Frailty in TAVI Patients

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Objective of Review

To assess the reliability:

Frailty definition

Frailty tools

Frailty scores

In predicting outcome after TAVR.
Frailty scoring in transcatheter aortic valve replacement patients

Lynne Hinterbuchner, Bernhard Strohmer, Matthias Hammerer, Erika Prinz, Uta C Hoppe and Christiana Schernthaner

Salzburg Protocol

Date of referral:

Patient name:

Date of birth:

Body height: ______ cm  Body weight: ______ kg  BMI: ______ kg/m²

- Single
- Divorced
- Married
- Widower
- Children; ___ Number of Children

Living Situation
- at home
- with husband/wife
- with family members
- with professional health care
- without professional health care
- nursing home
- other.
Development of a risk-stratification tool for transcatheter aortic valve implantation

Moritz Seiffert, Jan-Malte Sinn, Anika Dademasch, Maximilian Y. Emmert, Thomas Walther,...
Results

- In all studies the impact of frailty after TAVR has been proven.
- In most studies frailty is an independent predictor of short & long term mortality, procedure outcome and longer hospital stays.
Frailty

Frailty is theoretically defined as a clinically recognizable state of increased vulnerability resulting from aging-associated decline in reserve and function across multiple physiologic systems such that the ability to cope with everyday or acute stressors is comprised.

Frailty can be either physical or psychological or a combination of both and is a dynamic condition that can improve or worsen over time.
Wasting (both loss of muscle mass and strength, and weight loss)

Loss of endurance

Decreased balance and mobility

Slowed performance & Relative inactivity

Potentially, decreases in cognitive function

Comorbidity - Disability

- Comorbidity (presence of two or more medically diagnosed diseases in the same individual)
- Disability (difficulty of dependency in carrying out activities essential to independent living)
They need to be separated regarding assessment, appropriate clinical intervention and outcome evaluation.
Risk scale for non-frail and frail patients

Adapted from Robinson et al.
Cardiac Operative Risk Assessment Tools

- European System for Cardiac Operative Risk Evaluation (EuroSCORE)
  - The EuroSCORE has shown to be useful in low and intermediate risk patients, yet routinely overestimated the likelihood of mortality in the higher risk patient
    - Euro SCORE II poor mobility was added, making the scoring more accurate and reliable for high risk elderly patients.

Society of Thoracic Surgeons (STS) Score

- It tends to overestimate mortality in elderly cardiac surgical patients
- It was developed for patients undergoing SAVR

Frailty and other clinical and technical procedures were not included

Recommended to add frailty assessment yet not how
Multi-domain approach defining frailty as a proportion of accumulated health deficits

- It is a validated instrument for diagnosing physical frailty
- Lacks cognitive or psychosocial factors
Clinical Frailty Scale*

1 Very Fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2 Well – People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g. seasonally.

3 Managing Well – People whose medical problems are well controlled, but are not regularly active beyond routine walking.

4 Vulnerable – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being “slowed up”, and/or being tired during the day.

5 Mildly Frail – These people often have more evident slowing, and need help in high order IADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6 Moderately Frail – People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.

7 Severely Frail – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8 Very Severely Frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9 Terminally Ill - Approaching the end of life. This category applies to people with a life expectancy <6 months, who are not otherwise evidently frail.

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common symptoms in mild dementia include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In moderate dementia, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In severe dementia, they cannot do personal care without help.

Rockwood

- Normal cut-off - very fit = 1 severly frail = 7

- Seifert et al. greater than or = to 6 moderate or more frail

- Frailty significantly related to 1 year mortality
Fried Phenotype Frailty Assessment (FFS)

- Underlying physiological state of multisystem and energy deregulation
- Consistently identified a profile of high-risk, adverse outcomes in older adults with cardiovascular disease
- Validated tool for defining physical frailty
- Not screened in the FFS is cognitive function and psychosocial assessment
- Unintentional weight loss
- Self-reported exhaustion
- Weakness
- Slow walking speed
- Reduced physical activity
Fried

- Green et al. Assessment loosely parallel to FFS including gait speed (5MWT) and grip strength, divided into quartiles, 0-3 points for frailty score
- Suendermann et al. A new frailty score (CAF) was developed including FFS but not unintentional weight loss; 4- MWT to test gait speed
Walk Test

- Greent et al. - 5 MWT; in m/s divided into quartiles: 0-3 points
- Suendermann et al. - 4 MWT
- Afilalo et al. - 5 MWT, 3 times, averaged, permitted to use walking aids
  - Frailty = slow walkers >6s
  - validated for CV patients
  - Strong predictor of mortality
The absolute values of grip strength measurements can be influenced by many aspects such as frequency of testing, body position, encouragement instruction, time of day and testing protocol.

Green et al. Jamar dynamometer, quartiles stratified by gender, 0-3 points.

Suendermann et al. was part of CAF.

Low values = impaired QOL & > mortality.
The time that a person takes to rise from a chair, walk three meters, turn around, walk back to the chair and sit down.

TUG scores correlate with mobility and strength complaints.

Stortecky et al.

≥ 20s = moderate to severe limitations of mobility

Schoenenberger et al.

≥ 20s = mobility impairment = 1 point assigned in new frailty index

A cut off score of ≥ 13.5 s was shown to predict falls in community-dwelling frail elders.

