

Update in Geriatrics: Evidence Published in 2013

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The 8 articles selected for this update reflect the continuing maturation of the geriatrics literature. An aging population so familiar to internists is presenting new clinical challenges, increased utilization of ever more costly therapy, and more demands about justification of services and hospitalization. This update discusses how evidence-based principles can facilitate more cost-effective geriatrics care by internists in the ambulatory and hospital environments. Topics include cognitive impairment and dementia, hospital readmissions, adverse drug events, and falls.

Cognitive Impairment

Brief Screening Instruments Can Detect Dementia

Lin JS, O'Connor E, Rossom RC, et al. Screening for cognitive impairment in older adults: a systematic review for the U.S. Preventive Services Task Force. *Ann Intern Med.* 2013;159:601-12. [PMID: 24145578]

Background: What are the pros and cons of screening for a prevalent disease in older adults if no treatments can alter the natural history of the disease? In 2013, a major systematic review done to inform the U.S. Preventive Services Task Force addressed the diagnostic accuracy of brief cognitive screening instruments and the benefits and harms of pharmacologic and nonpharmacologic interventions for early cognitive impairment.

Findings: The authors searched English-language literature through December 2012 to identify studies involving community-dwelling adults that tested the accuracy of any cognitive screening instrument that could be delivered by a clinician in primary care in 10 minutes or less or could be self-administered in 20 minutes or less. The authors also searched literature to identify evidence about benefits and harms of pharmacologic and nonpharmacologic treatments for older adults with mild cognitive impairment or mild to moderate dementia. The best-studied cognitive screening instrument was the Mini-Mental State Examination, which had a sensitivity of 88.3% (95% CI, 81.3% to 92.2%) and a specificity of 86.2% (CI, 81.8% to 89.7%) for the most commonly reported cut points of 23/24 or 24/25. Other brief screening tests, including the Clock Drawing Test and the Mini-Cog, had acceptable test performances but limited reproducibility and unknown optimum cut points. No positive or negative effect of screening on families and caregivers was evident. Medications approved for Alzhei-

mer disease had a small, probably clinically insignificant benefit and some unacceptable adverse effects.

Cautions: Many findings were based on relatively small subsets of studies. Data on types of dementia other than Alzheimer disease were limited.

Implications: The identification of subtle cognitive abnormalities, although not diagnostic of incipient dementia, is valuable in the primary care setting. It establishes a baseline for future follow-up and may identify patients who may be more prone to overall nonadherence to medications or have difficulties with driving. Accordingly, despite the lack of any definitive therapy for dementia, every primary care office should develop the expertise to use brief cognitive screens (1).

Hyperglycemia Contributes to the Onset of Dementia

Crane PK, Walker R, Hubbard RA, et al. Glucose levels and risk of dementia. *N Engl J Med.* 2013;369:540-8. [PMID: 23924004]

Background: Dementia is perhaps the most important chronic illness in older adults. Current aging populations have an increasing rate of obesity and diabetes, which have been identified as risk factors for dementia. An area worthy of focus is the relationship between glucose levels and dementia in diabetic and nondiabetic populations.

Findings: The ACT (Adult Changes in Thought) study enrolled 2067 participants aged 65 years or older (mean age, 76 years) without dementia who were followed in a large primary care health system. Participants were invited to be evaluated every 2 years for incident dementia with the Cognitive Abilities Screening Instrument. A singular feature of this study was the implementation of a complex hierarchical Bayesian model to develop an estimate of serial glucose levels over 5 years incorporating serial glucose and hemoglobin A_{1c} levels. During a median follow-up of 6.8 years, 524 participants (74 with and 450 without diabetes) developed dementia. Among nondiabetic participants, higher glucose levels were associated with an increased risk for dementia. Participants with a glucose level of 6.4 mmol/L (115 mg/dL) compared with 5.5 mmol/L (100 mg/dL) had an adjusted hazard ratio of 1.18 (CI, 1.04 to 1.33). Among diabetic participants, average glucose levels were also associated with risk for dementia. Those with a glucose level of 10.5 mmol/L (190 mg/dL) compared with 8.9 mmol/L (160 mg/dL) had an adjusted hazard ratio of 1.40 (CI, 1.12 to 1.76).

Cautions: Confounding variables contributing to the development of dementia, such as poor nutrition and lack of exercise, may not have been identified or adjusted for.

