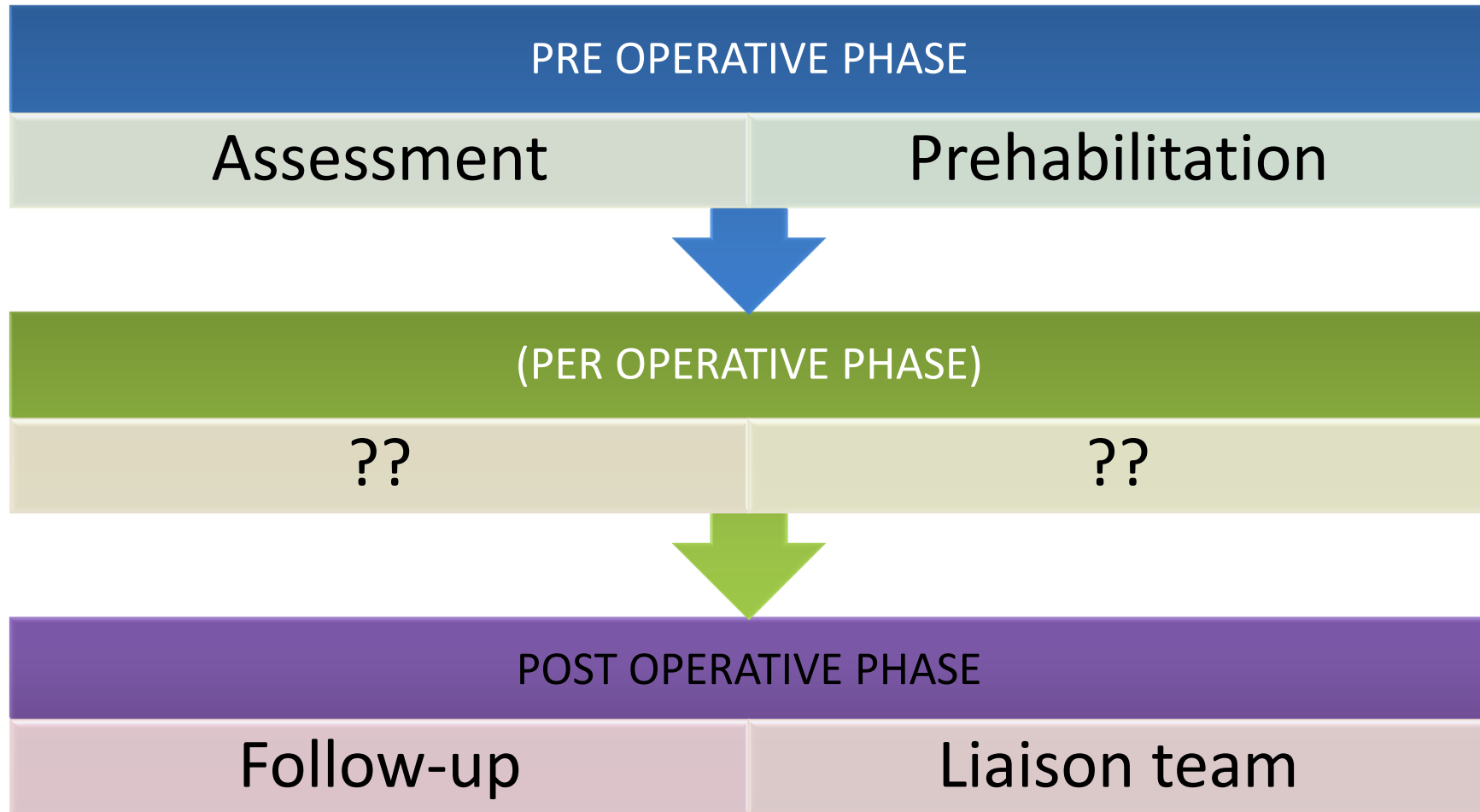


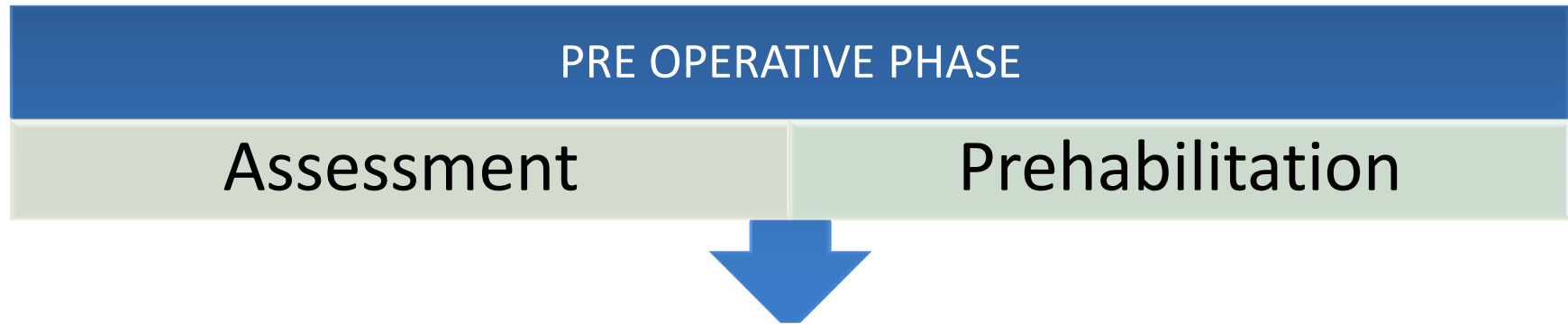
Fig.1 Kaplan–Meier estimate of survival in nonagenarians after transcatheter aortic valve replacement from the OBSERVANT study

- Nonagenarian (n=80)
  - Frailty score (moderate–severe), n (%) 23 (28.8)
- SR (9 studies) :
  - Pooled 30-d mortality : 7,1%
  - Pooled survival rates
    - 1 y : 79.2,
    - 2 y : 68.2
    - 3 y : 55.6 %