Scores of ≥ 30 s correspond with functional dependence in people with pathology.
30 second Chair Stand Test (30 CST)

- A more extended measurement for function of lower extremity strength in older adults
- The test is administered using a chair without arms with a seat height of 17 inches - recording the number of stands a person can complete in 30 seconds
- Suendermann et al. 3x sit to sand, time measured in points added to CAF

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Lawton Instrument Activities of Daily Living Scale (IADL)

- Low function = 0 points = dependent to high function, 8 points = independent
- Afalilo et al. 6-7 = 0 points; 5 = 1 point; 0-2 = 3 points
- Schoenenberger et al. ≥ limited activity = 1 point for the summary frailty score
- Alone was not a significant predictor of 1 year mortality
- Not predictive of short or long term outcomes
- Good for planning care
- *Limitation self reported
Katz ADL Survey Index

- A marker of disability
- Functional assessment of dependency in elderly individuals in the six functions: full function 6, moderate impairment 4 & severe functional impairment < or equal to 2
- Green et al. Any dependence = 3 points
- Puls et al. 6 = independent < 6 frail
- It has been demonstrated that frailty & onset of dependence in ADL has a strong association
ISAR is used to predict adverse health outcomes 6 months after an emergency visit and the need for high hospital utilization and is based on 6 self-rated questions.

Kanga et al.

No impact on mortality

> risk = need of help after TAVR
Serum albumin

- normally ranging from 3.5 to 5.0 grams per deciliter (g/dL)
- Preoperative serum albumin levels are a surrogate marker for malnutrition and wasting in the absence of liver disease or malabsorption
- It is a validated instrument in cardiac patients for mortality prediction and has been shown as an independent risk factor for all-cause mortality in older persons
- Green et al. – g/dl quartiles, 0-3 points for the frailty score (combined with ADL was better than gait for identifying frail patient ask risk)
- Kamaga et al. - g/dl no significant difference between survivors and non-survivors
Mini Nutritional Assessment (MNA)

- Schoenenberger et al. - < 12 = 1 point frailty index
- Stortecky et al. - < 12 = malnutrition = 1 point MGA score
- Kamga et al. - < BMI predictive of 1 year mortality after TAVR
- Has been proven as a validated assessment tool in cardiac surgery patients
- Malnourishment poor prognostic factor in general heart surgery patients

8-11 points = at risk of malnutrition

http://www.mna-elderly.com/mna_forms.html
Mini Mental State Examination (MMSE)

- Stortecky et al. 2 points for MMSE < 21 1 point for MMSE ≥ 21

- Kamga et al. – a shortened for was incorporated in the ISAR score MMSE <15 /21 = 2 points

- Predictive ability of Fried definition of frailty significantly improved with MMSE

- Any score 27 out of 30 points indicates a normal cognition

- For its correct use, training of the tester is essential

http://hartfordign.org/practice/try_this/
Eye Ball and End of Bed Test are traditional ways used for frailty assessment based on visual appearance and clinical judgment.

In the study by Green et al. a more advanced age and lower BMI, commonly used in the subjective eye ball evaluation of frailty, were not associated with a higher frailty score.

Highlights importance of objective tools.
In none of the reviewed studies was quality of life assessment incorporated, although one major aim of the TAVR procedure is an improvement in quality of life (Short Form Health Survey SF-36).

- The Kansas City Cardiomyopathy Questionnaire (KCCQ) used for heart failure patients, was validated in the PARTNER study for patients undergoing TAVR,
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Frailty assessment tools in TAVR patients

- Wide variety of frailty tests
- Different instruments were used in the conducted studies that have not been robustly evaluated
- Frailty was defined differently and results may not be comparable
- The gold standard instruments for assessing physical frailty recommended by the frailty consensus have not been established in detail by any of the authors
Reviewed Studies

- Most authors of the reviewed studies used a combination of tests to cover different aspects of frailty and disability.

- All reviewed studies used different test combinations and often self-defined modifications of the well-established assessment tools.

- A composite index capturing a broader range of functional abilities may better discriminate the risk across the spectrum of frailty.
All reviewed studies used different cut-offs and scales and some a composite scoring system, although there was limited data for its validity.

Using a composite index may help to discriminate frailty manifestations across the whole spectrum of its early and late manifestation.
Rather than implementing new frailty indices, well-established standardized frailty scoring systems should be used in patients referred for a possible TAVR procedure.

We can all agree that frailty assessment is pivotal for decision making.
Frailty has been reported as a significant and independent predictor of functional decline, prolonged hospital-stay, worse outcomes and higher mortality rates in all reviewed studies. All conducted studies showed discrepancies in use of defined geriatric assessment within the frame of established frailty tests. Use of validated scales or scoring systems is seldom. Implementation of standardized protocols would allow validated comparison among TAVR centers.
The recently published ACC/AHA guidelines recommend the use of Katz ADL as limited evaluation of surgical and interventional risk, measurement of gait speed (5 MWT), grip strength and muscle mass.

The proposed assessment tools cover some aspects of frailty and disability, not all, and cited literature refers to surgical studies, rather than patients undergoing TAVR.
The recently published AHA guidelines

- Recommend the KATZ index, beside the 5-MWT and the grip strength test for a limited surgical and interventional risk evaluation, as follows:

- No frailty = able to perform all activities of daily living and the 5 MWT < 6 s

- Mild frailty = unable to perform 1 activity of daily living or unable to perform 5 MWT < 6 s

- Moderate to severe frailty = unable to perform ≥ 2 activities of daily living.
Frailty assessment in every single patient is pivotal for decision making.

Frailty evaluation should be integrated in an individual risk-benefit analysis.

The aim of the right decision is to achieve an improvement in the patient’s quality of life.

The patient will derive significant benefit for at least two years after the procedure.

Absolute conclusion
THANK YOU
References


