Older Age Risk Assessment Case Discussion

AAIM Triennial October 15-20, 2022
Boston, MA

Facilitators

Sheila MacDonnell, MD, MS, DBIM

Tim Steffen, MD, DBIM, FALU, FLMI

Older Age Risk Assessment Workshop

- We are presenting 4 challenging cases for open discussion today
- While listening to each case presentation, please consider **favorable** and **non-favorable** findings
- Risks may include
  - **Favorable/Average**
  - **Increased mortality**
  - **Unfavorable**
  - **Not enough information to offer**
- The cases, slides, and takeaway material will be given out at the end of the triennial on the AAIM web site

Case 1 -73F Applying in 3/19 for life insurance

- She is an admitted smoker. On insurance exam her medical history included a h/o a TIA in 2012 and high cholesterol.
- Short APS- (2/19) –New patient visit. H/o a stroke. Meds – ASA-Dipyridamole (Aggrenox) 25-200mg bid, Atorvastatin (Lipitor) 80mgqd, smokes 5 or less cigs/day, 1-2 alcoholic drinks per month. Recent move after sudden death of husband. Lives by herself but has great support from her daughter. Exam WNL no specific cognitive screen performed. Neuro – CN II-XII grossly intact. Psych – appropriate mood and affect. Labs at exam – normal CBC, HbA1c 5.7% chol 210, LDL 141, HDL 49 chol/HDL 4.3, CMP BUN/CR 15/0.69, albumin 4.7 normal LFTs, normal TSH. – Given reference to a stroke history- the underwriter pursued the prior APS.
- Prior APS -(4/11) –h/o gait disturbance and dizziness. Applicant indicated at time that she may have had a stroke because she was having a heavy feeling in left arm and left leg. Symptoms had begun the week prior. Brain MRA – unremarkable. Brain MRI – acute to subacute lacunar infarct, right thalamus junction laterally with the superior lateral posterior limb of the internal capsule. A small lacunar infarct of chronic character was present in the left mid corona radiata. Additional scattered small vessel changes above the tentorium were noted. 4/11 carotid u/s – <50%stenosis both internal carotid arteries, RICA peak systolic velocity 88cm/sec, LICA peak systolic velocity 68 cm/s.
- (3/19) insurance labs – chol 137 LDL 72.4, HDL 49.6 ratio 2.76, albumin 4.7, BUN/CR 11/0.69 NT-probnp 26. UA – positive nicotine
- Insurance questions – No use of assist devices, she drives, she has had no falls in the past year, exercises by walking and stretching daily, reports no help with bathing, dressing, house cleaning, finances, or taking medications

Case 1 – 73F Applying in 3/19 for life insurance

- She answered the year, day of the week and day of the month correctly
- 3-word DWR – words: TV, medicine bottle, and Easter décor – responses: TV, medicine, and Easter tree
- Clock draw: "Ten minutes after eleven" –

- GUG – recorded time – 5 seconds.
- Able to rise from the chair with ease and unassisted in one attempt. Walked without a cane or other walking aid and without any type of assistance. Gait was noted to be steady and when turned it was without assistance with a steady gait and without holding on to an object or wall.
- Exam biometrics: 5'0 127lbs (BMI 25) with no admitted weight loss Bp 120/80 HR 66 examiner notes "appears to be in good health"

Case 1 - What is the Risk Here?

- **Favorable/Average**
- **Increased mortality**
- **Unfavorable**
- **Not enough information to offer**

Case 1 - Discussion

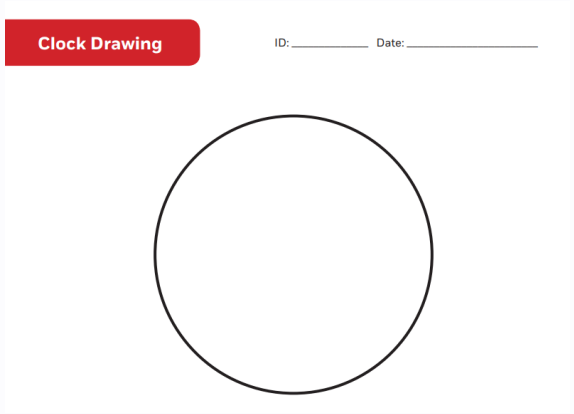
- Do you have concerns about this case?
- What is favorable/unfavorable?

Case 1 - Discussion

- How did she do on her mini-Cog and how would you score it?
- Is her distant cerebrovascular history a concern now?
- Do you see her recent MD evaluation as favorable or unfavorable and why?
- From a mortality standpoint, are lacunar infarcts better than other types of ischemic strokes and why?
- Are you comfortable with her cardiac risk? What are favorable/unfavorable aspects?

Mini-Cog

- Includes recall of 3 unrelated words and a clock draw test (CDT)
- 3-word DWR – 1 point for each word
- CDT
  - All numbers should be present in correct order with hands displaying requested time
  - No points off for length of the hands, circle is already provided
  - Score - 0 points for an abnormality or 2 points if done correctly
- Total score out of 5 - Impaired if cannot recall the 3 words or if recall only 1 or 2 words and have an abnormal CDT(cut-point of <3 for dementia screening)
- Sensitivity 76 to 100% but specificity only 54 to 85% for dementia and worse for MCI - sensitivity 39 to 84% specificity 73 to 88%



https://www.alz.org/media/Documents/mini-cog.pdf

Mendez, M. (2019). Mental Status Scales to Evaluate Cognition. In *UpToDate*, J. Wilterdink (Ed.), UpToDate, Waltham, MA. (Accessed on September 11, 2022), from https://www.uptodate.com/contents/mental-status-scales-to-evaluate-cogntion

CNS small vessel disease A clinical review

Rocco J. Cannistraro, MD, Mohammed Badi, MD, Benjamin H. Eidelman, MD, Dennis W. Dickson, MD, Erik H. Middlebrooks, MD, and James F. Meschia. Neurology 2019:92:1146-1156.

- Increased life expectancy has increased the prevalence of CNS small vessel disease (CSVD)
- CSVD on MRI may include small subcortical infarcts, white matter hyperintensities (WMH), lacunes, cerebral microbleeds, enlarged perivascular spaces and cerebral atrophy
- Prevalence of WMH increases with age
  - Approx 5% at age 50 to nearly 100% at age 90
- Risk factors include hypertension, smoking, hyperlipidemia, diabetes, moderate to severe sleep apnea
- Attributable cause of 25% of strokes
- Contributes to 45% of dementia cases
- CSVD can be asymptomatic or depending on lesion location(s) can lead to cognitive, mood, behavior, gait and motor symptoms

Table 1 Demographic and clinical risk factors for CSVD

Risk factor	Odds ratio[a]
Age 65–69	***1.41*** (reference 9)
Age 70–74	***1.44*** (reference 9)
Age ≥ 75	***2.38*** (reference 9)
Hypertension	***1.49*** (reference 9)
	4.88 (reference 12)
Cigarette smoking	*0.94* (reference 9)
	1.84 (reference 12)
Hyperlipidemia	*1.11* (reference 9)
	0.86 (reference 12)
Diabetes	*0.91* (reference 9)
	2.74 (reference 12)
Moderate-to-severe OSA	***2.03*** (reference 13)

Abbreviations: CSVD = CNS small vessel disease; OSA = obstructive sleep apnea.
ORs in bold were found to be statistically significant in the cited study. ORs not in bold text were found not to be statistically significant. ORs in italics were from studies conducted in Asian populations. ORs not in italics were from studies conducted in Caucasian populations.
[a] Odds ratios (ORs) are based on multivariable adjusted models.