# Role of geriatrician?

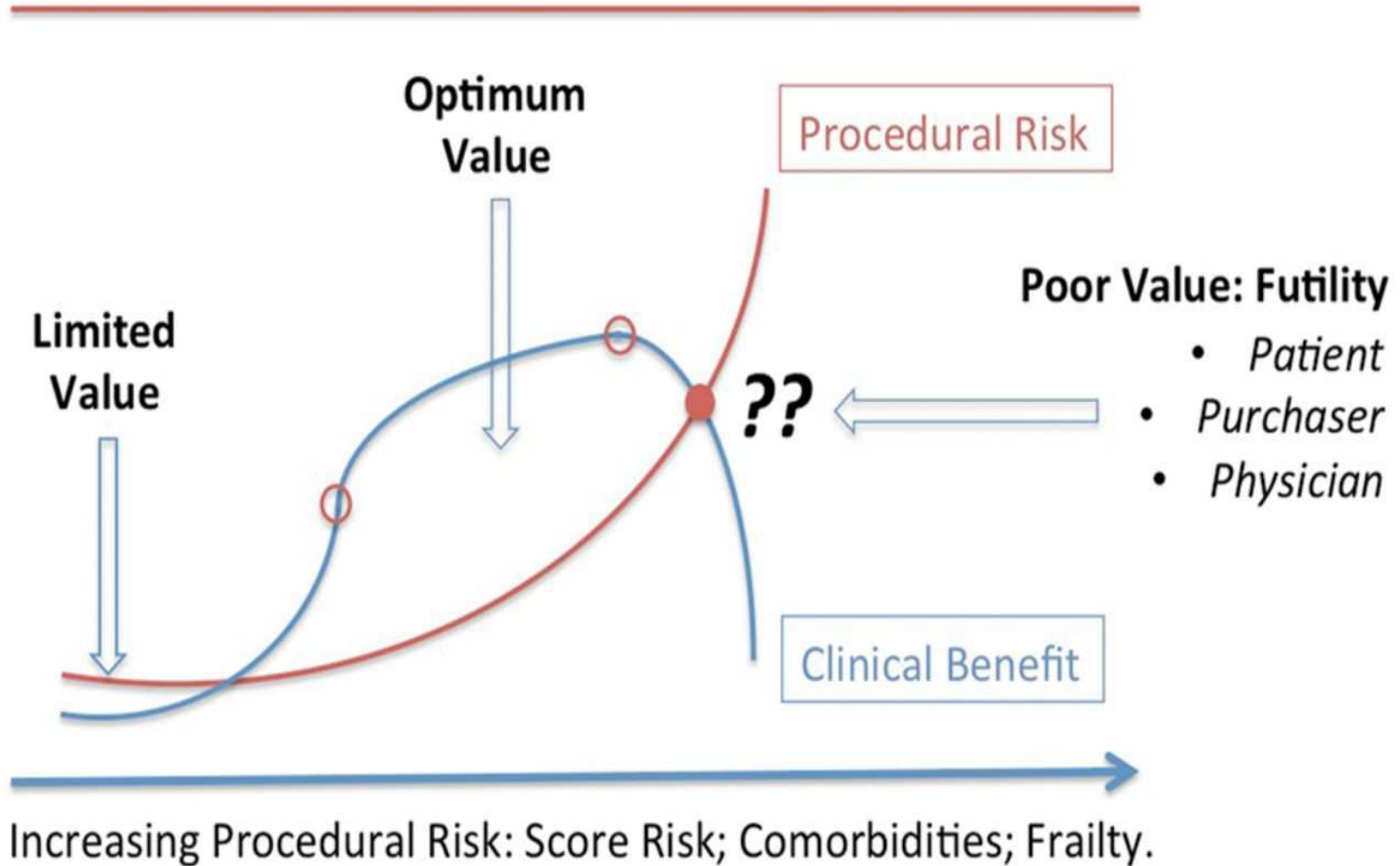


# Role of geriatrician?



# 1. Assessment

## Procedural Risk vs Clinical Benefit



## PRE-OP

# Conventional preoperative assessment

- **ASA** (Amer Soc of Anesthesiol) **Physical status score**
- **STS** (Society of Thoracic Surgeons)
  - Risk of operative mortality and postop (acute) morbidity
  - <http://riskcalc.sts.org/stswebriskcalc/#/calculate>
- **EUROScore**
  - Risk of hospital / 30 d mortality
  - <http://www.euroscore.org/calc.html>
  - New version II

## PRE-OP

# Conventional preoperative assessment

- ASA (Amer Soc of Anesthesiol) Physical status **score**
- STS (Society of Thoracic Surgeons)
  - Risk of operative mortality and morbidity (acute)
  - <http://riskcalc.sts.org>
- EUROSCORE
  - 30 d mortality
  - [euroscore.org/calc.html](http://euroscore.org/calc.html)
  - new version II

Accurate for predicting mortality  
in low-risk patients

**PRE-OP**

**Same preoperative score, same patient?**



*Taramasso M et al, Eur Heart J 2013*



## PRE-OP

# EuroScore II

Patient related factor	Cardiac related factors	Operation related factor
Age	NYHA	Urgency
Gender	CSS class 4 angina	Weight of the intervention
Renal impairment	LV function	Surgery on thoracic aorta
Poor mobility	Recent MI	
Extracardiac arteriopathy	Pulmonary HT	
Previous cardiac surgery		
Chronic lung disease		
Active endocarditis		
Critical preoperative state		
Diabetes + insuline		

<http://www.euroscore.org/calc.html>

“may be not accurate > 90y”

# EuroScore II

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Previous cardiac surgery		
Chronic lung disease		
Active endocarditis		
Critical preoperative state		
Diabetes + insuline		

“severe impairment of mobility secondary to musculoskeletal or neurological dysfunction”

[euroscore.org/calc.html](https://euroscore.org/calc.html)

