Cardiovascular Health and Cognitive Resilience

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Disclosure of conflict of interest: None



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Objectives

- To identify that the top risk factor of cognitive decline is impaired cardiovascular function;
- To describe ways to maintain and improve vascular and cardiac health;
- To review the importance of reducing cardiac & vascular risk factors (e.g., HTN, dyslipidemias, CHF & arrhythmias), on preserving the brain.

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Case Presentation #1

 $\bf 81$ yo woman with HTN, MCI, hearing loss, macular degeneration, depression.

Caregivers statement: "During the past month she has become <u>suddenly</u> "demented". Gets "lost" in middle of a sentence & "conversation does not make any sense. Also has <u>nausea all the time</u>, no appetite, and she is much fatigued."

Prior functional status: Good. Prior cognitive status, MCI.

 $Meds: Done pezil\ 5mg,\ Ome prazole\ 20mg,\ amlo dipine\ 10mg,\ citalopram\ 10mg$

<u>PE</u>: Vitals wnl; Reduced respiratory excursion and reduced breath sounds; Syst M 3/5 LLSB; Pedal edema 3+ bilat; Hearing loss, too weak for cognitive test;



Local PCP had diagnosed her as having sideeffects of donepezil because of nausea, loss of appetite and had reduced donepezil dose;

Caregivers were concerned about dementia and wanted the donepezil to be increased again.

Case #1, con'd Treatment & Outcome

Labs: Unremarkable, except BNP = 2749

2D-Echo: <u>LVEF 10</u>%; diffuse hypokinesis; MR; TR; PR; dilated RA and dilated LA;

<u>Dx:</u> <u>Delirium</u>, due to acute heart failure, with poor brain perfusion, hypoxemia; Predisposing factors: age, MCI, hearing loss, visual impairment, depression.

Outcome: With gradual diuresis, LVEF gradually improved to >20%, and cognition progressively returned to pt's baseline of MCI.

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Case # 2

92 yo woman, PMH: GERD, osteoporosis, Vit D deficiency. No h/o smoking or alcohol, father died, age 68, heart attack

One evening, started having heartburn after eating at a restaurant. Took 2 aspirins. Called the PCP, was advised to go to ER. She was alone at home - heartburn continued. Called PCP again, ambulance called.

Meds: aspirin 81 mg, Vit D 50,000 IU/mo, B12 1mg injection/mo

PE: BP 109/80mmHg, pulse 85/min, weight 103 lbs, BMI 19.5 Cardiac S1 and S2 normal, no murmur or gallop. Pulses 2+ Mental status – judgment and insight intact

In ER, EKG: ST elevation, anteriolat leads CK 470, troponin 31.5, BNP 1760 Lipids 168, TG 39, HDL 53, LDL 107

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Case # 2, con'd Treatment & Outcome

Work-up:

- Cardiac Cath: LMCA patent; LAD, 100% occlusion at ostium; Left circumflex normal; RCA 100% occlusion in proximal part and fills via collaterals from the distal portion; LVEDP 22mmHg and filling defect at apex
- \bullet S/P PCI with Placement of BMS in LAD
- \bullet Echo with LVEF 25%, severe diffuse hypokinesis with only inferior wall moving well. RV pressure 50
- Outcome: Discharged home on Plavix, carvedilol and lasix

Follow-up:

- Currently still going strong, at age 104 years old!
- BP 150/64, Pulse 94, Temp 97.1 $^{\circ} F$ (36.2 $^{\circ} C$), Resp 20, SpO2 99%, BMI 17 kg/m^2
- Cognition alert, oriented x3, conversation good. Has excellent insight
- Able to walk holding onto objects and using a cane (prefers no walker).

Case #3

Beaten by an Old Heart

This is the first time I've gotten old (I think) ...

At night all night long love, my heart babbles to me of gone loves, racing with excitement and regret, my heart is beating me to death.

On my stone, they'll write "Beaten by his heart," and the space between my thoughts will be found in the closets where they hang to dry all my tangled memories.

1955 The Estate of Larlie I. Seamons

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2022-2023 Cardiology Advances

- 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure:
- · Prevention of HF;
- Management strategies in stage C HF, including: New treatment strategies in HF, including SGLTZi, GLP-1 and ARNi; Management of HF and atrial fibrillation (AF), including ablation of AF; Management of HF and AS and secondary MR, including TAVR and TMVR transcatheter repairs;

Specific management strategies, including: Cardiac amyloidosis; Cardio-oncology; Implantable devices. Left ventricular assist device (LVAD) use in stage D HF;

IV iron (ferric carboxymaltose or ferric derisomalotose) for HFrEF & HFmrEF $\,$ and IDA $\,$

JACC May 2022; JACC Aug 2023;,Circ 202

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CLINICAL PRACTICE GUIDELINE 2023: AHA/ACC/ACCP/ASPC/NLA/PCNA Guideline for the Management of Patients With Chronic Coronary Disease (CCD):

- · Team-based, shared decision making;
- · Non-Pharm therapies, including diet and exercise;
- Reduce sitting time, aerobic & resistance; cardiac rehab;
- Use SGLT2 I and GLP-1;
- · BB or CCB, for shorter duration;
- Statin or adjunct agents (ezetimibe, PCSK9I, bempedoic acid);
- Antiplatelet RX for shorter duration if needed;
- · No clear benefit of omega-3 or other supplements;
- No routine testing if no clinical/functional change; No e-cigs $\,$
- PCI = Med mgmt; PCI Radial ?= Femoral; BMS ?=DES
- TAVR = SAVR; TMVR ?=SMVR

