Geriatric Cardiology: Octogenarian Pearls

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2016 Richard P. Lewis Memorial Lecture

DISCLOSURE STATEMENT

Nanette Kass Wenger, M.D.

Name of Commitment	Name of Organization
Research Grants/Contracts/Trial Steering Committee/Trial Data Safety and Monitoring Board	Alnylam Pharmaceuticals, Gilead Sciences, NHLBI, Pfizer, Society for Women's Health Research
Consultantship	Amgen, AstraZeneca, Gilead Sciences, Merck

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Cultural Resources for Positive Images

- "Old people are as valuable as precious stones"
  Chinese
- "Retirement is like a second childhood"
  Italian
- "He who has not an old man [in his household] let him buy one"
  Lebanese
- "Aging is like a tree in the fall: the leaves fall off, but the trunk is still strong"
  Swedish
- "The old pan is the one that makes good food"
  Portugese
- "The heart doesn't age; only the skin shrivels"
  Spanish

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Why is the Demography Important? (1)

- Unprecedented growth of elderly population worldwide - aging predisposes to cardiovascular disease (CVD)
  - 19% US population > 65 by 2030
  - 19 million > age 85
  - Globally > age 85 ↑ 151% 2005→2030
- Prototype U.S. cardiology patient an older adult
- Benchmarks: > 75 old age
  > 85 very old age
  - Aging changes → clinically relevant differences in physiology, organ function, reserves

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Why is the Demography Important? (2)

- Population > age 65
  - > 85% CV disease deaths
  - 65% CV disease hospitalizations
  - 62% MI hospitalizations
  - 77% HF hospitalizations
- Attributable CV risk highest in senior population
  - Greatest potential to favorably affect morbidity, mortality
  - Counterbalanced by increased iatrogenic risks

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What is Geriatric Cardiology?

- Geriatric cardiology = practice of CV medicine adapted to needs, complexities of older adults
  - Multimorbidity
    - 68% have > 2 chronic conditions
  - Polypharmacy
  - Frailty
  - Cognitive impairment
  - Functional status/disability
  - Social, financial, psychological dimensions of aging
- Patient-centered care required to embrace complexity

Bell, J Am Coll Cardiol 66:1286, 2015

Geriatric Cardiology Issues

- Few data-driven studies to guide care for this vulnerable population
  - Patients outlived current data-driven recommendations
- Transformative effect of aging on CVD
  - ↓ Capacity to tolerate, desire medications, devices, procedures vs younger patients
- Co-existing conditions affect health-related QOL, survival
- Patient-centered outcomes, priorities vs disease-specific outcomes

Bell, J Am Coll Cardiol 66:1286, 2015

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Essentials of Cardiovascular Care for Older Adults (ECCOA) Curriculum

- Designed for cardiovascular specialists and other clinicians who care for older patients with cardiovascular disease.
- Teaches practitioners key features of aging that directly impact CVD to improve care and quality of life in this rapidly growing segment of the cardiovascular patient population.
- 17 ABIM MOC Part II points

Essentials of Cardiac Care for Older Adults (ECCOA)

- Online curriculum
  - www.acc.org/ECCOA
- Available to all practitioners.
- Each module takes ~30 minutes to complete
- 15 modules in total
- Provides 17 CME/CNE (Nursing)/CPE (Pharmacists) credits & MOC credits!
- Curriculum is FREE to all providers!

Modules

- Cardiovascular Physiology in the Older Adult
- Pharmacology for Older Adults
- Care of Older Adults
- Decision Making for Older Adults
- Heart Failure in Older Adults
- Chronic Coronary Disease in Older Adults
- Acute Coronary Syndromes in Older Adults
- Electrophysiology and Heart Rhythm Disorders in Older Adults
- Syncope in Older Adults
- Perioperative Care in Older Adults
- Palliative Care in Older Adults
- Prevention in Older Adults
- Vascular Disease in Older Adults
- Valvular Disease in Older Adults

ECCOA
ESSENTIALS OF CARDIOVASCULAR CARE IN OLDER ADULTS

CV Changes of Aging Increase Susceptibility to CV Disease

- ↑ Central arterial stiffness → ↑ afterload
- ↓ Endothelial function → ↓ vd
- ↓, Delayed early diastolic filling → ↑ dependence on "atrial kick"
- ↓ SA node pacemaker cells → sick sinus syndrome
- ↓ Aerobic capacity (↓ VO_2 max)
- ↓ β adrenergic responsiveness
- ↓ Preconditioning benefit
- ↓ Angiogenesis