# **PRE-OP** Specificities of preoperative assessment in older patients

- Frailty
- Functional statut
- Cognition
- Nutrition
- Polymedication
- Depression
- Ethical issues

**PRE-OP**

# Screening tools

- Edmonton Frail Scale
- Mobility
  - Gait speed

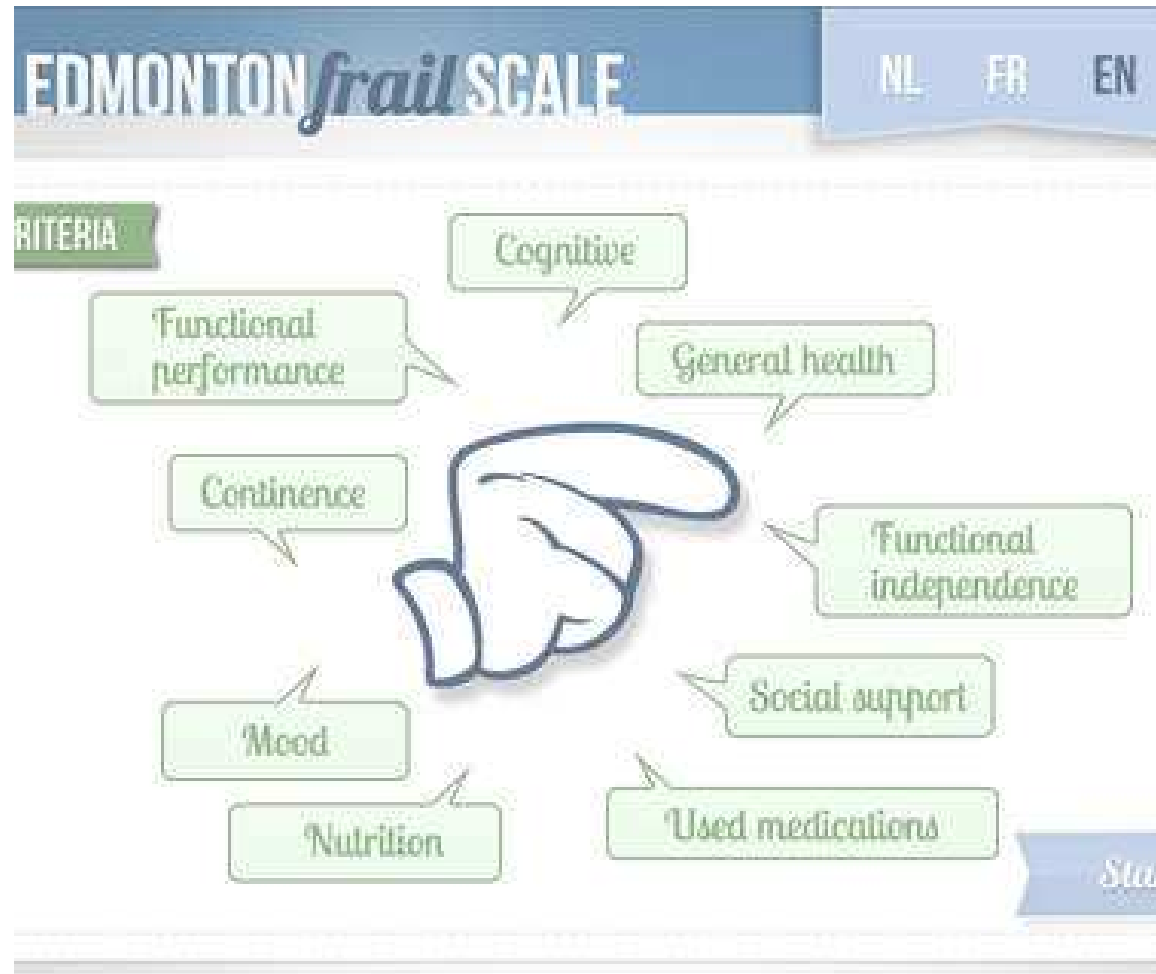
# PRE-OP

## Edmonton Frail Scale

PERIOPERATIVE CARE  
OF THE OLDER PERSON  
SATURDAY, 10 NOVEMBER 2012  
JOINTLY ORGANISED BY THE SARB AND THE BSGG



THERMAE PALACE HOTEL, OSTEND  
Annual Meeting of the Society  
of Anesthesia and Resuscitation of Belgium (SARB)  
&  
Meeting of the Belgian Society  
of Gerontology and Geriatrics (BSGG)



Recommended by the BGS (consensus frailty 2014) –appstore et google play

The Edmonton Frail Scale:

Score: \_\_\_/17

Frailty domain	Item	0 point	1 point	2 points
Cognition	Please imagine that this pre-drawn circle is a clock. I would like you to place the numbers in the correct positions then place the hands to indicate a time of 'ten after eleven'	No errors	Minor spacing errors	Other errors
General health status	In the past year, how many times have you been admitted to a hospital?	0	1-2	≥2
	In general, how would you describe your health?	'Excellent', 'Very good', 'Good'	'Fair'	'Poor'
Functional independence	With how many of the following activities do you require help? (meal preparation, shopping, transportation, telephone, housekeeping, laundry, managing money, taking medications)	0-1	2-4	5-8
Social support	When you need help, can you count on someone who is willing and able to meet your needs?	Always	Sometimes	Never
Medication use	Do you use five or more different prescription medications on a regular basis?	No	Yes	
	At times, do you forget to take your prescription medications?	No	Yes	
Nutrition	Have you recently lost weight such that your clothing has become looser?	No	Yes	
Mood	Do you often feel sad or depressed?	No	Yes	
Continence	Do you have a problem with losing control of urine when you don't want to?	No	Yes	
Functional performance	I would like you to sit in this chair with your back and arms resting. Then, when I say 'GO', please stand up and walk at a safe and comfortable pace to the mark on the floor (approximately 3 m away), return to the chair and sit down'	0-10 s	11-20 s	One of >20 s patient unwilling, or requires assistance
Totals	Final score is the sum of column totals			