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Lacunar Infarcts – Short- and Long-Term Risk

- Short term – **research suggests lacunar infarcts typically have better prognosis at 3 months than other types of ischemic strokes**
  - 91% of lacunar strokes – moderate to good recovery based on Glasgow Outcome scale
  - 55% of large vessel atherosclerotic strokes had moderate to good recovery
- Long term – prognosis may not differ greatly from that of other types of ischemic strokes
  - Systematic review of 19 cohort studies involving 2402 patients with lacunar and 3462 with nonlacunar ischemic stroke
  - **Odds of death were significantly greater following nonlacunar stroke at one month (OR 3.81), 1 to 12 months (OR 2.32) and 1-5 years (OR 1.77) – although the difference gradually decreased**
  - **Odds of recurrent stroke were significantly greater for nonlacunar stroke only at one month (OR 2.11)** and not at 1-12 months (OR 1.24 (95%CI 0.85 – 1.83) or 1-5 years (OR 1.61 (95%CI 0.96-2.7)
  - Recurrent strokes were more likely to be lacunar if the index stroke was a lacunar infarct
  - Few studies reported on MI risk, but **results available suggested similar cardiac deaths in lacunar vs nonlacunar stroke** (relatively small numbers -85 cardiac deaths among 1966 nonlacunar infarct participants and 33 cardiac deaths among 668 lacunar participants)

Jackson C, Sudlow C. Comparing Risks of Death and Recurrent Vascular Events Between Lacunar and Non-Lacunar Infarction. Brain, 2005; 128 (Pt 11): 2507. Epub2005 Sep 29 https://pubmed.ncbi.nlm.nih.gov/16195245/

Oliveira-Filho, J. (2022). Lacunar Infarcts. In *UpToDate*, J. Dashe (Ed.), UpToDate, Waltham, MA. (Accessed on September 11, 2022), from https://www.uptodate.com/contents/lacunar-infarcts

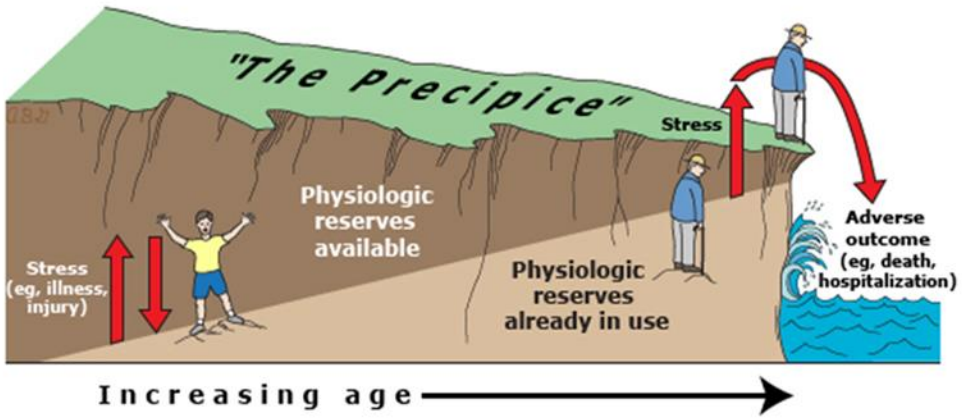
Long-Term Mortality and Recurrent Vascular Events in Lacunar vs Non-Lacunar Ischaemic Stroke: A Cohort Study

S. Portiegiijs, Areil Y Ong, Nynke Halbesma, Aidan Hutchison, Cathie LM Sudlow, Caroline A Jackson. Eur Stroke J. 2022 Mar;7(1) 57-65 - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8915237/

- **Investigated whether long-term mortality, recurrent stroke and MI risk differed in individuals with vs without lacunar/small vessel disease (SVD) ischemic stroke**
- Hospital based stroke cohort study
  - 812 participants recruited 2002-2005 to the Edinburgh Stroke Study (ESS)
  - 283 with lacunar/SVD ischemic stroke
  - 529 other stroke
  - Excluded participants with prior stroke, uncertain pathologic type, unusual cause of stroke
- Median f/u 9.2 years, 519 deaths, 181 recurrent strokes, 79 MIs
- **From one year onward, no statistically significant difference in all cause mortality between the two groups – HR 0.86 (95% CI 0.7-1.05)**
- **No clear difference in recurrent stroke risk HR 0.84 (95% CI 0.61-1.15) or MI HR 0.83 (95%CI 0.52-1.34)**

Successful Aging?

- Is she aging successfully?
  - Successful aging - older individuals who continue to function well, both physically and cognitively, with minimal to no chronic disease impact
  - These are individuals who have a high quality of life, low stress, are quick to recover from adversity, and have a high level of vitality/activity



Based on information from: Taffet GE. Physiology of aging. In: Cassel CK, Leipzig RM, Cohen HJ, et al [eds]. Geriatric Medicine: An Evidence-Based Approach, 4th ed. New York, Springer, 2003.

Graphic 58907 Version 9.0

Taffert, G. (2022). Normal Aging. In *UpToDate*, J. Givens (Ed.), UpToDate, Waltham, MA. (Accessed on July 18, 2022), from https://www.uptodate.com/contents/normal-aging

Case 1 - Takeaways

- 73 smoker with hyperlipidemia with cerebrovascular disease starting in her 60s with two prior lacunar infarcts and small vessel disease with an abnormal CDT on exam raises concern for vascular cognitive impairment
- APS red flag MAY be the fact that the applicant moved after her husband passed away to be closer to her daughter who is of “great support” to applicant
- Lacunar infarcts have a better prognosis and mortality within the short term than other types of ischemic strokes but long term prognosis may not differ greatly
- Applicant appears active with cardiac risk factors controlled but she is a smoker and has had cerebrovascular disease - a normal NT-probnp is favorable but ideally would like more information on her cardiac status
- Precipitous drops in cholesterol can be worrisome but in this case she likely had a lapse in her medication while changing doctors

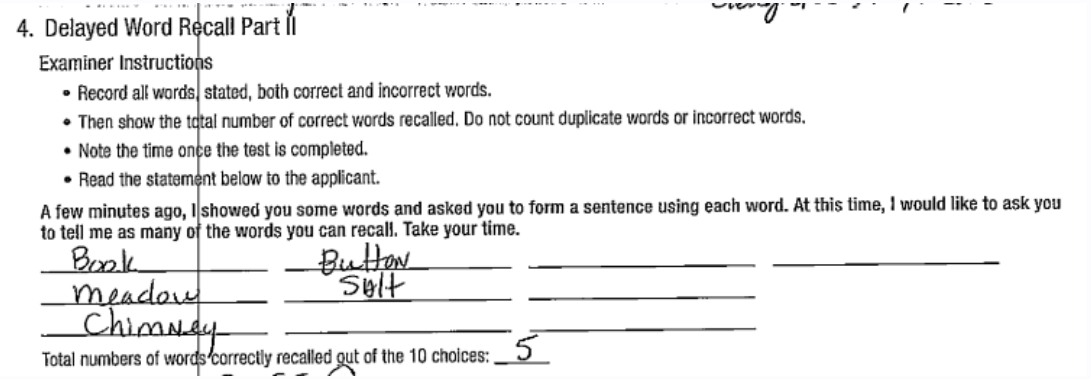
Case 2- 74-year-old male applying for life insurance application dated: 4/2022