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Diagnostic Assessment

- Typical CV symptoms: chest pain, dyspnea, dizziness, exercise intolerance
  - Less specific with age-related physiologic attrition
  - > 50% patients have 5 or more coexisting chronic conditions

- CVD underestimated
  - Treatment delays notorious
  - Utilities of therapies uncertain

- CVD also overdiagnosed, overtreated
  - Imaging studies reflect age-related vasculature, physiologic changes
  - Unrelated to presenting complaint, e.g., geriatric syndromes of falls, dizziness, syncope, weakness

Forman, Am J Cardiol 106:1382, 2010

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Clinical Examples

- Dx atrial fibrillation simple
  - Complex is decision which 85 year old should receive anticoagulants, which agent to use
- Dx severe aortic stenosis frequent, established criteria
  - Complex is assessment of frailty, multimorbidity prohibitive of TAVR
- Clinical, angiographic indications for PCI established
  - Complex is decision when dementia, multimorbidity precludes use

Goals of Care at Elderly Age (1)

- RCTs often assess mortality endpoints
  - Elderly patients may not view length of life as highest priority
- Health goals of elderly patients with chronic illness
  - Independence in daily living
  - Functional capacity: ability to ambulate
  - ↓ Hospitalizations
  - ↓ Symptoms (prolongation of symptom-free life)
- Concerns: psychosocial/financial burdens – personal and family

Goals of Care at Elderly Age (2)

- Elderly patients may not perceive RCT endpoints as beneficial
  - Manner and quality of death
  - ICD prevents sudden, painless death
    - Death from CHF, MI, cancer, noncardiac causes
    - ICDs rarely deactivated in hospice care

Pellegrini, Europace 10:1296, 2008

Contemporary Care Extrapolation from Evidence-Based Guidelines

- Pitfalls of disease-specific guidelines for elderly patients with multiple conditions
  - Data > age 80 virtually absent
- RCTs exclude elderly participants and when included systematically exclude those with comorbidities, complexities
- Elderly in RCTs ≠ community elderly
- Evidence-based care less certain

Tinetti, NEJM 351:2870, 2004

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Perioperative Management for Non-Cardiac Surgery (1)

- Revised Cardiac Risk Index (RCRI)
  - Hx ischemic heart disease
  - Hx CHF
  - Hx stroke or TIA
  - Hx diabetes requiring preoperative insulin use
  - CKD (creatinine > 2mg/dL)
  - Undergoing suprainguinal vascular, intraperitoneal, or intrathoracic surgery

- Risk for cardiac death, MI, HF, cardiac arrest, heart block
  - 0 predictors – 0.4%
  - 1 predictor – 0.9%
  - 2 predictors 6.6%
  - ≥ 3 predictors - ≥ 11%

Fleisher Circulation 130;e278, 2014

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Perioperative Management for Non-Cardiac Surgery (2)

- Rate of surgery up to 4-fold higher in older adults
  - Age ≥ 80 years independent predictor perioperative complications, death
  - Functional status, comorbidities rather than age alone determinants perioperative risk

- RCRI does not address baseline frailty, cognitive function, multimorbidity

- Perioperative complications →
  - ↑ Length of stay
  - ↑ Likelihood discharge to transitional care or chronic care facility
  - ↑ Risk disability, dependency
  - ↓ Quality of life
  - ↓ Likelihood recovery to preoperative physical, mental function

London, JAMA 309:1704, 2013
Wijeysundera, J Am Coll Cardiol 62:2460, 2014
January, J Am Coll Cardiol 64:e1, 2014

Perioperative Management for Non-Cardiac Surgery (3)

- Delirium in 15-53% older surgical patients (70-87% in ICU)
  - May → persistent cognitive deficits, functional decline
- Atrial arrhythmias, especially AF
  - Valve surgery > CABG > thoracic surgery > nonthoracic surgery
  - ↑ Stroke risk, ↑ hospital stay
- Inadequate pain control as well as excessive analgesics →
  - ↑ Risk perioperative complications

