

Background

- Older age is associated with increased morbidity and mortality following AMI.
- Functional outcomes are of equal (if not particular) importance to older adults.
- Frailty is a physiologic state of heightened vulnerability for adverse outcomes.
- We have previously demonstrated that more than one-third of older adults demonstrate frailty by slow gait speed at 1 month following MI.
- The association between frailty and long-term post MI health status is unknown.

Purpose

- To explore the change in gait speed from 1 month to 6 months.
- To describe the relationship between frailty by slow gait speed and functional outcomes at one year following AMI among older adults.

Methods

The Translational Research Investigating Underlying Disparities in Acute Myocardial Infarction Patients' Health Status (TRIUMPH) study enrolled patients from 21 US hospitals between April 11, 2005 and December 31, 2008. Patients >18 years of age with positive cardiac enzymes within 24 hours of hospital admission and supporting evidence of ischemic signs or symptoms for >20 minutes or electrocardiographic ST changes were enrolled. Data was collected through chart abstraction and standardized in-depth interviews. All participants provided informed consent and protocols were approved by the institutional review board at each site.

Older adults (≥65 years) also received an aging assessment panel at one month by telephone or in-person by Exam Medical Services Incorporated (EMSI).

Performance assessments (in-home only) (Figure 1)

>Gait speed (normal is >1.0m/sec) is measured by three timed walks over a 15 foot course at a preferred gait. The 15 foot walk time is converted to a continuous variable (gait speed [m/sec] = [15 feet x 0.3048 conversion to meters/time in seconds]). Frailty by gait speed <0.65m/sec cut point.

>Grip strength is measured by a dynamometer and is adjusted for body mass index. Grip strength <25 kg is considered an indicator of frailty.

Aging assessments

>Telephone inventory of cognition (TICS-M) is a 13-item instrument to assess cognitive functioning (range 0-39). TICS-M <22/39 is considered an indicator of cognitive impairment.

>Fried's frailty score (5-items): (1) mobility (lowest 20% walking speed); (2) strength (lowest 20% grip strength); (3) endurance (CES-D questions); (4) physical activity (SF-36 PF lowest quartile); (5) nutrition (weight loss ≥10 lbs/year). If 3 or more items are positive, then the score is considered an indicator of frailty.

One year of independent functioning and survival by gait speed frailty were reported.

Results

Figure 1. Study population

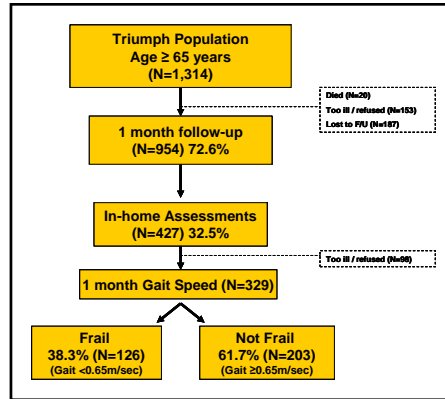


Table 1. Baseline characteristics by frailty group

	Frail (gait <0.65m/sec) N=126	Not frail (gait ≥0.65m/sec) N=203	P value
Age (years)*	74.8 ± 6.3	72.8 ± 5.8	0.003
Sex (% female)	52.4	32.0	<0.001
Race (% black)	27.8	12.8	0.001
Education (% >HS)	44.4	58.6	0.012
BMI*	28.5 ± 5.7	27.6 ± 4.6	0.099
Live alone (%)	34.4	24.4	0.051
Employed (% full or part time)	12.8	29.2	<0.001
Depressed (%)	43.4	33.0	0.016
Depression score (PHQ9)*	5.4 ± 5.8	3.6 ± 3.8	<0.001
EF <40% (%)	25.5	12.3	0.004
Chest pain on arrival (%)	59.3	70.5	0.043
Killip Class (% ≥ II)	12.8	7.6	0.236
Prior MI (%)	30.2	15.8	0.002
HTN (%)	84.1	70.0	0.004
Prior CHF (%)	13.5	6.4	0.030
Prior CVA (%)	10.3	2.0	<0.001
Diabetes (%)	37.3	25.6	0.025
Chronic lung disease (%)	12.7	6.4	0.050
Hemoglobin (mg/dL)	13.1 ± 2.1	13.9 ± 1.7	0.003

*Mean +/- standard deviation
BMI=body mass index; CHF=congestive heart failure; CVA=cerebrovascular accident; EF=ejection fraction; HS=high school; HTN=hypertension; EF=ejection fraction; MI=myocardial infarction; PHQ9=Patient Health Questionnaire 9