- Medical History
  - Hypertension
  - Hyperlipidemia
  - Osteoarthritis of the hips post bilateral replacements last year (7/2021 Right & 9/2021 Left)
  - Osteoarthritis of bilateral knees
  - "mild" COPD
  - BPH – prior negative bx per report
  - Personal history of colon polyps – last colonoscopy 10/2017
- Medications
  - Tamsulosin 0.4mg qd
  - Metoprolol 25 mg qd
  - Atorvastatin 10 mg qd
  - Ferrous Sulfate 325 mg qd (since 10/2021)
  - ASA 325mg qd
- Social history
  - Sales – account manager
  - Lives at home with his spouse
  - Former smoker – quit 15 years ago
    - Previously smoked 40 years, 1PPD
  - Denies alcohol consumption
  - Admits to THC gummies for pain when needed
- Paramedical Exam
  - 6'1" weight 205lbs (stable)
  - BMI 27.04
  - BP 150-156/78-82
  - Pulse 52 Regular
- Exam Labs
  - A1c 5.3%
  - eGFR (Mayo) 95.42
  - HOS is WNL
  - Albumin 4.4 g/dl (NL>3.9)
  - Cholesterol 178 mg/dl (NL 140-225)
  - Chol/HDL ratio 2.59
  - NT-ProBNP 170 pg/ml (NL 0-124)

Case 2 - 74-year-old male applying for life insurance application dated: 4/2022

- Mature Assessment
  - Employed – works full time salaried position – account manager sales representative
  - Education: 2-year associates degree
  - Likes to hike metro parks during the good weather
  - Travels 1-2 times yearly
  - Drives 60 miles a week and no accidents
  - Able to perform all ADLs and IADLs
- Timed Get up and Go
  - Rises easily with no assistance
  - Pace normal
  - Turns smoothly with no hesitation
  - Sits down in chair smoothly with no hesitation
  - Time documented as 9:52 AM (not measured in seconds)
- Serial 7's normal
- Oriented to date, day of the week and place
- Admits to no falls in the last 3 years

- DWR score 5/10



4. Delayed Word Recall Part II

Examiner Instructions

- Record all words stated, both correct and incorrect words.
- Then show the total number of correct words recalled. Do not count duplicate words or incorrect words.
- Note the time once the test is completed.
- Read the statement below to the applicant.

A few minutes ago, I showed you some words and asked you to form a sentence using each word. At this time, I would like to ask you to tell me as many of the words you can recall. Take your time.

Book, Button, Meadow, Salt, Chimney

Total numbers of words correctly recalled out of the 10 choices: 5

- Other observations by Paramed:
  - Has had no issues after hip replacements, a little slower and sometimes uses a cane when needed for steadiness, did not use it for mobility testing today

Case 2 -74-year-old male applying for life insurance application dated: 4/2022 - Medical Records

- Annual physical Exam 12/2019
  - Breathing has been good
  - Short of breath with strenuous activities like raking/bagging leaves
  - Joint and back pain, hips most limiting
  - BP 130/67
  - PSA 5.7 ng/ml
  - Diagnosed with Mild COPD – no medication treatment prescribed; diagnosed 3-4 years ago with PFT's reported as mild obstruction - outside the VA and report not available
  - Follow up in 1 year
- Annual Physical Exam 11/2020
  - BP 201/99 when initially checked
  - Repeat BP 162/84
  - Home BP monitor ordered
  - If BP remains high will need medication
- 1/2021 Nursing note
  - BP's at home 170/101, 163/99, 174/96
  - Metoprolol 25mg added
- 7/2021 Right total hip arthroplasty (THA)
- Echocardiogram 7/2021 – dx LE edema post hip replacement
  - **Poor echo windows**
  - EF 55-60%
  - Normal LV size and function
  - Normal RV size and function
  - Possible grade 1 or mild diastolic dysfunction
  - LA size not able to be measured
  - Heart valves and Aortic root not well visualized

Case 2 -74-year-old male applying for life insurance application dated: 4/2022 - Medical Records

- 9/2021 Pre-op exam for Left THA
  - Hx of recent right THA, required prolonged foley catheter due to urinary retention
  - Developed LE edema post operatively
    - Cardiology evaluation - determined to be dependent edema
    - BNP was 154 pg/ml (nl 0-100)
    - Had echocardiogram
  - BP 126/67
- 2/2022 PCP
  - Still with right hip pain, states he has to use his cane to walk when pain is bad enough
  - Using tramadol and Tylenol for pain relief
  - Denies any recent falls
  - BP 148/78
  - Diagnosed with iron def anemia, "Hgb trending up" – to continue taking his iron and Vit C supplements
  - COPD – stable, no medications
- 3/2022 - orthopedics
  - Still with ongoing right hip pain, tender over greater trochanter
  - Bursal injection provided
- Labs 2/2022
  - Ferritin 21.9ng/ml (nl 25-250)
  - Iron 62 mcg/dL (nl 65-175)
  - TIBC 391 mcg/dl (nl 265-400)

Date	Hgb	MCV
5/2021	14.1	88.6
9/2021	12.9	85.1
10/2021	9.7	83.6
2/2022	12.8	78.1

Case 2 - What is the Risk Here?

- **Favorable/Average**
- **Increased mortality**
- **Unfavorable**
- **Not enough information to offer**

Case 2 - Case Discussion

- Do you have concerns about this case?
- What is favorable/unfavorable?

Case 2 - Case Discussion

- What does a 5/10 DWR mean and how do you handle this finding on a mature assessment?
  - Is this normal or abnormal?

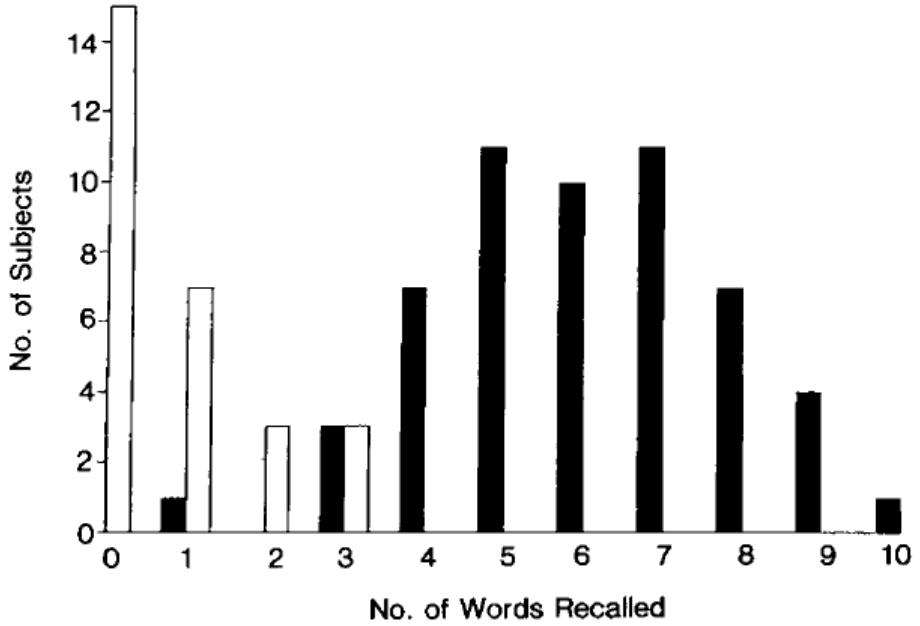
Delayed Word Recall (DWR)