Fleisher, Circulation 130;e278, 2014

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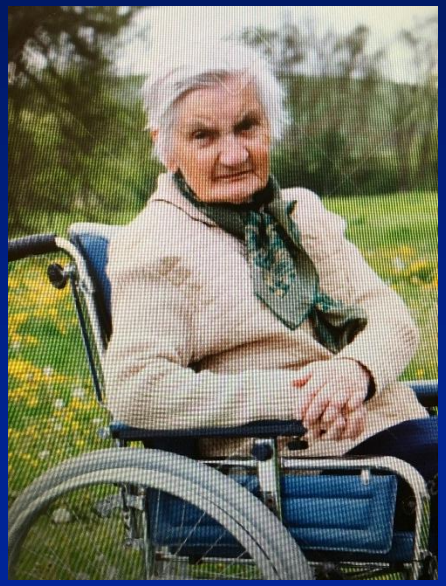
Cardiovascular Prevention at Elderly Age: Is it Ever Too Late?

- Patient-centered approach: INDIVIDUALIZE!



87 year old woman
No known CVD
BP = 160/90 mmHg
$HgbA_{1c}$ = 7.9
LDL-C = 150 mg/dL

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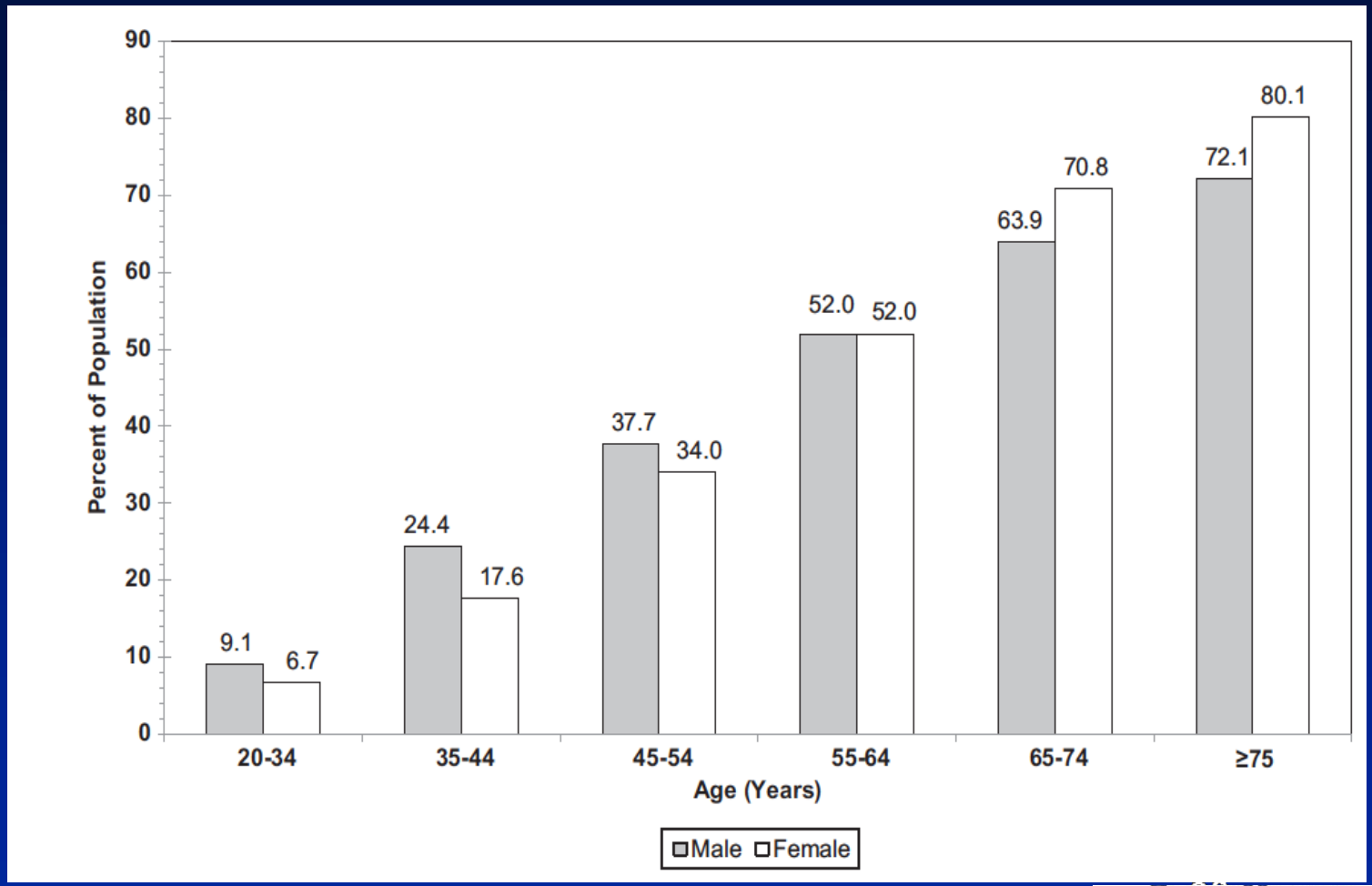
Hypertension in Older Adults (1)
The Epidemic