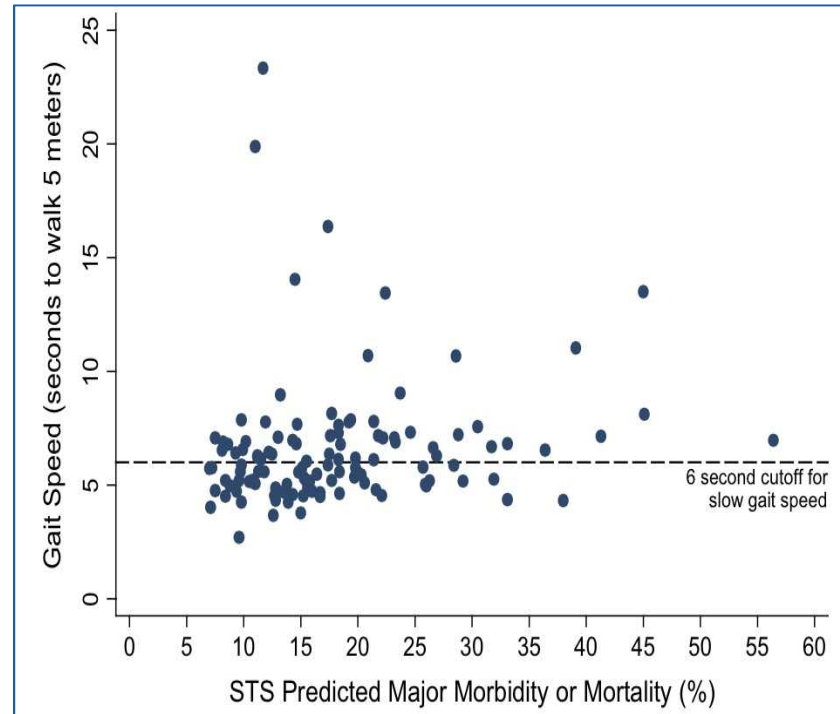
*0-3 : non frail ; 4-5 : low frailty ; 6-8 : moderate frailty ; 9-17 : severe frailty*

**Rolfson et al, Age Ageing 2006;35(5):526-9**

## PRE-OP

# Gait speed and cardiac surgery

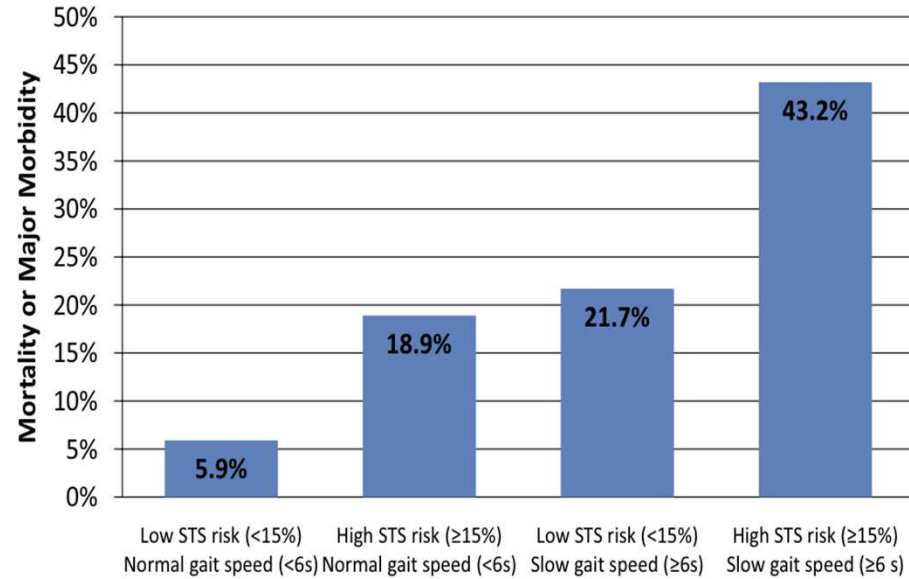
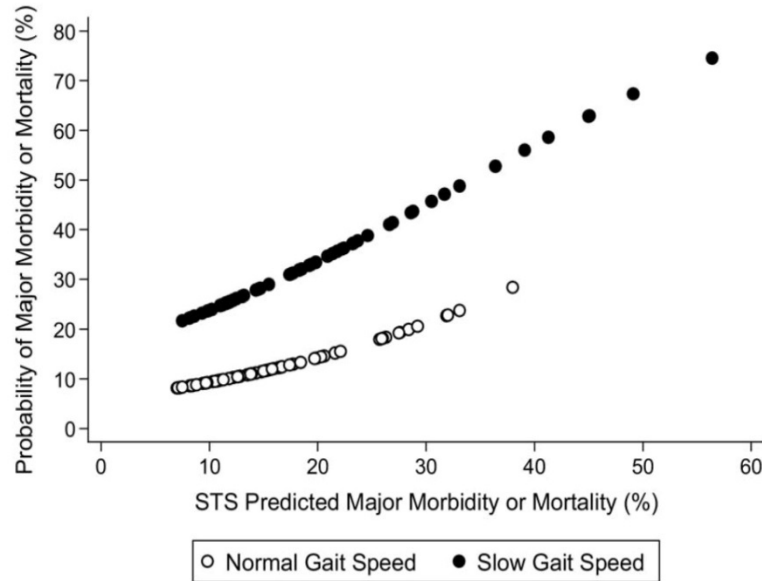
- Elective surgery
  - 131 patients
- STS, Euroscore
- Mortality or severe morbidity (5 complications)
  - 23% (n=30)



- Cut off : > 6 s for 5 m (0,83m/s)
  - 46% patients (n=60)