Implications: The 5-year risk for dementia in this older population is highly associated with glucose levels below or above the threshold for a diagnosis of diabetes. Among persons without diabetes, for example, those with glucose levels of 6.7 mmol/L (120 mg/dL) are 20% more likely to have developed dementia than those with levels of 5.5 mmol/L (100 mg/dL). Among diabetic persons, there was a “U-shaped” relationship of adjusted risk. Those with average glucose levels less than 8.9 mmol/L (160 mg/dL) had higher adjusted risk ratios, possibly related to periods of hypoglycemia during self-management of diabetes. In those with average glucose levels above this threshold, the risk for dementia increases in a linear manner. This study suggests a remarkably close relationship between average glucose levels and cognitive impairment in older adults with and without diabetes (2).

Hospital Readmissions

Diagnoses at Hospital Readmission Differ From Those at Admission

Dharmarajan K, Hsieh AF, Lin Z, et al. Diagnoses and timing of 30-day readmissions after hospitalization for heart failure, acute myocardial infarction, or pneumonia. *JAMA*. 2013;309:355-63. [PMID: 23340637]

Background: Approximately 20% of Medicare patients discharged from acute care hospitals require rehospitalization within 30 days. Most of these readmissions seem attributable to medical issues different from those responsible for the initial admission. In 2012, the Centers for Medicare & Medicaid Services began to penalize hospitals with relatively high readmission rates for 3 major diagnostic conditions: heart failure, acute myocardial infarction, and pneumonia. Substantial penalties have already been imposed on hospitals; as this “quality measure” expands to include more diagnostic categories, health systems that cannot develop strategies to reduce 30-day readmissions will face serious consequences.

Findings: This study analyzed Medicare fee-for-service claims data between 2007 and 2009 to identify patterns of 30-day hospital readmissions. The ratios of readmission to initial hospitalization for 3 index conditions were 329 308:1 330 157 (19.9%) for heart failure, 108 992:548 834 (19.9%) for acute myocardial infarction, and 214 239:1 168 624 (18.3%) for pneumonia. The proportions of patients readmitted for the same condition as the initial hospitalization were 35.2% for heart failure, 10.0% for acute myocardial infarction, and 22.4% for pneumonia. Most patients were readmitted within 15 days of discharge from the initial hospitalization. Many readmission diagnoses were seen, and there were no statistically significant

differences in such diagnoses among the 3 index conditions. Readmission diagnosis and timing did not differ among the 3 index conditions by sex, age, or race.

Cautions: This study did not identify potential regional geographic differences or analyze cohorts of hospitals with “best practices.” The readmission cohort had a mean age of 80 years and therefore falls into the category of “old-old,” which may not be representative of all Medicare patients. However, reported hazard ratios for readmission were similar across age groups (3).

Implications: Among Medicare patients hospitalized for heart failure, acute myocardial infarction, or pneumonia, 20% are readmitted within 30 days of discharge, mostly within the first 2 weeks. Most have a different clinical condition from that responsible for the initial hospitalization. The spectrum of readmission conditions varies, and no single category stands out.

Acute Care of the Elderly Units Are Cost-Effective and Reduce Readmissions

Flood KL, MacLennan PA, McGrew D, et al. Effects of an acute care for elders unit on costs and 30-day readmissions. *JAMA Intern Med*. 2013;173:981-7. [PMID: 23609002]

Background: As many as 20% of Medicare patients admitted to an acute care hospital will require readmission within 30 days, often with a diagnosis different from that of the initial admission.

Findings: This retrospective cohort study was done at a large tertiary hospital. The investigators compared variable direct costs from an interdisciplinary acute care of the elderly (ACE) unit with those from a multidisciplinary usual care (UC) unit. Patients were aged 70 years or older and were cared for by full-time hospitalists. A total of 818 patients were enrolled: 428 from the ACE unit and 390 from the UC unit. The interventions that distinguished the ACE unit included a geriatrician-led interdisciplinary team that documented the serial cognitive and functional status of all patients; conducted daily geriatrics-focused rounds; and, perhaps most important, communicated with the responsible hospitalists. Analysis indicated that the mean variable direct cost per patient was \$2109 (SD, \$1870) for ACE units and \$2480 (SD, \$2113) for UC units ($P = 0.009$). Other variables of cost were also lower for the ACE unit approach, and fewer patients in the ACE unit than in the UC unit were readmitted within 30 days of discharge (7.9% vs. 12.8%; $P = 0.02$).

Cautions: The study was retrospective and done at a major academic medical center. Application to smaller acute care hospitals may not obtain the same results.

Implications: Acute care of the elderly units have been operational for 2 decades and have generally shown cost-effective care. However, the concept has not been well-studied since the advent of hospitalist care for most inpatient services. This study shows that the addition of a

communicative interdisciplinary team can work synergistically with hospitalists to deliver high-quality care at lower costs and results in fewer 30-day readmissions. The expertise is within reach of most acute care hospitals. The concept of the ACE unit needs widespread dissemination.