Go, Circulation 127:e6, 2013

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Hypertension in Older Adults (2)

- ISH and widened pulse pressure ↑ with age
  - → Greater risk than diastolic HTN for coronary events, stroke, AF, HF, kidney disease, dementia
- Goal BP ???
- Pharmacologic management
  - Start low, go slow
  - Include lifestyle modifications

Fleg, Circulation 128:2422, 2013

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Physical Activity

- Sedentary lifestyle ↑ with advancing age
  - ↓ Aerobic functional capacity → ↑ mortality risk

- Aerobic and strength training ameliorate decline in age-related aerobic capacity (peak VO_2), diastolic dysfunction

- Physical activity → improvements in
  - BP
  - Lipid profile
  - Glucose control
  - Osteoarthritis symptoms
  - Neurocognitive function
  - Exercise capacity
  - Quality of life
  - Independence

Levy, Circulation 88:116, 1993
Fleg, Circulation 128:2422, 2013

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Statin Use at Elderly Age

- Impressive array of trials of efficacy, safety → statins ↓ mortality for older adults, ↓ CHD events, stroke and DVT
- JUPITER
  - Elderly patients had greater rosuvastatin benefit than patients < 70
- Relevant aging dynamics
  - ? Eighth pill in complex regimen
  - ? Nebulous muscle aches, ↓ mobility
  - ? Medication costs

Afilalo, JACC 51:37:2008
Fleg, Circulation 128:2422, 2013

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SIHD in Older Adults (1)

- Older adults have high prevalence of 3-vessel and left main disease
- Atypical symptoms angina common
  - Nausea, vomiting, mid-epigastric discomfort, ↓ activity tolerance
- Pharmacologic testing a more useful option than exercise stress testing: diagnosis and prognosis
- Same guideline-based secondary prevention as younger adults
- Cardiac catheterization/revascularization with high risk, refractory symptoms on optimal medical therapy: consider
  - Individual risks and benefits
  - Comorbidities
  - Goals of care
  - Current vs expected level of function

Fihn, J Am Coll Cardiol 60:e44, 2012
Levine, J Am Coll Cardiol 58:e44, 2011
de Boer, J Am Coll Cardiol Intv 3:324, 2010
Hillis, J Am Coll Cardiol 58:e123, 2011

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SIHD in Older Adults (2)

- Marked ↑ PCI ≥ 75 years in past 25-30 years
- Despite ↑ bleeding, stroke risk PCI in older patients, comparable angiographic success, clinical benefits to younger patients
  - Absolute benefit may be greater in older patients
- CABG patients ≥ age 80 have greater extent/severity CAD, ↑ LV dysfunction, ↑ concomitant valve disease, prior cardiac surgery
  - ↑ Comorbidities not in many surgical risk scores
  - Euro SCORE II includes poor mobility
  - STS score incorporates gait speed as surrogate for frailty
  - None assess functional capacity or dementia
  - ↑ Operative mortality (2x↑) in octogenarians, discharge home ½ that of younger patients

Yanagawa, Eur J Cardio Thorac Surg 42:507, 2012
Bardacki, Ann Thorac Surg 83:483, 2007
McClurken, Curr Cardiovasc Risk Rep 5:422, 2011

ACS in Older Adults (1)

- 35% myocardial infarctions in US in patients 75 and older (11% of patients > age 85)
- STEMI less common than NSTEMI in older adults, although absolute numbers of STEMI ↑ with ↑ age
- Older patients, particularly older women, often present with non-chest pain ischemic symptoms
  - "GI symptoms" of nausea, vomiting, abdominal discomfort represent myocardial ischemia
  - Also common: severe dyspnea, fatigue, dizziness, syncope
  - Confusion, altered cognition
- EKG diagnosis often complicated by
  - Abnormal baseline EKG – LVH, prior MI, AF, conduction disease
  - STEMI presenting with new LBBB more common at advanced age