# PRE-OP

## Gait speed, cardiac surgery and morbi-mortality



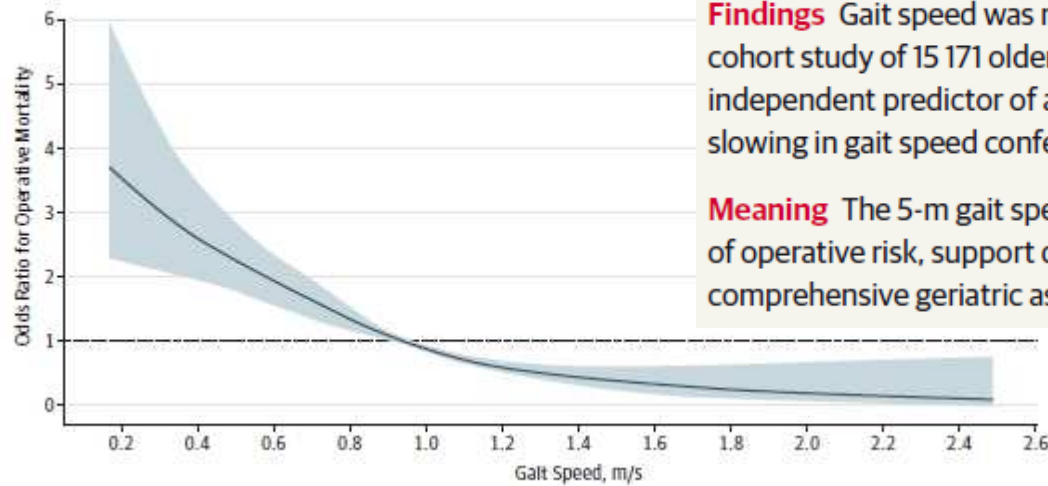
- Need to associate both scores



# PRE-OP

## Gait speed, cardiac surgery and mortality

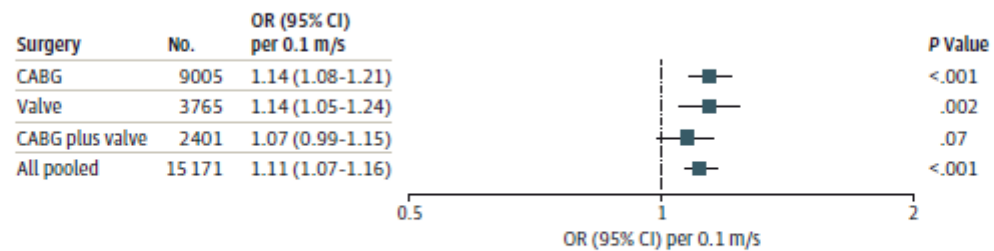
Figure 2. Unadjusted Association Between Gait Speed and Operative Mortality



**Findings** Gait speed was measured before cardiac surgery in a cohort study of 15 171 older adults and was found to be an independent predictor of adverse outcomes, with each 0.1-m/s slowing in gait speed conferring an 11% increase in mortality.

**Meaning** The 5-m gait speed test can be used to refine estimates of operative risk, support decision making, and decide when a comprehensive geriatric assessment is warranted.

Figure 3. Effect of Gait Speed After Adjusting for Society of Thoracic Surgeons (STS) Predicted Risk



A logistic regression model was stratified for the 3 cardiac surgical procedures, and adjusted for the STS predicted risk of mortality as a fixed offset term (from the surgery-specific STS model). The pooled odds ratio (OR) for gait speed to

predict operative mortality was 1.11 (95% CI, 1.07-1.16) per 0.1-m/s decrease in gait speed. CABG indicates coronary artery bypass graft.

## **2. Prehabilitation**

### *Preoperative optimisation*

- Improve functional capacities in the preop phase to improve outcomes
- Intervention studies
  - Heterogenous results
- Elective surgery only...

## What EBM suggests...

- **Preoperative physical therapy for elective cardiac surgery patients.**
  - preoperative physical therapy reduces postoperative pulmonary complications (atelectasis and pneumonia) and LOS
  - lack of evidence for impact on postoperative pneumothorax, prolonged mechanical ventilation or all-cause deaths (with usual limitations)

## 2. Prehabilitation

### *Preoperative optimisation*

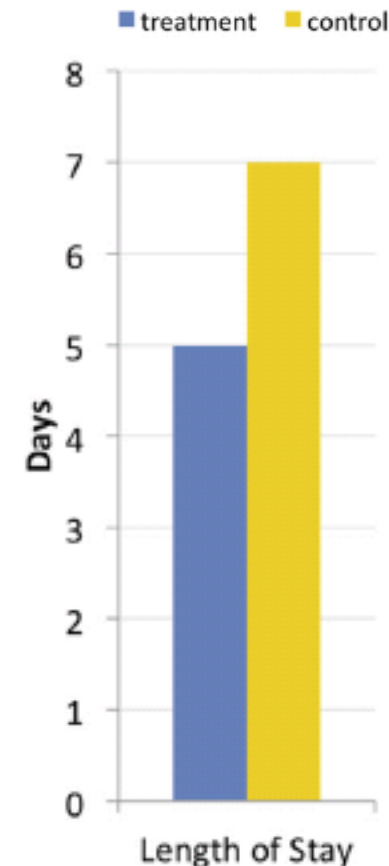
- Multimodal interventions
  - (POPs *P*roactive care of *O*lder *P*eople undergoing *S*urgery)
  - Optimal nutritional intakes
  - Early screening for delirium
  - Decrease anxiety
  - Physical training (muscles, respiratory functions)

# PRE-OP Michigan Surgical Home & Optimisation Program

- Major thoracic or abdominal surgery (n=641)
  - Case control with propensity matching
  - Mean age 60 y
  - Min 2 weeks betw inclusion and surgery
- Intervention :
  - Empowerment
  - Walking
  - Spirometry
  - Education : stress, nutrition, care planning (smoking)

# PRE-OP Michigan Surgical Home & Optimisation Program

- Major thoracic or abdominal surgery (n=641)
  - Case control with propensity matching
  - Mean age 60 y, engagement 81,5%
  - Min 2 weeks betw. inclusion and surgery
- Intervention : empowerment
  - Walking
  - Spirometry
  - Education : stress, nutrition, care planning (smoking)
- Outcome : LOS ( $\downarrow$ 31%,  $p < .001$ )
- ...quality?