- Developed in 1989 by Dr. David Knopman and routinely used in LTC and life insurance risk assessment to screen for cognitive decline.
  - **A score cut-off of ≥3 vs <3** was used to demonstrate 89.3% sensitivity and 98.2 specificity for detecting Alzheimer's Disease
- In 2007, Vecchione, et al. demonstrated increased MR (196%) for LTC applicants scoring between **0-5 on the DWR**
- This tool was developed for clinicians to be a rapid way to screen for dementia
- In underwriting these tools are used to attempt to uncover those who are "at risk" for developing dementia or those with pre-clinical disease
- "Low normal" tests may be an indication of an at-risk group

A Verbal Memory Test With High Predictive Accuracy for Dementia of Alzheimer Type

David S. Knopman, MD:Soren Ryberg, MD. *Arch Neurol.1989;46(2): 141-145*.
doi:10.1001/archneur.1989.00520380041011

- Recent memory deficit is the most common early finding in people with Alzheimer's disease (AD)
- Delayed word recall (DWR) - devised for large scale screening to be performed at the bedside and to help distinguish patients with AD from normal older adults
- A set of 10 common nouns presented one word at a time (words taken from lists B and C of the Rey Auditory Verbal List Learning Test)
  - In response to reading each word, the participant was required to make up a sentence using the word
  - A second exposure to the list immediately occurred using the same format
  - After a 5 minute interval, recall of the items was tested
- Small study size -participants included 28 patients with possible or probable AD and 55 "normal" older adults
- Both groups were matched for age and education
- Overall predictive accuracy was 95.2%, scores were not correlated with education or age
- Used a cut-off ≥3 vs <3



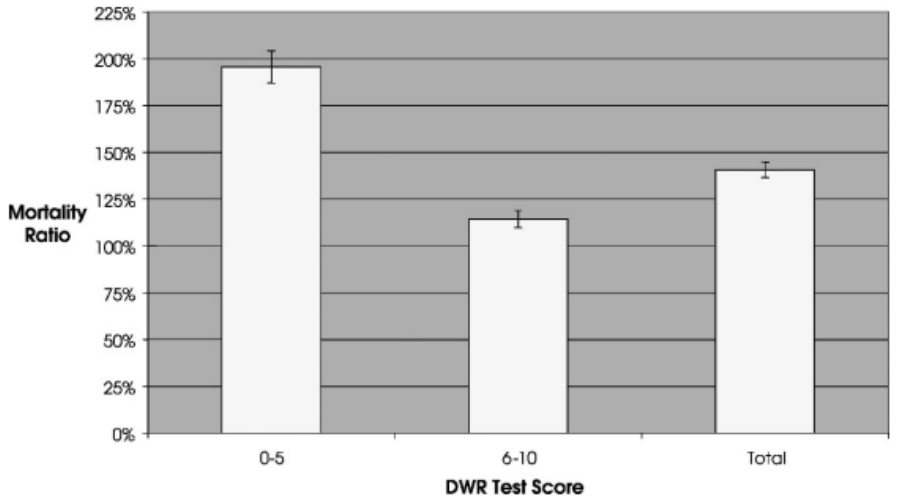
Histogram depicting distribution of scores of normal subjects (filled bars) and probable/possible patients with Alzheimer's disease (open bars)

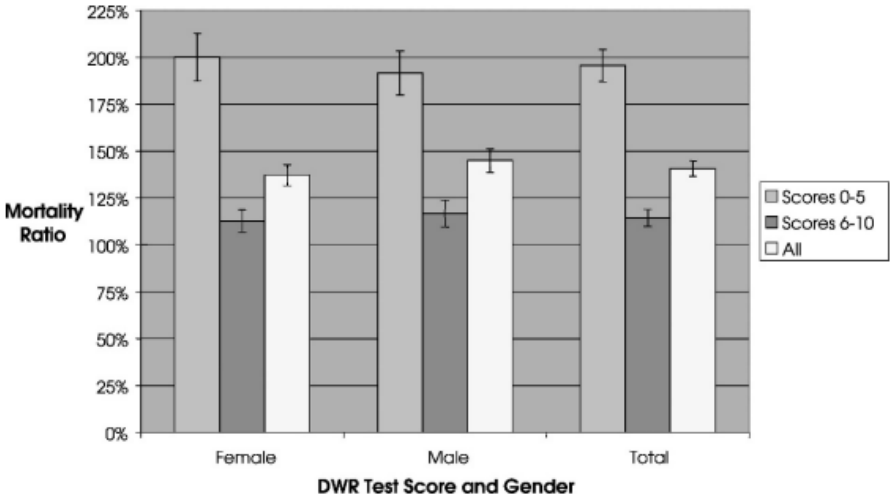
Mortality Risk Assessment in the Elderly: The Utility of DWR, Part II

Laura Vecchione, MD; Eric Golus, FSA, MAAA

J Insur Med 2007; 39:264-269

- Purpose of this Study was to understand the use of the DWR as a potential underwriting tool because it is simple, objectively scored and validated
- Subjects underwritten between 1995 – 2006 for an employee sponsored LTCI program
- Total # of participants – 14,631 - those declined for non-cognitive reasons were excluded
- 1995-2006, average duration 6.9 years, 4,388 deaths
- Overall mortality ratio (MR) for all study participants was 141% (+/- 4%)
- MR for DWR 0-5 was 196% (+/-9%) and for DWR 6-10 the MR was 114% (+/- 5%)
- Men with DWR 0-5 had a MR of 192%, DWR 6-10 had a MR of 117%
- Women with DWR 0-5 had a MR of 200%, DWR 6-10 had a MR of 113%





Case 2 - Case Discussion

- What is the cause his low iron microcytic anemia and are you concerned?
- Is he aging successfully?

Physiologic Changes Associated with Normal Aging

- **Hematopoietic system**
  - **Functional bone marrow reserves are reduced – persistent IDA**
  - Reduced WBC function
- Gastrointestinal
  - Increased reflux esophagitis
  - Sensitivity to gastric irritants (NSAIDS)
- Renal
  - Renal mass and function decline with reduced creatinine clearance
  - Increased sensitivity to medication toxicity
- **Cardiovascular**
  - **Elevated blood pressure – severe at times**
    - Ventricular cardiomyocytes hypertrophy in compensation
  - Increased risk for CAD
  - **Impaired LV filling/diastolic dysfunction leading to risk of increased LA size and resultant risk of A. Fib**
  - Reduced response in HR and EF to exercise
  - Increased calcification of heart valves
- **Pulmonary – "Mild" COPD history with reported DOE symptoms in the past**
  - Increased frequency of pneumonia and likelihood of hypoxia
  - Loss of lung volume surface area and lung elasticity
  - Cough is less vigorous and mucociliary clearance is slower
- **Genitourinary – BPH and post surgical obstruction**
  - Prevalence of urinary incontinence increases
- **Musculoskeletal**
  - Reduced muscle mass in relation to body weight
  - **Recovery to injury is slowed**
  - **Impaired mobility and balance – periodic need for cane**
  - Increased probability of fracture with reduced bone mass
- **Central Nervous System – significance of 5/10 DWR?**
  - Brain volume loss/atrophy most prevalent in the frontal and temporal lobes
- Skin
  - Atrophy, decreased elasticity, and impaired reparative responses
- Eyes
  - Presbyopia
- Immune system
  - Immunosenescence –
    - Disruption in the ability of lymphocytes to work in concert to generate effective immune responses
    - Loss of precise regulation of the inflammatory process
    - Increased risk of infection, malignancy and autoimmune disorders