O'Gara, J Am Coll Cardiol 61:e78, 2013
Amsterdam, J Am Coll Cardiol 64:e139, 2014

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ACS in Older Adults (2)

- Reperfusion associated with ↑ STEMI survival in older adults
- PCI favored over fibrinolytic therapy (at least to age 80) to ↓ 30-day mortality
  - Particular benefit anterior MI presenting > 6 hr after symptom onset, shock
  - ↓ Hemorrhagic stroke PCI vs fibrinolytic therapy
  - Fibrinolytic Rx associated with ↑ risk myocardial rupture ≥ age 75 (17% vs 5% with PCI)
  - Major primary PCI benefit is ↓ recurrent ischemic events, ↓ need subsequent target vessel revascularization
- NSTEMI: Greater absolute benefit early invasive management vs younger adults
  - Higher risk adverse outcomes with conservative management

Bueno, Eur Heart J 32:51, 2011
Boersma, Eur Heart J 27:779, 2006
Brass, Stroke 31:1802, 2000
Bueno, Eur Heart J 26:1705, 2005
Capodanno, J Am Coll Cardiol 56:1683, 2010
Tegn, Lancet 387:1057, 2016

Bleeding Risk

- ↑ Bleeding propensity in older adults
  - ? Age-related vasculopathy involving small hemostasis – maintaining vessels → impaired vascular healing
  - ? Loss of anatomic vasoreactivity
  - ? Immune incompetence

- Patient factors
  - Anemia, renal dysfunction, heart failure, diabetes
  - Female sex, low body weight, prior Hx bleeding, peripheral vascular disease

- Catheter-based interventions

- Inappropriate dosing of anticoagulants (weight, renal function based)

Alexander, JAMA 294:3108, 2005
Nikolsky, Eur Heart J 28:1936, 2007

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Clinical Pearls: STEMI in Older Adults

- Community systems for acute reperfusion
- Geriatric dosing of guideline-directed medical therapies
  - Altered pharmacokinetics (due to renal and/or hepatic dysfunction, reduced muscle mass, reduced volume of distribution)
  - Altered pharmacodynamics (↑ risk of bleeding, hypotension)
- Avoidance of bleeding complications
- Early mobilization, referral to cardiac rehabilitation
- Communication/information in care transitions

Kripalani, JAMA 297:831, 2007
Suaya, J Am Coll Cardiol 54:25, 2009

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Anticoagulant/Antiplatelet Therapy and ACS

- Acute coronary syndromes
  - Challenge of dual antiplatelet therapy after PCI/stent in older adults anticoagulated for AF
    - Clopidogrel + oral anticoagulant as effective as triple therapy in preventing MI/coronary death, ischemic stroke, bleeding
  - TRILOGY ACS – prasugrel vs clopidogrel for planned medical management after MI
    - Baseline frailty assessment ≥ age 65 → independently associated with ↑ CV death, MI, stroke
    - Need early targeted follow-up with multimorbidity, frailty

Lamberts, J Am Coll Cardiol 62:981, 2013
Dewilde, Lancet 381:1107, 2013
White, Eur Heart J Acute Cardiovascular Care 5:231, 2016

Heart Failure and Older Adults (1)

- HF predominantly disease of older adults
  - Inadequately recognized and treated
  - Symptoms incorrectly attributed to aging, other conditions

- Special issues older adults
  - 3-4% blacks carry allele of serum protein transthyretin (TTR $V_{122}I$) → ↑ risk amyloid HF
  - ↑ Risk hyperkalemia with pharmacotherapy due to underestimation renal dysfunction
  - ↑ Natriuretic peptides with ↑ age limits diagnostic utility
  - ↑ Risk digoxin toxicity
  - ↑ Association of AF with HF

Yancy, J Am Coll Cardiol 62:e147, 2011

Heart Failure and Older Adults (2)

- Mechanical circulatory support as destination therapy
  - Requires expert multidisciplinary team evaluation
  - Age $\geq$ 80 years relative contraindication
- Comprehensive discharge planning, post-discharge support, advance directives, palliative care
- Heart failure with preserved EF
  - Predominantly disorder of older women
  - No proven effective therapy

Peura, Circulation 126:2648, 2012
Allen, Circulation 125:1928, 2012
Paulus, J Am Coll Cardiol 62:263, 2013