Adverse Drug Events

High-Dose Proton-Pump Inhibitors Are Associated With Higher 1-Year Mortality

Maggio M, Corsonello A, Ceda GP, et al. Proton pump inhibitors and risk of 1-year mortality and rehospitalization in older patients discharged from acute care hospitals. *JAMA Intern Med.* 2013;173:518-23. [PMID: 23460307]

Background: Proton-pump inhibitors (PPIs) are frequently prescribed during acute hospitalization for prophylaxis and treatment of gastroesophageal reflux disease and peptic ulcer disease. These highly effective medications are among the 10 most commonly prescribed drugs and are frequently used in older adults. Over the past decade, serious adverse events have been associated with PPI use, including hospital-acquired pneumonia, *Clostridium difficile* infection, and metabolic bone disease. As many as 50% of patients who receive PPIs during acute hospitalization may continue therapy after discharge without clear indications justifying prolonged use. The potential consequence of prolonged PPI use after hospitalization has not been well-studied.

Findings: This study retrospectively investigated the relationship between the use of PPIs and risk for death (or the combined end point of death or rehospitalization) in 491 older patients (mean age, 80 years) who received PPI therapy during and continued it after acute care hospitalization. Time-dependent Cox proportional hazards regression was the major statistical tool. The use of PPIs was independently associated with death (hazard ratio, 1.51 [CI, 1.03 to 2.77]) but not with the combined end point (hazard ratio, 1.49 [CI, 0.98 to 2.17]). Patients who received high doses of PPIs had a marked increase in mortality compared with other patients (hazard ratio, 2.59 [CI, 1.22 to 7.16]).

Cautions: This study was observational, and patients receiving PPIs had higher morbidity than other patients at baseline.

Implications: Adverse drug events in older adults are not always limited to pharmaceutical agents that can be easily labeled “never use.” More often we observe the unintended consequences of appropriate drug use in an increasingly older cohort. Use of PPIs after hospitalization may represent one of these “perfect storms.” An indicated drug during acute hospitalization is used in age-inappropriate doses and continued after discharge without clear indications for long-term use. These patients, often deconditioned and

malnourished because of their acute illness, have low or absent gastric secretion, reduced immunity, and poor nutrition status. Moreover, PPIs may interfere with anticoagulation and the efficacy of nonsteroidal anti-inflammatory drugs. Although randomized, controlled studies in this age group are required, data from this study alert us to be cautious about continuation of PPIs after hospitalization in older adults.

Use of Nonbenzodiazepine Sleep Medications Is a Risk Factor for Hip Fracture in Nursing Homes

Berry SD, Lee Y, Cai S, et al. Nonbenzodiazepine sleep medication use and hip fractures in nursing home residents. *JAMA Intern Med.* 2013;173:754-61. [PMID: 23460413]

Background: Insomnia is a common and persistent condition among older adults, especially those residing in nursing homes. For many years, benzodiazepine hypnotic agents were commonly prescribed for sleep disorders. In 2006, Medicare Part D instituted a restrictive policy that excluded benzodiazepines from mandatory drug coverage over concerns of adverse effects, including injurious falls. Subsequently, use of nonbenzodiazepine hypnotics has increased.

Findings: Investigators examined the association between use of common nonbenzodiazepine hypnotic drugs (zolpidem tartrate, eszopiclone, and zaleplon) and the risk for hip fracture among 15 528 long-stay nursing home residents with hip fracture. A self-controlled crossover design was used. The analyses were stratified by individual characteristics, such as concomitant drug use, cognitive status, functional state, ability to transfer, urinary incontinence, and restraint use. Odds ratios for hip fracture were estimated by comparing the exposure to nonbenzodiazepine drugs 0 to 29 days before hip fracture (hazard period) with that 60 to 80 and 120 to 149 days before hip fracture (control periods). The risk for hip fracture within 30 days of receiving a nonbenzodiazepine hypnotic drug was increased (odds ratio, 1.66 [CI, 1.45 to 1.90]). This added risk was similar if the hazard period was shortened to 15 days (odds ratio, 1.47 [CI, 1.24 to 1.74]). When analysis was limited to new users, the risk for hip fracture was greatest in the first 15 days before hip fracture (odds ratio, 2.20 [CI, 1.76 to 2.74]). Residents with cognitive or severe functional impairment were at greater risk. No difference was noted when residents were stratified by urinary incontinence or use of bed restraints. No confounding effects were identified relative to use of other pharmacologic medications.

Cautions: One potentially confounding variable that could not be quantified was the degree of antecedent insomnia in the population, which may contribute to injurious falls independent of hypnotic use.