## PRE-OP

# Randomized clinical trial of comprehensive geriatric assessment and optimization in vascular surgery

	Control (n = 105)	Intervention (n = 104)
Age (years)*	75.5(6.3)	75.5(6.6)
Sex ratio (M:F)	79:26	80:24
Current or ex-smoker	68 of 89 (76)	94 of 102 (92.2)
Alcohol consumption (units/week)*	6.6(14.1)	10.3(17.5)
Ischaemic heart disease	37 of 100 (37.0)	39 (37.5)
Cardiac failure	6 (5.7)	8 (7.7)
Atrial fibrillation	17 of 100 (17.0)	15 of 100 (15.0)
COPD	25 of 100 (25.0)	25 of 100 (25.0)
Diabetes	25 of 100 (25.0)	26 of 100 (26.0)
Cerebrovascular disease	21 of 100 (21.0)	10 (9.6)
Cancer	15 of 100 (15.0)	17 of 100 (17.0)
Hypertension	81 of 101 (80.2)	78 of 101 (77.2)
Dementia	5 (4.8)	2 (1.9)
Falls	10 (9.5)	26 of 100 (26.0)
Peripheral artery disease	40 of 100 (40.0)	46 of 102 (45.1)
Multiple-site vascular disease	22 of 100 (22.0)	27 of 100 (27.0)
End-stage renal failure	2 (1.9)	0 (0)
No. of medications*	6.1(3.0)	6.4(3.3)
Haemoglobin (g/l)*	133(17)	129(16)
Creatinine ( $\mu\text{mol/l}$ )*	106(54)	101(44)
eGFR (ml/min)*	66(25)	69(26)
Self-reported exercise tolerance†	24 of 73 (33)	38 of 100 (38.0)
Surgical procedure (aortic)	64 (61.0)	64 (61.5)

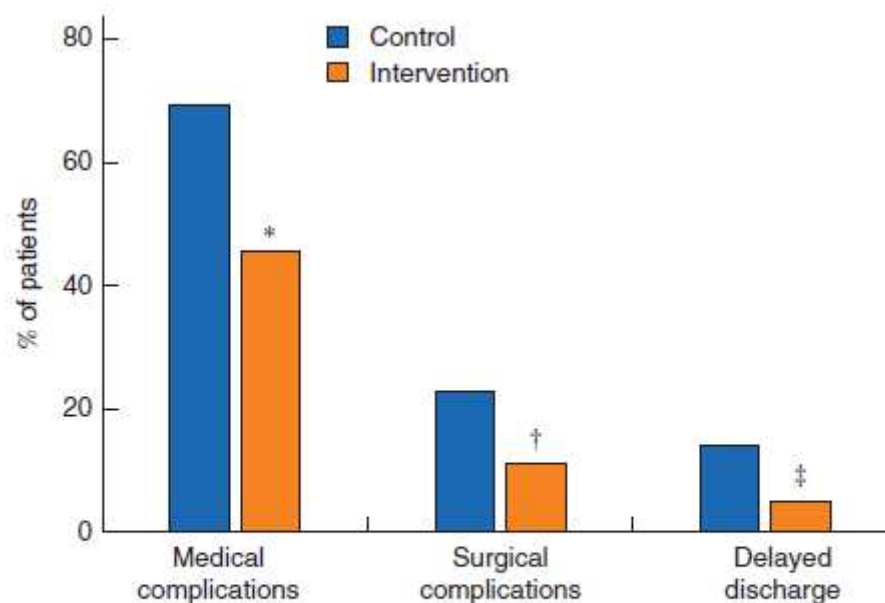


Fig. 2 Percentage of patients with complications and delayed discharge by trial arm. \* $P = 0.002$ , † $P = 0.042$ , ‡ $P = 0.051$  versus control ( $\chi^2$  test)

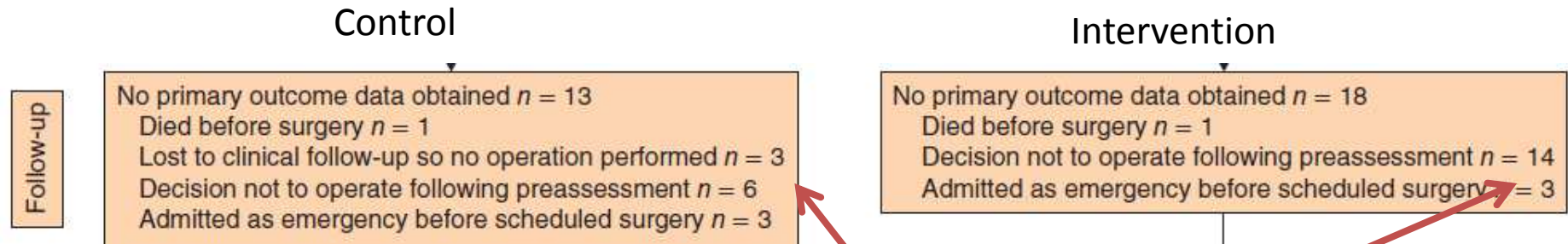
Trend to decreased admission to long-term care (NS)