Heart Failure Trials and Older Adults

- Heart failure
  - PARADIGN-HF – RCT EF ≤ 40% enalapril vs valsartan + neprilysn inhibitor sacubitril
    - ↓ CVD death, HF hospitalizations, all-cause mortality
    - Similar benefit valsartan/sacubitril > 65 years and ≥ 75 years as in younger
  - ICD ≥ age 75 – controversial
    - Individualize selection
  - Mechanical circulatory support
    - ↑ Outcome carefully selected older adults
    - ↑ Complications vs younger patients
    - Frailty predicts worse outcome

McMurray, NEJM 371:993:2014
Barra, Europace 17:174, 2015
Rosenbaum, J Card Fail 20:161, 2014

Valvular Disease and Older Adults

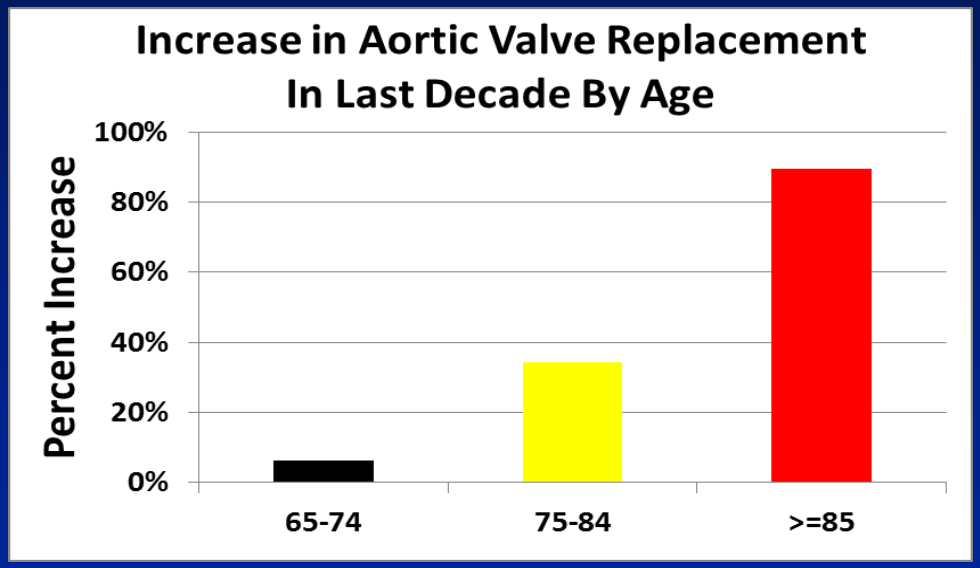
- Calcific AS most common valvular disease
  - Often coexists with CAD, PAD
  - Disease progression more rapid in elderly
  - ↑ Progression with smoking, dyslipidemia, diabetes, HTN
  - Signs and symptoms difficult to recognize
    - ↓ Physical activity with aging
    - Symptoms attributed to other conditions

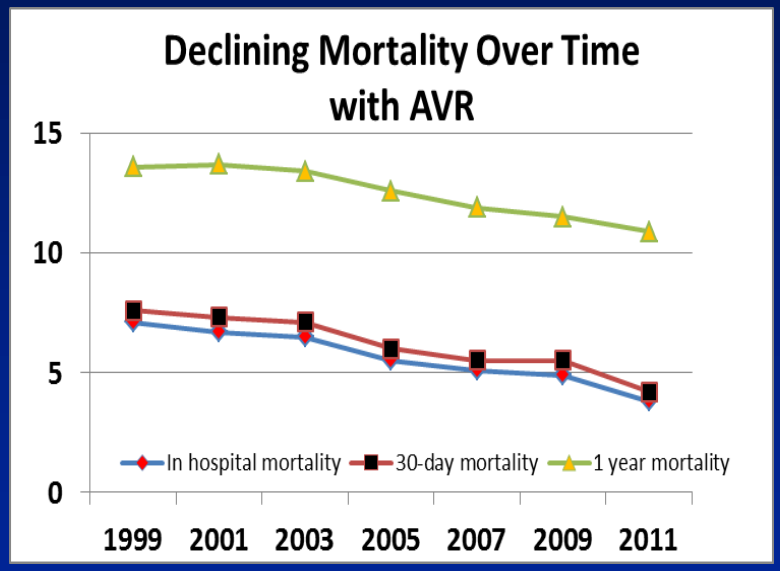
- Mechanical vs bioprosthetic AVR
  - Durability of valve vs bleeding risk anticoagulation
  - Generally favors bioprosthetic valve

