Is it possible to assess frailty in Aortic Stenosis?

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Disclosure

- None

  except that...

- I am not an expert in geriatracy or frailty!

- Special thanks to Dr Michelle Graham,
  Mazawkowski Institute, Edmonton, AB, Canada
Is it possible to assess frailty in AS?

Yes but first:

- Do we need to assess frailty?
- Is it useful?
- How to correctly assess frailty in AS?
The rapidly growing number of elderly patients with AS

- Fastest growing segment of population: In the US, the number of patients aged ≥80 y.o will have increased from 7 million in 1990 to 25 million by 2050.

- AS is the most common VHD in elderly patients: 2-8% of patients >75 y.o.

- The number of patients >75 y.o. presenting with severe AS will increase from 200,000 to 750,000 by the year 2050.
Definition and Prevalence of Frailty

**Definition:** global impairment of physiological reserves involving multiple organ systems, and causing vulnerability to adverse outcomes

A reflection of biological rather than chronological age

**Prevalence:** 20–30% of the elderly population over 75 y.o. and increases with advancing age

**Clinical phenotype:** low physical activity, global weakness with low muscle strength, fatigability/exhaustion, overall slowness particularly of gait, loss of weight

*Fried LP et al, J Gerontology 2001;56A:M146-56*
Frailty, Co-morbidity and Disability

Fried LP et al, J Gerontology 2001;56A:M146-56
Factors included in traditional operative risk scores

- « Chronological » Age
- Female Gender
- BSA or BMI
- Diabetes
- Peripheral Vascular Disease
- CAD
- COPD
- Renal Failure (Dialysis dependent, SCr > 2.0)
- Priority of Operation (Salvage, Emergent, Urgent)
- Inotropes /IABP
- Prior Cardiac Surgery
- Hx Stroke
- LV Function
- CHF
- Atrial Fibrillation
Factors not captured in the traditional risk scores

- Liver disease/cirrhosis
- “Porcelain” aorta
- Chest irradiation
- Chest wall deformities
- Oxygen dependence
- Neurocognitive dysfunction
- Frailty
Current risk scores do not provide a reliable estimate of exact operative mortality in an individual patient with VHD

Rosenhek et al. 2011
AVR Mortality: EuroSCORE vs. Observed

Why do we need assess frailty?

Same chronological age **BUT** different biological age!
Subjective assessment of frailty: Surgeon’s eye-ball test
More Objective Assessment of Frailty

Fried Criteria

- Mobility/Strength impairment
- Low physical activity/exhaustion
- Inability to perform ADL’s
- Cognitive impairment
- Malnutrition/Weight loss
- Incontinence

Fried LP et al, J Gerontology 2001;56A:M146-56
Mobility / Strength

- Gait speed (15-foot walk)
- 30-second Chair-stand test
- Grip strength
Inability to perform ADL’s

For how many of these activities do you require help?

- Meal prep
- Transportation
- Housekeeping
- Managing money
- Shopping
- Telephone
- Laundry
- Taking meds
Cognitive Impairment

- Mini-Mental State Examination
- Digit Symbol Substitution test
More Objective Assessment of Frailty

Fried Criteria

- Mobility/Strength
- Low physical activity/exhaustion
- Functional Independance
- Cognitive impairment
- Malnutrition/Weight loss
- Incontinence

1 or 2 criteria: intermediate or prefrail
≥ 3 criteria: Frail

Fried LP et al, J Gerontology 2001;56A:M146-56
Relation between Frailty and Survival in Older Adults

Fried LP et al, J Gerontology 2001;56A:M146-56
Role of Frailty in Patients with Cardiovascular Disease

- Relation between frailty and CVD:
  - CVD may lead to frailty
  - Frailty may lead to CVD

- The presence of frailty confers an incremental increase in mortality

Frail Patients Are at Increased Risk for Mortality and Prolonged Institutional Care after Cardiac Surgery

- Hospital mortality: OR: 1.8 (p=0.03)
- Prolonged institutional care: OR: 6.3 (p=0.0001)
- Mid-term mortality: HR: 1.5 (p=0.01)

The Challenge of Frailty Assessment in the AS Population

- Malnutrition/weight loss:
  - Inaccurate in the setting of advanced AS
  - Confounding effect of diuresis/ fluid retention

- Low Physical Activity/exhaustion:
  - Functional status is often limited by valve disease, not necessarily by the deconditioning associated with frailty
  - Physical performance tests not always applicable

Woglom A, TVT 2011
Columbia Frailty Index

- Serum albumin (<4 g/dl)  
  (Replacement of malnutrition/weight loss)
- Modified Physical Performance Tests
- Grip Strength
- Katz Index  
  (Inability to perform ADL’s)

≥ 3 criteria = Frailty
Katz Index of Activities of Daily Living

How many of these activities do you require help?

1. Bathing
2. Dressing
3. Toileting
4. Transferring
5. Continence
6. Feeding

Score 0 or 1 (Dependence vs. Independence)
Total score <4: positive for frailty
Modified Physical Performance Tests

- Standing static balance
- Chair rise
- Lift a book…
- Jacket on and off
- Pick up a penny…
- Turn 360
- 15-ft walk test

Maximum possible score = 28
Grip Strength

- Dynamometer
- Mean of 3 trials with dominant hand
- Normalized for BMI and gender
- Positive for frailty: ≤20%
Limitation of the Columbia Frailty Index: No Direct Assessment of Cognitive Impairment

- “Clock test” (used in Edmonton Frailty Scale)
  - Draw the numbers on the clock
  - Indicate “ten after eleven”

Rolphson et al. ageing 2006
91 patients with asymptomatic severe AS evaluated for treatment

Green et al, American Geriatrics Society Meeting, Washington DC, May 12, 2011
Frailty Assessment in the PARTNER Trial

PARTNER A (High risk): 17%

PARTNER B (Non-operable): 23%
Impact of Frailty on Survival following TAVI: Multicenter Canadian Experience

335 Patients
Prevalence of frailty: 25%

Rodes-Cabau J Am Coll Cardiol 2010;55:1080–90
Impact of Frailty on Survival following TAVI: Leiden and Milan Experience

- 147 TAVI patients
- Frailty was present in 30%
- Presence of frailty independently associated with a 4.2-fold increase (P<0.001) in the risk of MACEs

Ewe et al. Am Heart J 2010;160:1113-20
Conclusions

- Frailty reflects the biological status of the patient, which is usually not captured in surgical-risk algorithms.
- There are several methods to assess frailty but not necessarily suitable for patients with advanced VHD.
- The Columbia index may improve the assessment of frailty in the AS population.
- The PARTNER trial will provide an opportunity to determine the feasibility and prognostic value of this new index.
- If successful, it could improve the patient selection process for surgery and TAVI.
FRAILTY ASSESSMENT
IN PATIENTS SYMPTOMATIC SEVERE AS

Robust or Prefrail

AVR/TAVI

Frail

TAVI

Extremely Frail

Conservative Tx / BAV as bridge to TAVI