**Table 2** Primary and secondary outcomes of participants who progressed to surgery, according to allocated study arm

	Control (n = 91)	Intervention (n = 85)	Difference (intervention – control)‡	P¶¶
Primary outcome				
Length of hospital stay (days)*	5.53	3.32	0.60 (0.46, 0.79)§§	< 0.001##
Secondary outcomes				
Postoperative delirium	22 (24)	9 (11)	-14 (-25, -2)	0.018
Acute coronary syndrome	4 (4)	0 (0)	-4 (-11, 1)	0.051***
Cardiac failure	5 (5)	1 (1)	-4 (-11, 2)	0.212***
Tachyarrhythmia	17 (19)	3 (4)	-15 (-25, -6)	0.002***
Bradyarrhythmia	7 (8)	4 (5)	-3 (-11, 5)	0.413***
Pneumonia	12 (13)	8 (9)	-4 (-13, 6)	0.430
Wound infection	13 (14)	4 (5)	-10 (-19, 0)	0.032***
Urinary tract infection	9 (10)	4 (5)	-5 (-14, 3)	0.196***
Constipation	40 (44)	24 (28)	-16 (-29, -2)	0.026
Faecal incontinence	9 (10)	1 (1)	-9 (-17, -2)	0.019***
Catheter issue	7 (8)	4 (5)	-3 (-11, 5)	0.413***
Fall	7 (8)	2 (2)	-5 (-13, 2)	0.171***
Postoperative cardiac complication§	25 (27)	7 (8)	-19 (-30, -8)	0.001
Postoperative pulmonary complication¶	13 (14)	8 (9)	-5 (-15, 5)	0.319
Postoperative infective complication#	25 (27)	14 (16)	-11 (-23, 1)	0.086
Postoperative bowel and bladder complications**	50 (55)	28 (33)	-22 (-35, -7)	0.003
Postoperative vascular surgery-related issues††	10 (11)	6 (7)	-4 (-13, 5)	0.365
Discharge timed get up and go (s)†	20.1(11.6)	18.9(1.8)	-1.2 (-4.7, 2.3)	0.584
Discharge gait speed (m/s)†	0.7(0.2)	0.7(0.3)	0.0 (-0.1, 0.1)	0.696
Postoperative haemoglobin (g/l)†	104(84)	100(21)	-4 (-23, 15)	0.657
Postoperative blood transfusion (units infused)†	1.0(3.7)	0.3(0.7)	-0.7 (-1.5, 0.1)	0.065
Postoperative creatinine (µmol/l)†	134(120)	108(52)	-26 (-54, 2)	0.070
Unplanned 30-day readmission	10 (11)	15 (18)	7 (-4, 17)	0.193
Composite measure of complicated discharge‡‡	12 (13)	4 (5)	9 (-17, 0)	0.051***
Level 2/3 care used immediately after surgery	39 (43)	26 (31)	-12 (-26, 2)	0.082



# Randomized clinical trial of comprehensive geriatric assessment and optimization in vascular surgery



## Intervention group (n=104)

- Increased number of new diagnoses (RI, COPD, Dem)

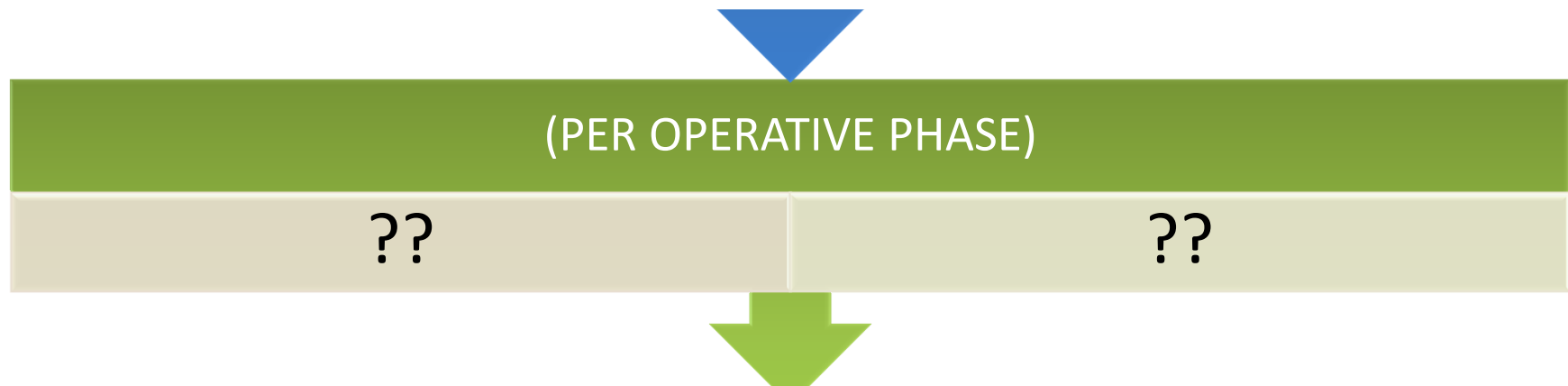
- Increased number of patients who did not undergo surgery

**PRE-OP**

# Prehabilitation

- Cancer surgery (colo-rectal cancer)
  - Fast track

# Role of geriatrician?



# Peroperative phase

- Adaptation of anesthesia // geriatric assessment?
  - Local versus general
  - Bispectral Index analysis (BIS//EEG)\*
    - Prediction of risk of delirium
    - Allowing titration of anesthesia? → BIS 40-60
- Surgical approach
  - Minimal invasive

*\*Soehle et al, BMC anesthesiol 2015*

*\*Frits et al, Anesth Anal 2016*

*Chang et al, J Neurosurgical Anesth 2011*



# Algorithm



Need for surgery?

## Indication

- Confirm diagnosis
- Symptoms!!

Decision-making capacity?

With patient / proxy

Choice

Treatment goals?

- Survival
- Function
- Cognition
- QOL

Appropriateness

Risk stratification

Geriatric assessment

Anatomic factors (imaging)

Benefits?

- QOL

Prehabilitation

Care planning

Preop Optimisation?