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Case Discussion

- Is he aging successfully?
  - Successful aging - older individuals who continue to function well, both physically and cognitively, with minimal to no chronic disease impact
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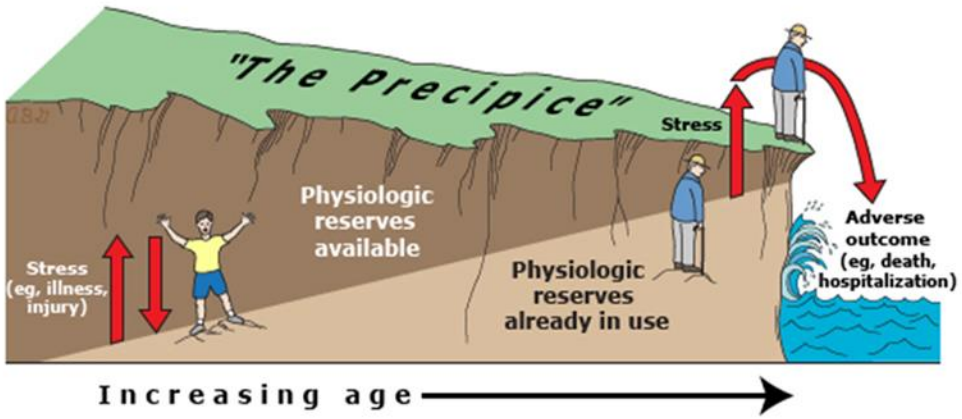

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Case 2 - Takeaways

- DWR of 5/10 appears unexpected for this employed sales manager who accomplishes other cognitive screens without issues (Serial sevens, orientation to place, date, day of the week)
  - His DWR test could be considered “passing” but may also infer some increased mortality risk
- Microcytic anemia in the older age population is a mortality risk indicator
  - Cause should be identified
  - His may be explained by his recent hip replacement surgeries
- There are “normal” physiological changes associated with aging but be mindful of clues for sub-clinical disease and diminishing physiologic reserves
  - This is not always straightforward or clearly evident
  - Evaluate the applicant holistically

Case 3 -82F nonsmoker applying for life insurance

- PMH - diverticulitis in 2016 and 2017 complicated by rectovaginal fistula requiring partial colectomy
- 6 months prior to application - the proposed insured fell at a playground when her grandchild bumped into her while on a swing and she suffered a ground level fall –falling on her left side and suffered a closed fracture of the left femoral neck, closed fracture of left distal radius, closed fracture of ulnar styloid with minimal displacement requiring hospitalization and surgery (ORIF left radius and percutaneous pinning of left hip). Day after surgery client had bilateral pulmonary emboli with a troponin bump.
- Preop EKG reading (tracing not in APS) reported possible inferior infarct and cannot rule out anterior infarct.
- Limited (TDS) echo LVEF 60% with no mention of wall motion abnormalities, no LVH, normal RV size and function, mod TR, PASP of 40 to 45mmHG
- After the inpatient stay, the client went to rehab and was on anticoagulation for PE, and discharged home to have her daughter help her. Went to PT for 6 weeks, used a cane for 2-3 weeks.
- 2 months after fall BMD – right femoral neck t-score (-2.8), right total hip t-score (-3.5), AP spine (L1-4) t-score (-3.4) – no prior BMD in APS

Case 3 -82F nonsmoker

- Current meds – Apixaban (Eliquis) 5mg bid, calcium 1200mg/d, Vit D3 5,000U/d, Vitamin C 500mg/d, Magnesium 400mg/d. No osteoporosis (OP) treatment listed c application or on RX report
- Exam – 5'5" 161lbs (BMI 27 -stable) 110/64 HR 81. Scored 10/10 DWR, she also had a Mini-cog -3/3 DWR and CDT – as seen. GUG 10 seconds, rise unassisted, no assist devices, gait steady, able to turn unassisted and able to sit back down without using objects for support. Additional examiner comments: "able to walk, get up, make her lunch without any problems. She walked quickly and functions with ease."
- The applicant indicated that she drives, is not using any assist devices, walks and does calisthenics for seniors daily. Denies need for assistance with bathing, dressing, house cleaning, finances, or taking medications
- Insurance labs – chol 347, LDL 262 ratio 6.94, albumin 4.5 NT-probnp 74 UA – LE positive, Microalb/CR 368.11 (0-28)mg/g, P/C 1594 (0-200), WBC TNTC, positive blood, 40 RBCs. (repeat UA negative).

Case 3 - What is the Risk Here?

- **Favorable/Average**
- **Increased mortality**
- **Unfavorable**
- **Not enough information to offer**

Case 3 - Discussion

- Do you have concerns about this case?
- What is favorable/unfavorable?

Case 3 - Discussion

- What are your concerns with this case?
- Would you consider her frail or meeting criteria for the “Frailty Phenotype”?
- Would you put a lot of weight on her favorable GUG and description the examiner included?
- Would your opinion change if her GUG was 25 seconds with the same description?
- Do you have any concerns about her recent hip fracture and osteoporosis? Would you consider her fractures traumatic or fragility fractures?
- Are you comfortable with her prior abnormal EKG, troponin bump and pulmonary hypertension? Is there anything that makes you feel better?
- How would you score her clock draw?

Fried Frailty Tool (Frailty Phenotype)

- Requires participation and specialized equipment for grip strength and walking speed
- 5 criteria
  - Weight loss (≥ 5% of body weight in last year) ← **No**
  - Exhaustion (positive response to questions regarding effort required for activity) ← **APS does not suggest underlying exhaustion**
  - Weakness (decreased grip strength) ← **No information**
  - Slow walking speed (>6 or 7 seconds to walk 15 feet) ← **Favorable GUG**
  - Decreased physical activity (males <383Kcals/week, females <270Kcals/week) ← **Recent hip fracture but appears active**
- Pre-frailty – 1 or 2 criteria
- Frailty – 3+criteria

Walston J. (2021). Frailty. In *UpToDate*, J. Givens (Ed.), UpToDate, Waltham, MA. (Accessed on September 11 2022), from https://www.uptodate.com/contents/frailty

Get Up and Go Test (GUG)

- A person is observed rising from a standard arm chair, walking forward 10 feet, turning around and walking back to the chair and sitting back down
- Originally described with a grading scale
  - 1= normal, 5 =severely abnormal
- Later versions used a timed component
- May uncover issues with leg strength, balance and vestibular function, and gait

Kiel, D. (2022). Falls in Older Persons: Risk Factors and Patient Evaluation. In *UpToDate*, J. Givens (Ed.), UpToDate, Waltham, MA. (Accessed on September 11, 2022), from https://www.uptodate.com/contents/falls-in-older-persons-risk-factors-and-patient-evaluation