Table 2. Hospital complications and discharge therapy by frailty group

	Frail (gait <0.65m/sec) N=126	Not frail (gait ≥0.65m/sec) N=203	P value
In-hospital complications			
Acute kidney injury (%Cr rise >0.3mg/dl)	17.6	7.0	0.022
NSTEMI	63.5	58.1	0.334
STEMI	36.5	41.9	
Major bleeding (%)	9.5%	12.3%	
Cardiac arrest (%)	6.3	2.0	0.065
CABG(%)	4.8	13.3	0.012
Discharge medications			
Aspirin (%)	91.3	95.1	0.170
Beta blocker (%)	89.7	91.1	0.662
Statin (%)	85.7	89.2	0.352
ACE/ARB (%)	73.0	69.5	0.490
Cardiac rehab (% participation)	25.2	38.1	0.017
Discharge location			
Home/self care	91.3	89.7	0.764
Home/home health nursing	6.3	7.9	
Home or rehab	2.4	2.4	

*Mean +/- standard deviation
ACE=angiotensin-converting enzyme; ARB=angiotensin receptor blocker; CABG=coronary artery bypass grafting; NSTEMI=non-ST-elevation myocardial infarction; STEMI=ST-elevation myocardial infarction

Table 3. Lab and performance assessments by frailty group

	Frail (gait <0.65m/sec) N=126	Not frail (gait ≥0.65m/sec) N=203	P value
Hemoglobin (mg/dL)	12.8 ± 2.1	13.6 ± 1.6	0.001
Fried frailty score	31.3	3.4	<0.001
Grip strength	55.7 ± 31.2	67.7 ± 26.2	<0.001
Cognitive impairment (TICS-M <22)	34.1	23.8	0.041
EuroQol-5D mobility (% no problems)	59.5	81.8	<0.001
EuroQol-5D self care (% no problems)	88.0	95.6	0.015
EuroQol-5D usual activities (% no problems)	57.1	74.6	0.001

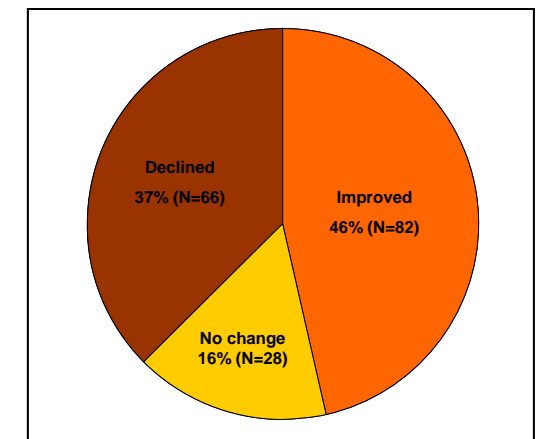
TICS-M=Telephone Interview of Cognitive Status - modified

Table 4. One year outcomes by frailty group

	Frail (gait <0.65m/sec) N=126	Not frail (gait ≥0.65m/sec) N=203	P value
Mortality	5.6	4.5	0.09
ADLs (% need help ≥1 ADL)	36.0	19.3	0.003
SF-12 PCS	39.2 ± 12.0	47.2 ± 9.7	<0.001
SF-12 MCS	55.0 ± 7.4	55.8 ± 7.1	0.396
EuroQual-5D mobility (% no problems)	55.0	76.8	<0.001
EuroQual-5D self care (% no problems)	88.9	96.4	0.015
EuroQual-5D usual activities (% no problems)	62.4	79.2	0.001

Note:
Continuous gait speed and 1 year mortality (unadjusted) p=0.09
Continuous gait speed and 1 year mortality (age adjusted) p=0.09
Continuous gait speed and 1 year SF12 PCS (adjusted for baseline PCS) p=0.013
ADL=activities of daily living; MCS=mental component score; PCS=physical component score

Figure 2. Gait speed at 1 and 6 months (significant Δ >0.05m/sec) (n=176)



Conclusions

- Frail patients report more need for assistance with mobility, self care and usual activities, and have significantly lower physical function at 1 year.
- Although many frail patients remain so over time, there is a dynamic component to these assessments, as well. The link between frailty and other factors (e.g. social isolation, cognitive impairment, depression, anemia, and heart failure) suggest targets for remediation.
- Understanding the mechanisms behind frailty and its dynamic features, may provide insights to preserving independence among older adults post MI.