- Despite ↑ perioperative morbidity, mortality at older age → ↑ gain long-term survival, QOL

Nishimura, J Am Coll Cardiol 63:e57, 2014

AVR: Increasing Application and Greater Success





Barreto-Filho, JAMA 310:2078, 2013

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TAVR and Older Adults

- Transcatheter aortic valve replacement
  - Surgically inoperable or very high surgical risk cohorts – median age 84
  - ↑ Long-term survival TAVR vs standard surgical AVR
  - TVT (transcatheter valve therapy) Registry (> 30,000 TAVR patients)
    - 7.0% 30 day mortality
    - 23.7% 1 year mortality
    - 4.1% stroke rate
  - STS/ACC TVT Registry: Benefit even in nonagenarians
  - STS score ≥ 15, frailty, porcelain aorta, prior chest radiation → ↓ likelihood TAVR benefit
  - Registry collecting baseline, longitudinal frailty, activity limitation assessments
    - Enable risk-adjusted mortality model → aid informed decisions by heart team, patients

Smith, NEJM 364:2187, 2011
Adams, NEJM 371:967, 2014
Kodali, NEJM 366:1686, 2012
Lindman, Circ Res 113:223, 2013
Arsalan, J Am Coll Cardiol 67:1387, 2016

Atrial Fibrillation and Older Adults

- Atrial fibrillation
  - Median age AF patients 75 years, 35% > age 80
    - 9% prevalence in elderly
  - Oral anticoagulation with CHA_2D_2 - VASc score > 2
    - Warfarin or new oral anticoagulants
    - Age > 75 → score of 2
  - BAFTA – aspirin or warfarin (MD discretion) ≥ 75 years
    - 3.8% 1 year aspirin vs 1.8% 1 year warfarin stroke
    - No difference major hemorrhage
  - NOAC metaanalysis
    - Efficacy equal or superior to warfarin in elderly in ↓ stroke risk
    - ↓ Major bleeding, ↓ risk intracranial hemorrhage

January, Circulation 130:2071, 2014
March, Lancet 370:493, 2007
Shama, Circulation 132:194, 2015

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Device-Based Therapy for Cardiac Rhythm Abnormalities and Older Adults

- Pacemakers
  - Sinus node pacemaker cells ↓ with age (<10% functional by age 75)
  - >75% pacemaker recipients ≥ age 65, ½ > age 75
    - Similar indications implantation older, younger age
- ICD efficacy similar in older, younger patients
  - Consider life expectancy, lifestyle factors, QOL, personal preferences
  - Discuss deactivation at end-of-life
- CRT reasonable to improve functional capacity, QOL with advanced HF

Epstein, J Am Coll Cardiol 61:e6, 2013
Delnoy, Am Heart J 155:746, 2008

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Abdominal Aortic Aneurysm and Peripheral Arterial Disease

- Screen for AAA in males 65-75 who smoked, with FH AAA, multiple CV risk factors, CAD or PAD

- PAD in ≥ 30% older adults
  - Often asymptomatic
  - RF modification important as PAD → ↑ CV mortality risk
  - Age >70 independent RF for PAD
  - Limitations of ABI for diagnosis (non-compressible arteries)
  - Hall walks valuable to assess functional capacity, response to therapy

Rooke, J Am Coll Cardiol 58:2020, 2011

Venous Thromboembolism/Pulmonary Embolism

- 1% annually in very old – 10x greater than younger persons
  - Associated with immobility
  - Aggressive prophylaxis and early mobilization in hospital

- PE presents more often as syncope at elderly age
  - ↑ Hospital mortality (10-30%) vs younger adults

Timmons, Age Ageing 32:601, 2003
Cohen, Lancet 371:387, 2008
Lopez-Jimenez, Haematologica 91:1046, 2006

Cerebrovascular Disease and Stroke (1)

- Older adults at ↑ risk adverse outcomes from stroke
  - Also ↑ risk pharmacologic, percutaneous, surgical interventions

- Ischemic stroke most common
  - Effectiveness IV TPA not well established
  - Exclusion criteria TPA: >80 years, taking oral anticoagulants, NIH Stroke Scale score >25, history of stroke and DM
  - Role of decompressive surgery for malignant cerebral edema > age 60 uncertain

Morgenstern, Stroke 41:2108, 2010
Brott, J Am Coll Cardiol 60:566, 2012
Jauch, Stroke 44:870, 2013
Wijdicks, Stroke 45:1222, 2014