Implications: This study contributes to our understanding of the risk of nonbenzodiazepine use among older adults in long-term care facilities. The conclusions seem equally ap-

plicable to community-dwelling persons with similar risk factors. These data emphasize the importance of considering other approaches to sleep hygiene, such as reducing ambient noise and discouraging daytime naps. An initial period of most active surveillance seems indicated because new users of nonbenzodiazepines are at greatest risk in the first 15 days.

Multivitamin Supplementation Does Not Provide Cognitive Benefits

Grodstein F, O'Brien J, Kang JH, et al. Long-term multivitamin supplementation and cognitive function in men: a randomized trial. *Ann Intern Med.* 2013;159:806-14. [PMID: 24490265]

Background: Multivitamin supplements, often recommended by health care providers in the United States, are widely used by older adults. Despite the lack of evidence that vitamins have efficacy in maintaining cognitive health, the multibillion-dollar retail market continues to grow. Relatively few older adults have knowledge of the discrete micronutrients and minerals in a vitamin capsule. Some vitamins, such as A and E, might even be harmful.

Findings: The PHS II (Physicians' Health Study II) was a robust randomized, double-blind, placebo-controlled trial that evaluated the long-term effects of a common multivitamin in the prevention of chronic disease. It addressed the potential benefit of multivitamins on cognitive health. The participants were 5947 male physicians aged 65 years or older. Follow-up evaluations were done every 2 to 4 years for 12 years, and follow-up was high. Cognition was evaluated by telephone interviews using conventional mental status tests plus additional tests aimed at verbal fluency and delayed recall. No statistically significant cognitive changes were observed between treated and control participants during the study.

Cautions: This study population of older male physicians with high educational attainment and superior knowledge of health care may not be representative of the general population.

Implications: Multivitamin use over an extended period in men aged 65 years or older had no demonstrable positive effect on cognitive abilities. Because the routine use of some vitamins may be harmful, providers may wish to rethink their recommendations about these supplements.

Falls

First- and Second-Eye Cataract Surgeries Are Risk Factors for Injurious Falls

Meuleners LB, Fraser ML, Ng J, et al. The impact of first- and second-eye cataract surgery on injurious falls that require hospitalization: a whole-population study. *Age Ageing.* 2013. [PMID: 24192250]

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Background: Cataracts, one of the leading causes of visual impairment in older adults, may lead to an increase in injurious falls. Although cataract surgery improves vision and quality of life, the effect on falls reduction is less clear, especially during the time before and after bilateral cataract surgery. This study analyzed the frequency of falls associated with cataract surgery in a large sample of adults aged 60 years or older.

Findings: This study documented injurious falls (that is, those requiring hospitalization) among 28 396 persons aged 60 years or older who had bilateral cataract surgery in Western Australia between 2001 and 2008. Using Poisson regression analysis, the investigators compared the frequency of falls in the 2 years before first-eye cataract surgery, the time between first- and second-eye cataract surgeries, and the 2 years after second-eye cataract surgery. The risk for an injurious fall doubled (risk ratio, 2.14 [CI, 1.82 to 2.51]) between first- and second-eye cataract surgeries compared with that in the 2 years before the first-eye cataract surgery. Subsequently, the number of injurious falls in the 2 years after the second-eye cataract surgery increased by 34% compared with that in the 2 years before first-eye cataract surgery (risk ratio, 1.34 [CI, 1.16 to 1.55]).

Cautions: Clinical characteristics of patients, such as functional status or use of medications, were not available.

Implications: These data suggest that an especially dangerous time for injurious falls is between the first- and second-eye procedures when risk is doubled. This increased frequency of serious falls is probably related to the difference in vision between the eyes. This risk is somewhat ameliorated after the second-eye cataract surgery. However, injurious falls still increased by 34% compared with the period before any surgery, which may be related in part to aging. These data have implications for primary care providers, who, in most communities, provide preoperative assessment and continue medical management between surgeries. This time frame is especially dangerous. Patients and families should be alerted. This is a time to assess the home environment for falls risk (for example, poor lighting, rugs, and obstacles); do a careful medication review; and limit the addition of any drugs that might potentiate falls, such as sedatives (4).

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The Grudge

Slick as a viper,
Fanged thoughts sink under skin,
Laying carnivorous eggs,
Like a spider wasp.

Leaving slimy slug trails,
The wriggling larvae,
Pupate into corrosive hate
So strong I can hear it.

The shrill wailing teakettle shriek
Of pressure-cooked shouts, packed in lies,
Crammed full and slammed shut
Like my suitcase when I left you.

Blame bubbles up from oily depths,
Collecting in corners,
Like the shriveled char
In a deep fryer, spewing smoke

That coats everything in a sticky black rime.
With burning eyes and stained lungs,
I crunch that angry, potato chip pain,
'Til the venom runs in my veins, I am poisoned.

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