The "Get up and go" test for gait assessment in older adult patients

The "Get up and go" test for gait assessment in older adult patients[1]	
Have the patient sit in a straight-backed high-seat chair	
Instructions for patient:	
Get up (without use of armrests, if possible)	
Stand still momentarily	
Walk forward 10 feet (3 meters)	
Turn around and walk back to chair	
Turn and be seated	
Factors to note:	
Sitting balance	
Transfers from sitting to standing	
Pace and stability of walking	
Ability to turn without staggering	
Modified qualitative scoring[2]	
(1) No fall risk	Well-coordinated movements, without walking aid
(2) Low fall risk	Controlled, but adjusted movements
(3) Some fall risk	Uncoordinated movements
(4) High fall risk	Supervision necessary
(5) Very high fall risk	Physical support of stand by physical support necessary
Timed test reference values (record time from initial rising to re-seating)[3]	
Age (years)	**Mean time in seconds (95% CI)**
60 to 69	8.1 (7.1 to 9.0)
70 to 79	9.2 (8.2 to 10.2)
80 to 99	11.3 (10.0 to 12.7)

Sources:

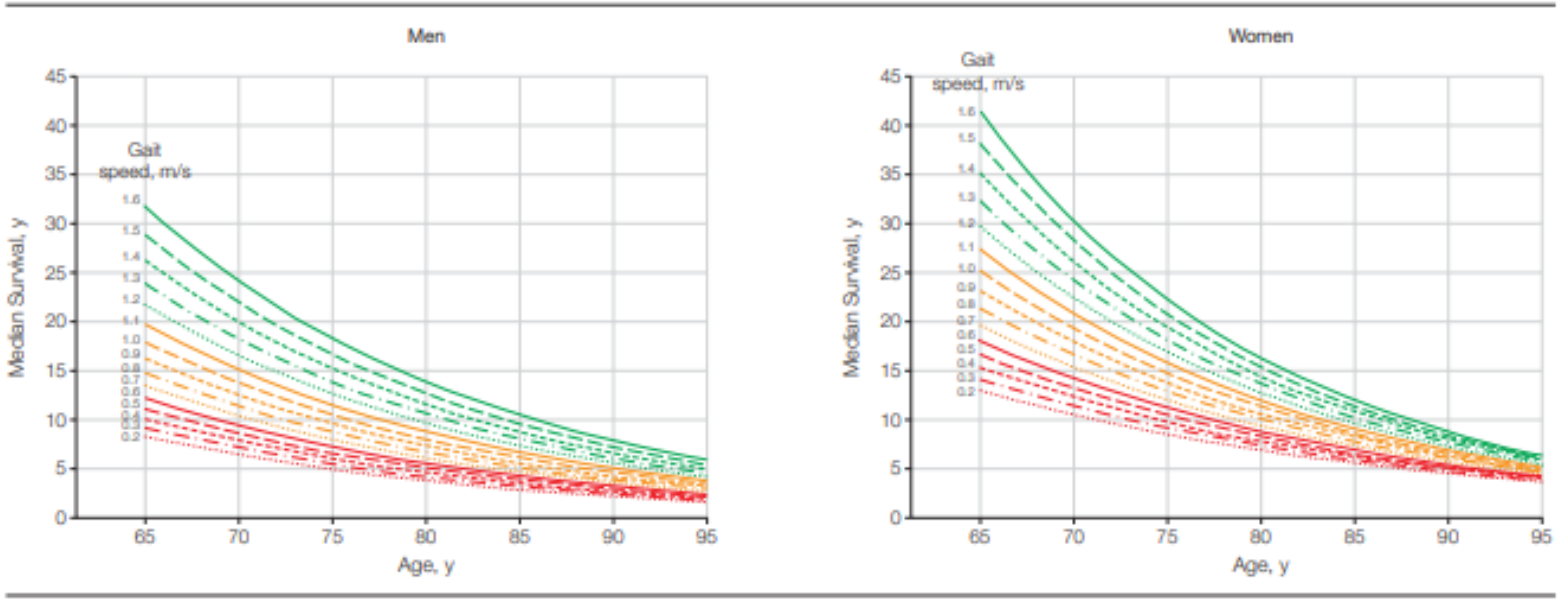
1. *Reproduced with permission from: Fleming KC, Evand JM, Weber DC, Chutka DS. Practical Functional Assessment of Elderly Persons: A Primary-Care Approach [Symposium on Geriatrics-Part III]. Mayo Clinic Proceedings 1995; 70:890. Copyright © 1995 Mayo Foundation.*
2. *From: Nordin E, Lindelöf N, Rosendahl E. Prognostic validity of the Timed Up-and-Go test, a modified Get-Up-and-Go test, staff's global judgement and fall history in evaluating fall risk in residential care facilities. Age Ageing 2008; 37:442. By permission of the British Geriatrics Society. Copyright © 2013 Oxford University Press.*
3. *Data from: Bohannon RW. Reference Values for the Timed Up and Go Test: A Descriptive Meta-Analysis. J Geriatr Phys Ther 2006; 29:64.*

UpToDate®

Gait Speed and Survival in Older Adults

Studenski S, et al. *JAMA*. 2011; 305(1): 50-58. doi:10.1001/jama.2010.1923.
https://jamanetwork.com/journals/jama/article-abstract/644554

- Data from 34485 community dwelling adults 65 and older (pooled analysis – 9 cohort studies)
- Baseline gait speed data follow up for 6 to 21 years
- Mean age 73.5 years, 59.6% women, 79.8% white, mean gait speed 0.92 (0.27)m/s
- 17528 deaths - gait speed was associated with survival in all included studies



Discriminative Ability and Predictive Validity of the Timed Up and Go in Identifying Older People Who Fall: Systematic Review and Meta-Analysis

Schone D, et al. *J Am Geriatric Soc*. 2013. Feb; 61(2): 202-8. doi.10.1111/jgs.12106.Epub 2013 Jan25.

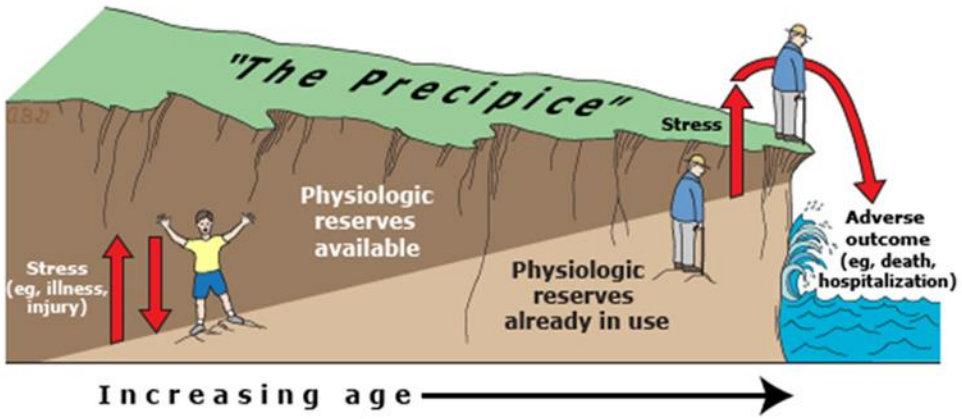
- 53 studies with 12,832 participants
- Findings suggested that timed up and go was not useful for discriminating "fallers" from "non-fallers" in healthy high functioning older adults
- In adults 60+ timed testing did not show a difference in those with falls and those without falls who live independently
- It was felt to be of more value in less healthy lower functioning older individuals
- The study suggested that the overall predictive ability and diagnostic accuracy of the timed up and go was moderate at best with no cut-points recommended
- Authors suggested a quick multi-factorial fall risk screen should be considered in addition to help identify older adults at risk for fall

Timed GUG

- **Gait speed was associated with survival** in Studenski S, et al. study published in JAMA in 2011
- Schone D, et al. published in J Am Geriatric Soc. from 2013 suggested that…
  - For adults 60+, the timed testing **did not show a difference in those with falls and those without falls who live independently**
  - Timed testing was felt to be of more value in **less healthy lower functioning** older individuals
- Perhaps the timed aspect of the GUG is more meaningful when there are…
  - Co-morbidity or frailty concerns present
  - A lack of information on an older applicant
- Although gait speed has been associated with survival, perhaps when there is significant underwriting evidence of a robust older applicant with no significant chronic conditions, the timed aspect of the GUG becomes less meaningful

Successful Aging?