Cerebrovascular Disease and Stroke (2)

- Primary stroke prevention
  - Aggressive BP management plus antithrombotic prophylaxis in patients with AF
  - Screen women >75 for AF
  - Carotid duplex screening before elective CABG > age 65

- Secondary ischemic stroke prevention
  - Apixiban 5 mg bid as alternative to warfarin or aspirin with nonvalvular AF
    - Without age ≥ 80, weight ≤ 60kg, creatinine ≥ 1.5 mg/dL
  - Compare risk of thromboembolism vs risk recurrent ICH in restarting antithrombotic Rx after ICH
  - > Age 70 carotid endarterectomy → ↑ outcome vs carotid stenting

Goldstein, Stroke 42:517, 2011
Bushnell, Stroke 45:1545, 2014
Furie, Stroke 43:3442, 2012
Kernan, Stroke 45:2160, 2014

Geriatric Risk Assessment – Lack of Metrics to Incorporate:

- Multimorbidity
- Frailty – grip strength, gait speed
- Sarcopenia – fall history, orthostasis
- Cognitive impairment
- Functionality: maintenance of independence, avoidance of dependency
- Social limitations, stressors
- Requires expertise to incorporate physiologic age with biologic age

Boyd, J Gen Intern Med 29:552, 2014
Fried, J Gerontol A Biol Med Sci 56:M146, 2001
Studenski, JAMA, 305: 50, 2011
Nasreddine, J Am Geriatr Soc 53:695, 2005
Borson, Int J Geriatr Psychiatry 15:2012, 2000
Amer Geriatr Soc Beers Criteria UpdateExpert Panel, J Am Geriatr Soc 60:616, 2012

Patient-Centered Approach (1)

- Management personalized to each patient's situation
- Assess CV risk in context of aggregated age-related risk
    - Determine realistic goals incorporating each patient's overall health circumstances re risk-benefit of care options
        - noncardiac comorbidities
        - functional capacity
        - quality of life factors
    - Select patients most likely to benefit from therapy
- Assess utility of diagnostic testing relative to overall treatment goals
    - Simple vs complex, expensive testing
    - Impact, consequences of test results

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Patient-Centered Approach (2)

- Incorporate patient preferences into care plan
  - End-of-life preferences
  - Advance directives
  - Durable power of attorney for health care
  - ? Discussion of palliative care options

- Initiate when stable (at ambulatory care encounter)
  - Teach patients, families about reasonable expectations

Cardiovascular Care of Older Adults: Lessons I Have Learned (1)

1. Tsunami of aging worldwide
   - US – 20% of population > 65 by 2030
   - Tripling of subgroup > 85 by 2050

2. CV disease occurrence and adverse outcomes ↑ with aging

3. Physiologic changes of aging ↑ vulnerability to CV disease
   - Most individuals > 75 demonstrate clinical effects of aging on CV system
   - Vulnerabilities accentuated by traditional CV risk factors
   - Routine assessment needed of cognitive function, independence, frailty

4. Concurrent aging changes in other organ systems ↓ aged individual's capacity to respond to stress
   - ↑ Risk for complications
   - ↓ Prognosis

5. Disproportionate age-related therapeutic risk
   - But absolute mortality benefits may outweigh morbidity, mortality risks

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Cardiovascular Care of Older Adults: Lessons I Have Learned (2)

6. QOL, function, independence, avoidance of adverse events more significant endpoints in older CVD patients, e.g.,
   - ? ↓ Hospitalizations more important than lack of effect on mortality
   - ? "Superior" antiplatelet regimen →↑ bleeding complications

7. Patient-centered treatment goals needed
   - ? Routine assessment of cognition, caregiver/family dynamics, pharmacologic interactions, comorbid complications

8. Adverse drug events → @ 30% of hospital admissions of older adults

9. ? Thresholds for invasive interventions, ? Strategies to minimize adverse events
   - ? Incorporate complex comorbidites into risk/benefit ratios

10. Attention to specific CV syndromes predominating in seniors (e.g., isolated systolic hypertension, heart failure with preserved ejection fraction)

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Summary

- Mainstream cardiology has become geriatric cardiology
- What we must learn, acquire
  - Systematic approach incorporating age-related complexities into routine clinical decision-making
  - Adaptation of standards of evidence-based care to older patients
  - Synthesis of multisystem aging, comorbidities, polypharmacy, psychosocial factors, personal preferences → individualized approach to care