Circulation, Aug 2023; JACC Sept 202

CVD and ADRD, Common Risk Factors

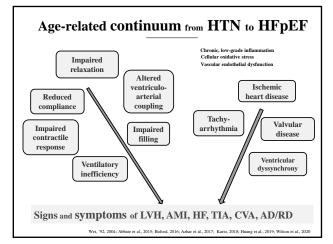
Known

Emerging

- · Family history
- Age
- Atherosclerosis
- Hypertension
- Dyslipidemia
- · Head injury
- · Arrhythmia
- LVH
- Diabetes
- · Thyroid disorder

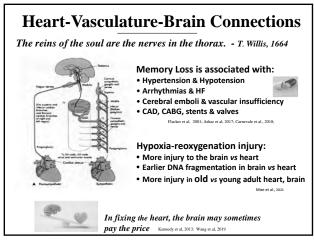
- · ApoEe4
- Metabolic syndrome
- Fibrinogen
- Hepatic Lipase
- · Oxidative stress
- C-reactive protein
- · Homocysteine • Inflammation
- · Hyperinsulinemia
- · Other polymorphisms

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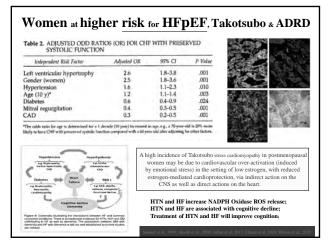


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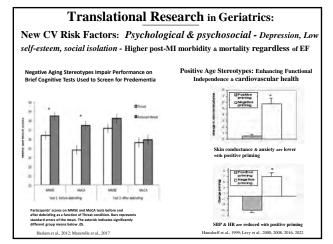
HTN, LVH Linked to Early Brain Changes Brain MRI fiber-tracking reveals white matter alterations in hypertensive patients without damage under conventional neuroimaging; HTN in middle-age (40's-50's) predicts cognitive decline in old age (70's-80's). This approach could identify patients at initial stages of brain damage and could gain benefit of therapies aimed at limiting the transition to cognitive decline and neurodegeneration.

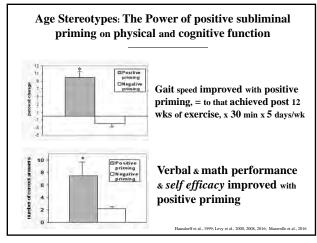


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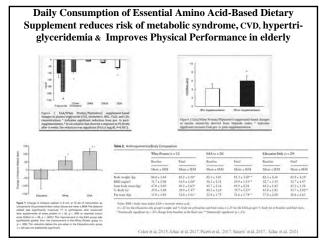


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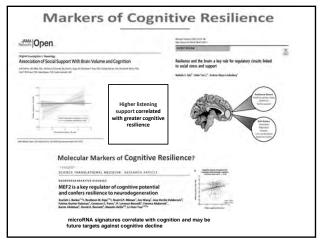


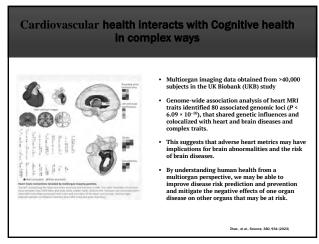
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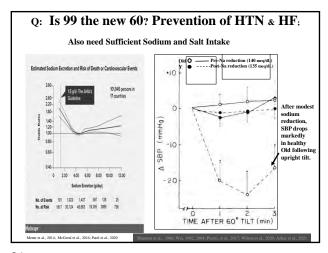


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Cognitive Resilience: Definition: Cognitive Resilience describes the capacity to overcome the negative effects of setbacks and associated stress on cognitive function or performance. Characteristics: Positive self-image: Problem-solving skills; Self-regulation; Adaptability; Faith/understanding the meaning and one's purpose; Positive outlook; Skills and talents that are valued by self and community; General acceptance by others. Other factors: Having good communication skills. Viewing setbacks as impermanent, opportunities for growth.







Cognitive Resilience: Pearls

- Learning Opportunities:

 Being resilient is not a trait, but a dynamic learning process.
- Focus on Progress, not Goals
- Perceive Obstacles as Challenges Rather Than Hindrances.
 Challenges are what make life interesting; overcoming them is what makes life meaningful.

Social Markers:

- Higher listening support from others gives greater cognitive resilience Feeling valued by others
- Listening to favorite music

Molecular Markers:

- Current:
- APOe4; Abeta 42/40; NfL; p-Tau 217 & 181; a-synuclein
- New: MEF2, SARE & TFs, microRNAs; BDNF; ADRD proteins

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CV health & Cognitive resilience: Pearls

1/2 - 2/3 of Alzheimer's & related dementias are preventable:

Before 65: HTN, HF, vascular disease, dyslipidemia, T2DM, homocysteine, inactivity, sleep disruption, depression, heart disease, arrhythmias, hearing loss, head trauma, pollution, isolation.

Social interactions: need listening support, feeling valued

After 65: Exercise and strength training: boost memory, maintain health and enhance longevity

 $\textbf{Diet} \colon \textbf{MIND, veggies} \ \& \ \textbf{fruit} \ (\textbf{eat the rainbow}); \ \textbf{low-fat, salt}$ low carb, antioxidants, vitamins, proteins

Naps & Sleep: Boosts memory and cognition

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