- Is she aging successfully?
  - Successful aging - older individuals who continue to function well, both physically and cognitively, with minimal to no chronic disease impact
  - These are individuals who have a high quality of life, low stress, are quick to recover from adversity, and have a high level of vitality/activity



Based on information from: Taffet GE. Physiology of aging. In: Cassel CK, Leipzig RM, Cohen HJ, et al [eds]. Geriatric Medicine: An Evidence-Based Approach, 4th ed. New York, Springer, 2003.

Graphic 58907 Version 9.0

Taffert, G. (2022). Normal Aging. In *UpToDate*, J. Givens (Ed.), UpToDate, Waltham, MA. (Accessed on July 18, 2022), from https://www.uptodate.com/contents/normal-aging

Case 3 - Takeaways

- Unfavorable aspects - recent multiple fractures - especially a hip fracture within 6 months from a ground level fall uncovering significant OP that as far as we know has not been treated
- Favorable frailty index – (0/5) with no evidence of weight loss, slow speed, decreased exercise or complaints of fatigue and with a favorable current GUG
- Favorable BMI with no other concerns such as polypharmacy or comorbidities
- Mild pulmonary hypertension and elevated troponin bump in the setting of an acute bilateral PE with favorable EF may be OK given situation if no adverse prior cardiac history and a normal current NT-probnp

Case 4 - 70-year-old Male Physician Applying for Life Insurance 12/2019

- Medical History
  - DMII x 8 years
  - Hypertension x 14 years
  - Hyperlipidemia
  - BPH
- Medications
  - Tamsulosin 0.4mg qd
  - Ertugliflozin (Steglatro) 10mg qd - SGLT2 inhibitor
  - Linagliptin/Metformin (Jentadueto) 2.5/1000 mg qd - DPP-4 inhibitor/biguanide combo
  - Pitavastatin (Livalo) 4mg qd
  - Azilsartan (Edarbi) 40 mg qd
  - Aspirin 81mg qd
- Family History
  - Father deceased age 79 – Pneumonia
  - Mother deceased age 82 – Pneumonia
  - 2 sisters living ages 76 and 78
- Social History
  - Denies alcohol and tobacco use
  - Married
  - Physician – Primary Care
- Paramed Exam:
  - Height 5’7”
  - Weight 220
  - BMI 34.5
  - BP 126-130/80-90
  - Pulse 72
  - Reports last check-up was 4/2018 and underwent a stress test at that time and it was normal
  - Mature assessment is without any functional or cognitive concern
- Exam Labs:
  - Gluc 129 mg/dl (12 hour fast)
  - Hgb A1C – 7.4 %
  - Albumin 4.4 g/dl
  - Total Cholesterol 116 mg/dl
  - HDL Cholesterol 36 mg/dl
  - Chol/HDL ratio 3.1
  - NT-pro-BNP 36 pg/dl
  - PSA 0.85 ng/ml
  - HOS – negative for MA
    - Glucose >1.0 gm%

Case 4 - 70-year-old Male Physician Applying for Life Insurance 12/2019 – Medical Records

- 4/2018 – Cardiologist office note
  - 68-year-old male with medical history of DMII, HLD and HTN
  - Complains of scapular pain, shortness of breath, dyspnea on exertion
  - Prior smoker
  - Medications
    - Olmesartan hydrochorothiazide (Benicar HCT) 20/12.5 qd
    - Aspirin 81mg qd
    - Finasteride 5mg qd
    - Tamsulosin 0.4mg qd
    - Empagliflozin (Jardiance) 25mg qd – SGLT2 inhibitor
    - Linagliptin/Metformin (Jentadueto) 2.5/1000 mg qd – DPP-4 inhibitor/biguanide combo
    - Pitavastatin (Livalo) 4mg qd
  - Weight 211 lbs
  - BP 135/83 HR 81
  - EKG with new complete RBBB, 1st degree AV block
  - Impression : DOE, HTN, HLD, DMII
    - Concerned about the presence of CAD
    - Will proceed with ischemic evaluation
    - Low threshold to proceed to cardiac catheterization

- 4/2018 - Exercise Stress Test Sestamibi
  - Exercise duration 7:11 Min – 8 METS
  - Peak HR 160 (105% MPHR)
  - Baseline BP 130/86 Peak BP 180/90
  - Terminated due to fatigue, no chest pain
  - EKG findings significantly limited due to artifact, no arrhythmia
  - Recovery was unremarkable
  - Nuclear findings – minor motion artifact
    - LV normal in size and normal LV function
    - Mild to moderate defects in the anteroseptal, inferior, inferolateral, and apical walls that are mostly fixed, predominantly corrected with prone imaging and demonstrated preserved wall motion suggestive of attenuation artifact
    - **Impression: Probably Normal Study**

- The applicant verified there are no other medical records
- He states he is his own physician and prescribes his own medication

Case 4 - What is the Risk Here?

- **Favorable/Average**
- **Increased mortality**
- **Unfavorable**
- **Not enough information to offer**

Case 4 - Discussion

- Do you have concerns about this case?
- What is favorable/unfavorable?

Case 4- Discussion

- The applicant is self-prescribing several medications and he states he is his own doctor
  - How do you approach challenging situations like this?

Absent Medical Care/Documentation

"Often underwriters or medical directors are asked to assess risk in elderly applicants who have no personal physician and have not seen a physician for many years. These cases should be viewed cautiously and skeptically." Linda Goodwin

- Subclinical disease may be present and undetected
- Regular preventative visits and screening has been shown to increase survival, among other health benefits
- Important information related to physical and cognitive function along with habits, activities and lifestyle may be missing – (Medicare screen)
- Must rely on application, paramedical exam and mature assessment

Goodwin, L (2006) *Brackenridge's Medical Selection of Life Risks Fifth Edition*, Chapter 7, pg 130

Older Age Underwriting Tools

- Application and paramedical exam
  - Build, Bp, pulse, EKG, level of activity, reported medical conditions, alcohol use and smoking history
- Older age supplement
  - Driving, IADLs, ADLs, social activities
  - Get up and go (GUG), clock draw, delayed word recall (DWR), other cognitive screens
- Current insurance labs
  - Cholesterol, albumin, NT-probnp, HbA1c, other screening labs
- Prescription data
  - Medication compliance, number of medications, stability in dosing
- Motor vehicle report (MVR)
- Lab data
  - Prior labs ordered and/or resulted
- Medical claims data
  - Diagnosis and procedural codes, emergency room visits, hospitalizations
- Attending physician statements (APS)
  - Physicals and Medicare assessments, (in)stability/trends in medical and psychological impairments, biometrics, labs including Hb etc

Case 4- Discussion

- Stress test 1.5 years before application noted “Probably Normal”
- Indications for this stress test were new RBBB, dyspnea on exertion, and scapular pain with multiple CAD risk factors
  - Is this a sufficient study to reassure no obstructive CAD?
  - What is his pre-test probability of obstructive CAD?