- Medications
- Comorbidities
- Physical
- Nutrition





POST OPERATIVE PHASE

Follow-up

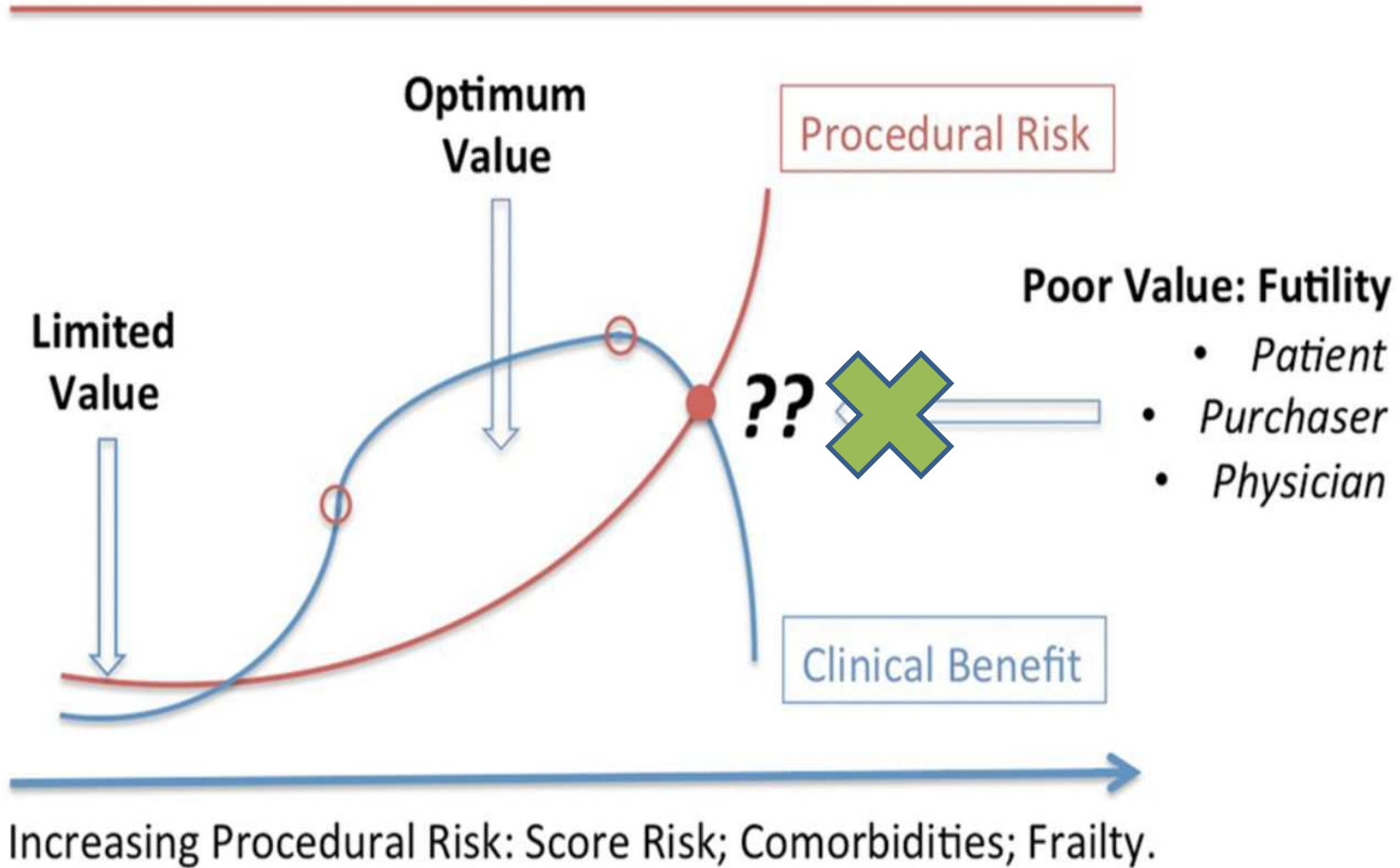
Liaison team

# Clinical situation

*Mrs X, 92 y*

- Admitted for : xxxx
- Pauci-symptomatic of severe aortic stenosis
- Go – No Go?

## Procedural Risk vs Clinical Benefit





## Dyspnea, René ♂ 82 ans

- MH: HT, MI 2001 (stop tabac), arthritis, constipation
- Medications (7): aspirine 100, coruno 16, coversyl 5, fludex 2.5, piracetam 3x1200, voltaren 3x50, zaldiar 3x
- CS: global & respiratory dysfunction s(10 d)
- Clin : TA 12/7, FC 136 irr, OMI++, ép pleuraux++, Satu 89%
- Bio : tropo (-) ; créat 1.3 (FG 30)
  
- Medications: STOPP & START ?
  - Which ones?
  - Why ?

**Dyspnée subaiguë, René ♂ 82 ans**  
**Insuffisance cardiaque, avec décompensation sur FA**

Heart failure	+ lasix® ↔ - fludex
FA	+ Bbq/tildiem® ( <i>cave Lanoxin®, Cordarone®</i> ) + <b>anticoagulant</b> if chronic (CHADS <sub>2</sub> ): Sintrom®
HT	coversyl®
Ischemic cardiopathy	coversyl® <i>[non statin &gt; 80 ans]</i> - <b>aspirine?</b>
Arthritis	zaldiar® → + <b>movicol</b> - <b>voltaren</b>
No indication	- <b>coruno</b> - <b>piracetam</b>

## Dyspnée, René ♂ 82 ans

### Oedème Pulmonaire sur FA

- AP: HTA, infar 2001 (stop tabac), gonarthrose, contipation
- 7 médicaments: **voltaren**, zaldiar  
**aspirine, coruno**, coversyl & fludex,  
**piracetam**
- AA: dégradation générale et respiratoire depuis 10 jours  
= décompensation cardiaque sur FA
- Réflexion STOPP & START →  $7 - 4 + 3 = 6$  médicaments:  
zaldiar + **movicol**  
**sintrom, tildiem**, coversyl & fludex  
(± vaccins)

# Anne-Catherine

- AAS and ischaemic event and AVK/DOA
  - ESC guidelines Afib FA management 2016
- Digoxine, Coruno?
- Specificities of HF
  - Preserved LVEF
- New treatments of HF
  - Data in aged patients?