ASCVD 2013 Risk Calculator from the AHA/ACC (MD Calc – created by Dr. David Goff)

https://www.mdcalc.com/calc/3398/ascvd-atherosclerotic-cardiovascular-disease-2013-risk-calculator-aha-acc

- The applicant's 10-year risk of cardiovascular event (coronary or stroke death, non-fatal MI or stroke) calculated is 28.2-29.5%
  - Does not account for his presenting symptoms
- Nuclear myocardial perfusion SPECT testing: 82% sensitive and 76% specific for the diagnosis of obstructive CAD

Stress testing and noninvasive coronary imaging: What's the best test for my patient?
Milad Matta, MD, et al
Cleveland Clinic Journal of Medicine September 2021, 88 (9) 502-515;

https://www.ccjm.org/content/88/9/502

Pre-test probability of CAD (CAD Consortium)

https://qxmd.com/calculate/calculator_287/pre-test-probability-of-cad-cad-consortium

- At his visit, he presented with symptoms of DOE, shortness of breath and scapular pain
  - With these symptoms (anginal equivalents) , EKG changes and his medical history, his pre-test likelihood of CAD is higher

Calculator | About | References

Pre-test probability of CAD (CAD consortium)

Determine pre-test probability of coronary artery disease in patients with chest pain.

Questions

1.	Age?	70 years
2.	Sex?	Male
3.	Chest pain?	Typical chest pain
4.	Diabetes?	Yes
5.	Hypertension?	Yes
6.	Dyslipidemia?	Yes
7.	Smoking history?	Yes
8.	Coronary Calcium Score Available?	No
9.	Coronary Calcium Score? (enter 0 if not done)	

Results ☆ Save Copy Results

Basic Model

70 %

The Basic Model estimates the probability based on age, sex, and symptoms

Clinical Model

86 %

The Clinical Model estimates the probability based on age, sex, symptoms, and cardiovascular risk factors

Clinical + CCS Model

Without coronary calcium score, unable to provide %

The Clinical + CCS Model estimates the probability based on age, sex, symptoms, cardiovascular risk factors, and the coronary calcium score (CCS)

Let's look at the sensitivity/specificity of this test in relation to his pre-test probability and post-test probability with a "normal" negative result

	Obstructive CAD Positive	Obstructive CAD negative	
SPECT Pos	A (True Positive)	B (False Positive)	PPV = A/(A+B)
SPECT Neg	C (False Negative)	D (True Negative)	NPV = D/(D+C)
	Sensitivity = A/(A+C) = 82%	Specificity = D/(D+B) = 76%	

- **Sensitivity** is the ability of the test to detect those with the disease
  - Higher sensitivity will have fewer false negatives
- **Specificity** is the ability of the test to correctly identify those without the disease
  - Higher specificity will have fewer false positives

- PPV – positive predictive value is the probability that a positive test result indicates that disease is present
- NPV – negative predicative value is the probability that a negative test result indicates that the disease is not present
- The **post-test probability** of the disease being present with a negative test result is **1-NPV**

Is this a sufficient study to reassure no obstructive CAD? - Pre-test probability **86%**

86% prevalence of disease	Obstructive CAD +	No Obstructive CAD	10,000 tested
SPECT Pos	7052	336	PPV = A/(A+B) = 7052/(7052+336) = **95%**
SPECT Neg	1548	1064	NPV = D/(D+C) = 1064/(1064+1548) = **41%**
Totals	**8600**	**1400**	
	Sensitivity 82%	Specificity 76%	

- His post-test probability of having obstructive CAD after having a negative test is **59%**
  - 1-NPV assuming his test was normal

- The numbers in the grid are calculated based off the disease prevalence (pre-test likelihood) and the sensitivity and specificity of the test

Pre-test probability of CAD (CAD Consortium)

https://qxmd.com/calculate/calculator_287/pre-test-probability-of-cad-cad-consortium

- If you choose non-specific chest pain in the calculator

Pre-test probability of CAD (CAD consortium)

Determine pre-test probability of coronary artery disease in patients with chest pain.

Questions

1.	Age?	70 years
2.	Sex?	Male
3.	Chest pain?	Non-specific chest pain
4.	Diabetes?	Yes
5.	Hypertension?	Yes
6.	Dyslipidemia?	Yes
7.	Smoking history?	Yes
8.	Coronary Calcium Score Available?	No
9.	Coronary Calcium Score? (enter 0 if not done)	

Results ☆ Save Copy Results

Basic Model

24 %

The Basic Model estimates the probability based on age, sex, and symptoms

Clinical Model

55 %

The Clinical Model estimates the probability based on age, sex, symptoms, and cardiovascular risk factors

Is this a sufficient study to reassure no obstructive CAD? – Pre-test probability 55%

55% prevalence of disease	Obstructive CAD +	No Obstructive CAD	10,000 tested
SPECT Pos	4510	1080	PPV 81%
SPECT Neg	990	3420	NPV **78%**
Totals	**5500**	**4500**	
	Sensitivity 82%	Specificity 76%	

- His post-test probability of having obstructive CAD after having a negative test is **22%**

Case 4 -Case Discussion

- An offer was made and accepted in 2/2020
- Prior to policy delivery and signature, he was hospitalized and died soon after
- What was the cause of death?

Contestable Death Claim – 3/2020

- Cause of death –
  - Acute Respiratory Failure
  - Pneumonia
  - COVID-19
- His risk factors for serious COVID-19 symptoms
  - Age 70
  - Class 1 obesity BMI of 34.5
  - DMII
  - HTN
  - ? CAD

Takeaways

- Underwriting older age applicants is complex and challenging when medical care and information is available
- When there is little to no routine medical care for an older age applicant, caution should be used
- Utilizing the underwriting tools for old age assessment can help to assess risk in situations where there is sparse medical documentation
- Understanding the prevalence or the pre-test likelihood of a disease and the sensitivity/specificity of a test to uncover such disease is important when assessing risk
- COVID-19 remains a mortality risk in this age population
  - Future “waves” and the long-term impact of COVID-19 are still difficult to predict

Conclusions

- By 2030 those Americans 65 and older are projected to make up 21% of population
- Assessing mortality risk in the older age population is complex
- The aging process is not uniform; there is significant heterogeneity observed among older adults which should be understood when assessing an individual's risk
- The number and severity of chronic diseases (multimorbidity), the degree of independence/dependance (disability), and indicators of vitality/frailty are often the best predictors of outcome in the older age population
- Frailty and prefrailty are prevalent at older ages and the insurance medical director can leverage biometrics, older age supplement information, cognitive screening, the GUG and APS information to help identify frailty concerns
- Industry studies published in the Journal of Insurance Medicine support use of build, albumin, hemoglobin, NT-probnp, and DWR when assessing mortality at older ages